

The
IOMA
Handbook
of
Logistics
and Inventory
Management

TEAMFLY

The
IOMA
Handbook
of
Logistics
and **Inventory**
Management

BOB DONATH, *Managing Editor*

JOE MAZEL and CINDY DUBIN, *Contributing Editors*

PERRY PATTERSON, *Editorial Director*



John Wiley & Sons, Inc.

Copyright © 2002 by IOMA. All rights reserved.

Published by John Wiley & Sons, Inc., New York.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 750-4744. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012, (212) 850-6011, fax (212) 850-6008, E-Mail: PERMREQ@WILEY.COM.

This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold with the understanding that the publisher is not engaged in rendering professional services. If legal, accounting, medical, psychological or any other expert assistance is required, the services of a competent professional person should be sought.

This title is also available in print as ISBN 0-471-44293-3. Some content that appears in the print version may not be available in this electronic edition.

For more information about Wiley products, visit our web site at www.Wiley.com.

CONTENTS

PART I LOGISTICS MANAGEMENT

1. Benchmarking Logistics Performance	3
1. Logistics Pros Reveal Secrets to Benchmarking Supply Chain Performance	3
2. Who's Benchmarking Logistics and How Are They Doing It?	6
3. New Study Reports That Small Firms Close the Gap on Logistics Excellence	10
4. WERC Study Discloses Logistics Managers' Plans to Increase Inventory Turns	13
5. Council of Logistics Management Says That the Best Logistics Metrics Have External Focus	16
6. Benchmarking Logistics: <i>Managing Logistics</i> and WERC Surveys Point Out What Firms Are Benchmarking and Why	21
7. <i>Exclusive Managing Logistics Benchmarking Study</i> : Logistics Wrestles with Service as Shipment Complaints Double	25
8. Take a Bow: Inventory-To-Sales Ratio Declines to Its Lowest in History	30
9. How Whirlpool and General Motors Create Meaningful Logistics and Inventory Benchmarks	35
2. Distribution	39
1. Ten Low-Tech Ways to Cut Cargo Theft	39
2. Four Steps to Optimize Your Distribution Network	43
3. Hot Logistics Products Showcased at Recent Distribution/Computer Expos	45
4. Expert Tips on How to Negotiate the Best Parcel Delivery Deals	54
5. Eight Site Selection Tips That Will Strengthen Your DC Network	56
6. Making Multivendor Consolidation Work in the Logistics Environment	59

7. How to Avoid a Legal Entanglement When Terminating a Distributor	63
8. APQC Study Analyzes Distributors' Best Inventory Practices	66
9. Use Virtual Transportation Control Centers to Integrate Carriers	69
10. Four Things to Keep in Mind When Outsourcing Freight Payment	71
11. Nine Ways That Logistics Pros Can Minimize Excise and Transportation Taxes	74
12. Achieve Perfect Order Fulfillment over the Internet <i>and</i> Reduce Costs	78
13. Five Ways to Raise the Effectiveness of Your Fleet Management Program	80
14. How Lucent's Merge-in-Transit Program Can Cut Your Logistics Costs	84
15. M&M/Mars Targets Goal of Shipping Only Perfect Orders	86
16. DaimlerChrysler Revs Up Parts Delivery to Boost Customer Satisfaction	89
3. International Logistics	92
1. How to Prepare Your Logistics Department for New Euro-Based Opportunities	92
2. Free Electronic Filing of Export Documents Speeds Process and Ensures Security	94
3. CAPS Reports on Ethics Issues in Offshore Sourcing	97
4. Going Global? Check Out These Sourcing Tips First	101
5. Ten Steps to Successful Global Logistics Retailing	105
6. Polaroid's Three-Step Approach to Successful Global Logistics	107
4. Controlling Logistics Costs	110
1. Exclusive Survey Reveals Five Best Practices to Control Logistics Costs	110
2. Use Activity-Based Costing to Improve Supply Chain Management and Reduce Logistics Costs	113
3. Assessing the Benefits and Dangers of Logistics Decision Support Systems	115
4. Logistics Pro Outlines Ten Ways to Reduce Your Supply Chain Management Costs	118
5. Thirteen Online Services Make Logistics Operations Faster, Easier, and Cheaper	122
6. Eight Techniques to Cut Freight Rates and Get Carrier Refunds	126
7. Logistics Managers Turn to E-Marketplaces to Cut Shipping Costs	129

8. Outsourcing Logistics Is Often the Best Option for Spin-Offs	132
9. <i>Exclusive Survey</i> : Inventory Control Is Key to Cutting Logistics Costs	134
10. How 3M Centralized Customer Service to Reduce Logistics Costs	138
11. How Caterpillar Revamped Logistics to Cut Costs and Improve Customer Service	141
12. Sprint PCS Identifies Three Ways to Reduce Reverse Logistics Costs	144
13. How Ingersoll-Rand Quantified Its Logistics Spending and Saved Millions	146
14. Ford Takes Control of Inbound Logistics to Cut Transportation Costs	148
5. Logistics Management and Strategy	152
1. How to Create a Logistics Strategy That Guarantees Competitive Advantage	152
2. Three Routes to ISO 9002 Certification of Your Logistics Operation	154
3. <i>Exclusive Survey</i> : Four Successful Logistics Strategies for Change	156
4. Ten Ways Logistics Managers Can Improve Supply Chain Productivity	160
5. <i>Exclusive Survey</i> : Twelve Tips for Solving Common Logistics Problems	163
6. Eight Steps to Determine Whether You Should Make or Buy a Warehouse Management System	165
7. Nineteen Training Tips That Will Reduce Logistics Staff Turnover	168
8. Six Steps to Solidify Supplier Partnerships	170
9. Where Outsourcing Is Changing Purchasing's Responsibilities	172
10. E-Fulfillment Is the Key to Logistics Strategies of Online Retailers	176
11. CEOs Now Look to Logistics Managers to Turn Customer Service Around	180
12. Four Ways to End a Logistics Outsourcing Relationship on the Right Foot	183
13. Council of Logistics Management Places Inventory Control at Center of Logistics Profession	187
14. Sequent Computer Systems Reveals Nine Secrets of Its Logistics Strategy	193
15. How Sprint Called on Logistics Managers to Support New Product Launches	196

16. Rite Aid Outsources Reverse Logistics to Focus on Core Business	197
17. How a Manager at Case Controls Strategic Alliance with Third-Party Logistics Providers	199
6. Software and Technology	202
1. New Study Reveals How to Select the Best Warehouse Management System for Your Needs	202
2. APICS Showcases New Logistics Management Software Solutions	206
3. Considering New Supply Chain Software? A List of the Leaders	210
4. P-Card and E-Comm Solutions Dominate NAPM Show	212
5. <i>Exclusive Survey</i> : New “Electronic” Ways to Improve Supplier Performance	217
6. Thomson’s Internet Initiatives to Leverage Purchasing Is TOPS	220
7. Internet Purchasing Poised to Drive Buying Strategies	223
8. Six Ways Logistics Managers Can Fulfill Internet Orders Quickly and Accurately	226
9. Outsourcing E-Logistics Allows Your Dot-Com to Focus on the Customer	229
10. Six Features to Look For in a Web-Based Procurement Solution	233
11. ERP Payback Calculation Must Include Process Improvement and Savings	236
12. Logistics Managers’ Needs Incorporated into New Product Development Software	238
7. Warehouse Management	242
1. How Efficient Is Your Warehouse Network? Free Analysis Available	242
2. Four Easy Steps to Motivate and Retain Your Warehouse Staff	243
3. Two Studies Identify Savings from Warehouse Site Relocation and Consolidation	247
4. Put Together a WMS Strategic Plan in Eleven Steps	251
5. A Lesson in Customized Warehousing for the Still-Skeptical Manager	254
6. Ten Strategies for Making Warehouse Operations a Success in the Twenty-First Century	259
7. WERC Study Identifies Best Methods to Integrate Warehouse Technology	261
8. WMS and EDI Capabilities Now Virtually Mandatory	265
9. Manage These “Hidden” Costs to Keep Your WMS Installation under Budget	268
10. Fifteen Points to Consider When Managing Warehouse Logistics	272

11. WERC Study Identifies Three Best Methods for Improved Order Accuracy	275
12. What the Retail Sector Can Teach Logistics Managers about Virtual Warehousing	279
13. <i>Warehousing Profitably</i> : a Great New Resource for Inventory Management and Staff	282
14. Slotting Techniques That Will Enhance Warehouse Efficiency and Productivity	286
15. Tomorrow's Warehousing Technology Is Available Today at Distribution/Computer Expo	289
16. Transformation of the Warehouse Now Key to Inventory Reduction	293
17. Advanced Voice-Based Technology Sharpens Warehouse Operations	296
18. Critical Attention to Details Brings Canon WMS Project Success	299
19. State-of-the-Art Tools Boost Bakery Crafts' Inventory Accuracy	302
8. Fifty-Four Tips for Improved Logistics Operations	305
9. New Logistics Products, Services, and Ideas	332

PART II

INVENTORY MANAGEMENT

1. Inventory Reduction Strategies: Insights from the Pros	387
1. APICS Forums: Potent Strategies for Inventory Reduction	387
2. How to Use Constraint-Based Manufacturing Resource Planning to Attack Inventory Carrying Costs	396
3. Kanbans, Done Right, Reduce Raw Material and WIP Inventories up to 70%	400
4. Cross Docking Comes of Age as a Working Inventory Reduction Tool	402
5. WERC Study Defines Key Factors That Improve Inventory Turns	406
6. Try Inventory Profile Analysis to Reduce Finished Goods Inventory	411
7. Flow-Through Inventory Works in Warehouse, Distribution, and Shop Floor	414
8. Barter Companies: A Better Way to Remove Excess Inventory	418
9. A Rewarding Approach for Reducing Excess Inventory: Donate It	420
10. Old SPC Concept Finds New Application with Inventory Management	422
11. Logistics Managers Detail Inventory Control Success with Automatic Replenishment Programs	426

2. Inventory Reduction Strategies: IOMA Readers Report	
What Works	430
1. <i>Exclusive Survey</i> : Eleven Hot New Tactics Managers Will Use to Pare Inventory	430
2. <i>Exclusive Survey</i> : Safety Stock Reduction Soars as Inventory Management Best Practice	434
3. <i>Exclusive Survey</i> : Thirteen Inventory Reduction Pros Reveal Their Best Practice Secrets	437
4. <i>Exclusive Survey</i> : Why Periodic Inventory Reviews Continue to Gain Favor as a Practice	440
5. <i>Exclusive Survey</i> : Fifteen Inventory Managers Explain Why Cycle Counting Is That Good	446
6. <i>Exclusive Survey</i> : How the “Best” of the Best Practices Are Used to Reduce Inventory	449
7. <i>Exclusive Survey</i> : How Managers Are Reducing Inventory with Technology and Software	453
8. <i>Exclusive Survey</i> : How Purchasing Applies Its Expertise to Drive Down Inventory	455
9. <i>Exclusive Survey</i> : Why It Is Necessary to Stay Focused on Usage, Lead Times, and Safety Stock	460
10. <i>Exclusive Survey</i> : Why More Inventory Ownership Is Being Shifted to Suppliers	463
11. <i>Exclusive Survey</i> : Reducing Excess and Obsolete Inventory Now Managers’ Biggest Challenge	465
12. <i>Exclusive Survey</i> : Twelve Practical Tips for Solving Recurring Inventory Problems	468
13. <i>Exclusive Survey</i> : Why Kanbans Are Now Catching the Attention of Inventory Managers	471
3. Inventory Reduction Strategies: Case Studies of Success	475
1. Ten Practical Techniques Help Case Corporation Cut Inventory Investment	475
2. <i>Case Study</i> : SCORE Model Roots Out Inventory in Cross-Company Supply Chain	478
3. How Hennessy Slashed Inventory 44% While Boosting Customer Service	482
4. Repetitive Manufacturing Lets ITT Automotive Make Major Inventory Cuts	485
5. Inventory Control in the Aftermath of an Acquisition: How Serengeti Managed It	486
6. How IBM Slashed Channel Inventory 50+% with Its Asset Management Tool	490

7. Gaming Equipment Company Hits Inventory Reduction Jackpot with Inventory Quality Ratio	493
8. Vermeer Manufacturing Goes “Lean” and Focuses on Inventory Reduction	497
9. Simple, Small Steps Create Big Inventory Cuts at Milgo Solutions	500
4. Technology/Computers/Software	504
1. <i>Exclusive Survey:</i> New Technologies Flex Their Muscles for Inventory Reduction	504
2. Expert Advice on Installing Inventory Software in Smaller Firms	513
3. Get Ready for the APS Revolution in Your Organization	517
4. Next-Generation APS Installation Reduces Inventory at Philips	520
5. What to Look for in a New Inventory Management System	523
6. 14 Inventory Control Software Modules Now Rated and Compared	525
7. New Inventory Management Software Introduced at National Manufacturing Week	532
8. Distribution/Computer Expo Provides Inventory Software Solutions for Every Need	534
5. Purchasing/Supplier Issues/Vendor Managed Inventory	539
1. VMI Takes Center Stage as Inventory Reduction Best Practice Tool	539
2. <i>Exclusive Survey:</i> New Applications Prove VMI’s Value as Tool for Inventory Reduction	543
3. <i>Case Study:</i> Textbook VMI Pays Dividends in Just Five Months	546
4. <i>Case Study:</i> Supplier Scheduling Plus VMI Equals Powerful Inventory Reduction Tool	549
5. How to Calculate the Savings Associated with VMI Programs	552
6. Where Purchasers Have Major Roles to Reduce Cycle Times	558
6. Audits and Physical Inventory/Accuracy	561
1. Cycle Counting Offers Quality Assurance for Inventory Managers	561
2. <i>Exclusive Survey:</i> How Thirteen Inventory Managers Are Expanding Cycle Counting Applications	565
3. It is a Major Challenge but Inventory Forecasts Can Be More Accurate	569
4. <i>Exclusive Survey:</i> Inventory Error Detection, Removal, Major Reason for Surge in Cycle Counting	573
5. How to Put Together an Inventory Accuracy Initiative That Works	576
6. APICS Experts Offer Ideas for Improving Forecast Accuracy	580

7. Benchmarks	585
1. New Study Benchmarks Best and Worst Plant-Level Inventory Performance	585
2. New Inventory Benchmarks Separate Profitable from Unprofitable Performers	590
3. <i>Exclusive Survey: Why Managers Prefer Inventory Turns to Days-on-Hand as Metric</i>	595
4. Four Logistics Pros Reveal Secrets to Benchmarking Inventory Management	599
5. U.S. High-Tech Sector Outdoes World in Inventory Performance	602
8. New Inventory Management Products, Services, and Ideas	608
9. Best Inventory Management Tips	668
1. <i>Inventory Reduction Report</i> Tips of the Month	668
2. More Tips for Inventory Managers	674
3. Facing Problems and Finding Solutions	678

PART III

SUPPLY CHAIN MANAGEMENT

1. Supply Chain Management: Insights from the Pros	729
1. What Level of Supply Chain Management Does Your Company Need?	729
2. Do Not Let Technology Be the Only Factor in Supply Chain Redesign	735
3. Two New Benchmarks Focus on Plant Site Purchasing Performance	739
4. Remove Supply Chain's Weak Links, No Matter Whose Fault They Are	742
5. Collaborative Strategies to Reduce Your Overall Supply Chain Inventory	747
6. Ten Factors Determine Whether You Are Ready for Supply Chain Synthesis	751
7. Today's Supply Chain Focus Demands Less Total System Inventory	757
8. Strategy Now Shifts to Managing Inventory as a Supply Chain Asset	761
9. Seven Reasons Logistics Managers Are Turning to eSCM Solutions	765
10. New VICS Guidelines Help Logistics Managers Implement CPFR	771

11. Supply Chain Software Eases Collaboration with Trading Partners	774
12. The Challenges and Pitfalls of Creating a Direct-to-Consumer Logistics Channel	776
13. Logistics Pros Offer Seven Ways to Reduce Supply Chain Unsalables	780
14. Two Manufacturers Share Tips for Forecasting Multi-SKU Selling Trends	782
15. New Definitions for Collaboration Enhance Supply Chain Management	786
16. Inventory Managers Need to Shorten the Global Supply Chain	790
17. Delaney Data Reveal No Inventory Reductions—Only Shifts in Supply Chain	793
18. Success with Outsourcing Inventory Management Begins with a Tight Contract	796
19. Certification Efforts Must Be Renewed to Boost Supplier Quality	799
20. Future Supply Chains Will Require Tighter Supplier Integration	803
21. Supplier Selection with a Difference: Getting Users Deeply Involved	806
22. Experts Reveal How They Measure Their Suppliers' Performance	809
23. Two New Studies Find Missed Opportunities in Supplier Management	812
24. Use These Scorecards and Audits in the Supplier Management Process	816
25. Are You Responsible for Your Supplier's FLSA Compliance?	822
26. Scorecards: Positive Reinforcement about Supplier Performance	826
27. More Purchasing Managers Benchmark Internal Customer Satisfaction	830
28. New Resource Helps Managers Conduct Supply Chain Audit	832
29. Purchasers Can Use the Supply Chain to Extend Its Capabilities	835
2. Supply Chain Management: IOMA Readers Report What Works	840
1. <i>Exclusive Survey:</i> Reducing Supplier Base Still Top Strategy for Purchasing Pros	840
2. <i>Exclusive Survey:</i> Supplier Consolidations Can Achieve 20–30% Price Reductions	843
3. <i>Exclusive Survey:</i> Supplier Consolidation Still Top Practice, but New Ones Emerging	846
4. <i>Exclusive Survey:</i> Supply Base Reductions Continue, but Not Just to Cut Costs	851
5. <i>Exclusive Survey:</i> Purchasing Pros Tackle Their Toughest Supplier Problems	854

3. Supply Chain Management: Case Studies of Success	857
1. Vermeer Gains Better Supplier Management by Going Lean	857
2. What Honeywell Requires of Its Resident Suppliers	861
3. Buyers Gain Influence in Hennessy's Supplier Development Process	864
4. Aggressive Supply Chain Management Pays Off for American Airlines	867
5. Sun Microsystems Sets Out to Develop a Long-Term Supply Chain Strategy	870
6. Eastman Sets Up CPFR in Its Logistics Operation	871
7. Why Intel Integrated Its Supply Chain Using the Internet	873
8. Kellogg's Optimization Model Ensures IT Adds Value to the Supply Chain	875
9. How Pioneer-Standard Applies SCM Strategies in Its Distributor Network	877
10. How Honda's Global Supply Chain Improves Its Inventory Control	880
11. How GTE's Supply Chain Meets Customer Demand with 40% Less Inventory	883
12. Pharmaceutical Giant SCORs with Winning Supply Chain Initiative	887
13. How Eli Lilly Worked with Suppliers to Attain 95% On-Time Delivery	890
14. Sikorsky's Kaizen Process Promotes Supplier Development	893
15. How Purchasing Rescued Lifetime's Materials Flow Process	897
16. Porter-Cable Transfers Schedule Responsibility to Its Suppliers	901
17. Strategic Sourcing Comes to Steelcase—With Impressive Results	903
18. D&B's No-Nonsense Approach Regenerates Purchasing Operation	907
19. Harley-Davidson's Pilot Builds Trust with Tier 2 and 3 Suppliers	909
20. Sequent Separates Strategic and Tactical Supplier Management	912
21. What One Company Is Doing to Boost Its Suppliers' Quality	916
4. Partnering Techniques and Negotiating	924
1. <i>Exclusive Survey</i> : Tap into the Flow of Improvement Ideas with Supplier Alliances	924
2. How to Transform Supplier Partnerships Into Supply Chains	927
3. Joint Service Agreement: The New Tool for Building a Closer Supplier Relationship	932
4. Expert Advice on How Best to End a Supplier Relationship	934
5. Eight Best Practice Tips on Building Supplier Partnerships	937
6. Practical Advice on How to Improve Your Supplier Partnerships	941

7. How to Create Synergy between Procurement and Logistics Departments	943
8. Supplier Feedback Encouraged as Buyers Expand Report Card Use	946
9. NAPM Conference Probes Supplier Development Strategies	948
10. Avoid Price Change Surprises by Spelling It Out in the Contract	953
11. How Purchasing Pros Are Expanding the Scope of Supplier Partnerships	957
12. Expert Guidance on How to Solidify Supplier Partnerships	958
13. Bring Suppliers Back to the Table after the Contract Is Signed	961
14. Now Is the Time to Review Purchase Order Terms and Conditions	964
15. Supplier Briefs Offer Control and Speed During Negotiation	968
5. E-Purchasing/E-Supply Chain	973
1. Embrace the Internet, but Do Not Let It Depersonalize Supplier Relationships	973
2. Three Experts' Advice on How to Start an E-Procurement Initiative	976
3. Hot E-Purchasing Tools from NAPM Meeting	980
4. APICS Introduces Audience to Hot New E-Purchasing Solutions	984
5. E-Procurement Selection in Just a Fraction of the Time, the Mobil Way	988
6. What You Need to Know Before Moving to E-Procurement	992
7. How the Internet Will Ultimately Transform Supplier Management	996
8. Expert Advice on Building Your Department's E-Purchasing System	998
9. Six Steps to Get Your Supply Chain Ready for Trading Exchanges	1003
10. How Web-Based Tools Are Fostering Supply Chain Collaboration	1007
11. Five Ways Leading Companies Can Become E-Supply Chain Innovators	1010
12. Web Exchanges Synchronize Supplier Relationships and Order Visibility	1013
13. Three New Studies Assess E-Supply Chain Service Providers	1015
14. Dozens of New Net-Based Logistics Solutions Aid Supply Chain Management	1018
15. Concentrate on Four Areas for Seamless E-tail Logistics	1020

PART I
LOGISTICS MANAGEMENT

Chapter I-1

Benchmarking Logistics Performance

LOGISTICS PROS REVEAL SECRETS TO BENCHMARKING SUPPLY CHAIN PERFORMANCE

In the current metrics frenzy, the “measure of the day” is the focus of most discussion and action. Unfortunately, this approach generates streams of short-term data but not much in long-term solutions. More emphasis should be given to the philosophy and development of the measurement process itself—in essence, “what we want to know, and what we are going to do when we find out about it.”

Those Who Have Craftily Applied Metrics

For instance, Baldrige award winner, Stephen H. Woodward, vice president of logistics and purchasing at Armstrong World Industries, Inc., Worldwide Building Products Operations (Lancaster, Penn.; shwoodwr@armstrong.com), believes, “Without an effective, well-defined and communicated strategy, it is difficult to set the ‘right’ type of measurement.” Further, he wants the feedback “quickly enough so the people receiving the metrics can initiate actions to correct the problems that have been uncovered.”

And, Alan L. Milliken, CFPIM, CIRM, and manager of supply chain projects at BASF Corp. (Mount Olive, N.J.; millika@bask.com) explains, “We’re looking for measurement processes, and not just a list of measurements.” To achieve this, he outlines some primary factors that performance metrics should provide. They should

- *Set expectations.* “We align our metrics within the organization and link them to our customers’ and shareholders’ expectations,” he explains.
- *Control.* The applied metrics should enable self-evaluation and facilitate control of linked performance.
- *Identify opportunities.* “We look to the metrics to quantify the gaps between performance and target, which then facilitates the development of our action plans,” he offers.

Create a Framework for Measurements

“There are many standards by which we judge performance measures, but the idea is to create the criteria first, before you just throw the individual metrics out there,” maintains J. Paul Dittmann, vice president of global logistics at Whirlpool Corp. (St. Joseph, Mich.; john_p_dittman@email.whirlpool.com).

He particularly recommends integration economy. “That’s really our challenge in the supply chain because trying to get all of the functions operating as a process can be difficult,” he notes. See the sidebar for other criteria.

Ways to Evaluate Performance Measures

Criterion	Description
Validity	The metric accurately captures the events and activities being measured and controls for any exogenous factors.
Robustness	The metric is interpreted similarly by the users and is comparable across time, location, and organization.
Usefulness	The metric is readily understandable by the decision maker and provides a guide for action to be taken.
Integration Economy	The metric includes all relevant aspects of the process and promotes coordination across functions and divisions.
Compatibility	The benefits of using the metric outweigh the costs of data collection, analysis, and reporting.
Level of Detail	The metric provides a sufficient degree of granularity or aggregation for the user.
Behavioral Soundness	The metric minimizes incentives for counter-productive acts or game playing and is presented in a useful form.

Source: J. Paul Dittmann.

Top Management Participation Is Critical

“It is essential to keep top management committed to the initiative,” insists Milliken. At BASF, for instance, the following tactics ensure that management’s attention is not diverted from the metrics initiative:

- *Integrate operational metrics into financial reporting.* “You don’t want to have one book for operational results and a separate one for financials; that gives the impression that operational results aren’t important,” he argues.
- *Include performance review at all staff meetings.* “We do not want periodic meetings to discuss performance measurements; it’s the worst thing in the world to have a separate meeting,” Milliken insists. “By integrating it into routine staff meetings, it sends a message that this is just as important as anything else on the group VP’s plate.”
- *Incorporate high-level metrics into management’s compensation objectives.* “If it doesn’t hit you in the pocket, it’s just not as important,” he notes. “Since 1998, we’ve been successful in having several nonfinancial measures, such as on-time delivery performance, begin to impact the pay of our group vice presidents.”
- *Include resources for the measurement process as line items in the annual budgeting process.* “We have shown that measurements consume resources. No matter how good a job we do, or how much we may restructure, we need resources. So, it now gets done,” he says.

Performance Measures Reflect Strategy

Before Whirlpool instituted its metrics program, the company “took a step back and asked, ‘What’s really important to us?’” Dittmann comments. “We found it was four things.” He cites them as customer service, cost, working capital, and cycle time.

“If that’s what is really important to us, certainly our measures have to capture those elements,” he explains. “We then set up a series of overarching principles for our supply chain measures. This is what we’re going to evaluate them by.” Among the factors are the following:

- *The measures must be global.* “We want the same supply chain measures in all regions of the world,” Dittmann describes. “They would not be

used punitively but to establish a framework from which we can create a dialogue and share best practices.”

- *They must be interlinked to avoid suboptimization.* If a measure for inventory is established, there would be an offsetting metric on customer service. “We don’t want to suboptimize one at the expense of the other,” he explains.
- *Measures must have an external link to economic value-added.* “We’ve discovered economic value-added is a measure that is the most direct link to stock price growth,” he explains. “Basically, it combines into one measure the balance sheet and income statement so you’re not only looking at one dimension (income) without considering the assets you’ve had to employ to generate that income,” Dittmann details.
- *Metrics must be fully communicated and understood throughout the organization.* Dittmann and the others insist on this. “Unless that’s the case, it’s all a waste of time,” Dittmann states. “Linkage is assurance that when we meet our nonfinancial goals, our strategic and financial goals are met as well.”

WHO’S BENCHMARKING LOGISTICS AND HOW ARE THEY DOING IT?

In an environment where customers demand more value-added services, it is important to measure value and costs. According to a recent *Managing Logistics* survey, however, only 25.3% of respondents say that benchmarking has been successful in helping to control logistics costs in the past year.

Respondents to the survey identified five main areas that they benchmark and updated us with their progress so far (see Table I-1.1). Topics include inventory accuracy, inbound and outbound shipment accuracy, and timeliness of inbound and outbound shipments.

For those who do benchmark, the results are something to brag about. “We began an increased level of service measurement and warehouse productivity measurements, both at the individual and total warehouse levels,” explains the director of operations for a small wire and cable firm in New York. “We have been able to reduce service complaints, which has also decreased our need for customer service staff.”

It is interesting to note, however, that the current benchmarks are slightly lower than those in the year-earlier *Managing Logistics* survey. This may be because newly implemented technologies are not used to their

Table I-1.1 Managing Logistics Logistics Benchmark Survey Results

Inbound shipments on time

	<i>Year earlier</i>	<i>Current</i>
Average	88.6%	88.2%

42.5% of companies had 92% or better on-time inbound shipments
 35.4% had on-time inbound shipments between 84.1% and 91.9%
 22.1% of companies said on-time inbound shipments were less than 84%

Outbound shipments on time

	<i>Year earlier</i>	<i>Current</i>
Average	94.0%	93.3%

38.1% of companies had 98% or better on-time outbound shipments
 35.1% had on-time outbound shipments between 90.1% and 97.9%
 26.8% had on-time outbound shipments less than 90%

Inventory accuracy

	<i>Year earlier</i>	<i>Current</i>
Average	94.1%	92.9%

49.7% of companies had 98% or better inventory accuracy
 27.8% had inventory accuracy between 90.1% and 97.9%
 22.5% said inventory accuracy was less than 90%

Outbound shipments with errors

	<i>Year earlier</i>	<i>Current</i>
Average	3.9%	2.9%

9.6% of companies had 8% or more outbound shipments with errors
 24.7% said their outbound shipments with errors were between 2.1% and 7.9%
 65.7% said their outbound shipments with errors were less than 2%

Inbound shipments with errors

	<i>Year earlier</i>	<i>Current</i>
Average	5.5%	4.7%

20.1% of companies said they had 8% or more inbound shipments with errors
 29.3% said their inbound shipments with errors were between 2.1% and 7.9%
 50.6% said their inbound shipments with errors were less than 2%

Source: Managing Logistics survey.

greatest potential or that labor cuts have left logistics departments less efficient than in the past.

How Companies Are Benchmarking

Three leading firms shared their benchmarking experiences with attendees at a recent Logicon conference in Atlanta. Representatives from Deere &

Co., Whirlpool Corp., and Xerox have each undertaken a benchmarking study and have experienced significant logistics productivity improvements as a result.

The case of Deere is of particular relevance, as the company set out to right wrongs causing long replenishment cycles, a loss of market share, and, ultimately, a loss in sales to the competition, explains Earl Brinkley, manager of logistics planning, North America, for Deere.

He explains, "All of our inventory was committed prior to the selling season with no inventory available to replenish unexpected sales." This ultimately led to a variance at the dealer and, if sales did not occur, to large unpaid inventories. A visit to other companies that had solved similar problems resulted in a new distribution system at Deere.

First, the company implemented an automatic replenishment system or perpetual ordering plan. Here, the dealer sets the desired inventory level and can change that level at any time. On a set day each week, the system automatically generates orders to bring inventory to the desired level. The dealer can also override and order any quantity and can place orders for emergency orders at any time.

Second, Deere set up distribution activities in one central consolidation center located in Streator, Ill. The factory produces to a predetermined forecast with variable production quantities. All factory production is moved to the Central Consolidation and Distribution Center (CCDC), and all dealer orders are sourced from there. The CCDC, owned and operated by a third party, charges customers based on space and units shipped, but Deere does guarantee that all deliveries will be shipped the next day.

The third improvement in Deere's distribution network comes in the form of a commitment to deliver within a maximum of seven calendar days, from order entry to delivery. This is done by submitting bids to less-than-truckload (LTL) carriers by region and notifying those carriers 24 hours in advance of shipping. This focus on fill rates, on-time shipments, error-free deliveries, and dealer satisfaction has led to the virtual elimination of the aforementioned headaches.

Key Steps in the Benchmark Process

Although the benchmarking process can vary from company to company, some basic elements must occur in every study:

1. *Identify a process to benchmark.* For example, J. Paul Dittmann says that the company focuses on four main areas: customer service, cost, working capital, and cycle time.

2. *Rank the measure.* Dittmann says it was important for Whirlpool to rank its processes according to the relevance they offer to all company stakeholders, at all levels in the organization and in the entire supply chain. Ranking the processes on a scale of 1 to 10 will give a good indication of which are most relevant and which should most actively be pursued.

3. *Identify the best in class for that process.* Xerox benchmarked itself against 15 other companies in the areas of service, inventory, and supply chain costs (see Figure I-1.1). “What we found was that no single company is best in all three areas,” says Mike Wilding, customer supply assurance manager at Xerox. “We can tell from the research that we are not best in class, but we sure are close.”

4. *Obtain customer feedback.* Asking your customers to rate your performance can generate valuable information. Xerox sent out a written questionnaire to its customers asking them to compare Xerox to its top competitor in several areas: ability to keep commitments, ease of contact, response to inquiry, flexibility, product quality, and product reliability.

Four areas were identified as most important to customers: reliability, responsiveness, relationship, and value. “These areas now guide our metrics,” says Wilding. “We know that customer satisfaction will help us retain, grow, and add customers.”

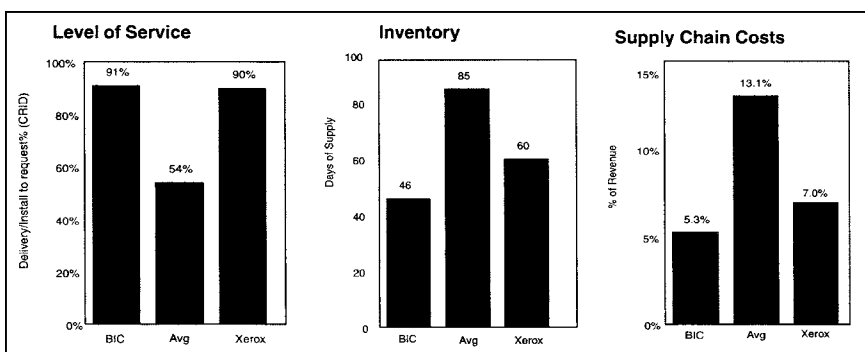


Figure I-1.1 Xerox Benchmarking Study

Source: Xerox.

5. *Implement measures.* Dittmann says that measures should be implemented based on a combination of difficulty and value. For instance, although trying to achieve the perfect order is important, it can be difficult. On the other hand, initiating a customer satisfaction survey is relatively simple to carry out and also carries a much greater value.

6. *Measure the results.* Whirlpool has driven 15 days out of its cash-to-cash cycle time, which Dittmann says equates to \$12 million per day of working capital that has been eliminated in the last year.

Xerox expects to see a 37% reduction in supply chain cost as a percentage of revenue and a 31% improvement in inventory as a percentage of revenue. Overall savings are estimated to be \$1 billion thanks to a reduction in supply chain costs and a decrease in inventory.

All three logistics pros stress that although they have realized, or expect to realize, dramatic results from their benchmarking strategies, such improvements start out slowly. “The curve is relatively flat in the early going but rises quite sharply when installations are further along,” says Dittmann.

NEW STUDY REPORTS THAT SMALL FIRMS CLOSE THE GAP ON LOGISTICS EXCELLENCE

New research from John Carroll University and West Virginia University finds that despite many differences, what large and small companies have in common is a dedication to transportation management issues. From an in-depth analysis of 116 firms, they found the following five parallels.

1. *Small and large firms exhibit dissimilar patterns of modal usage for outbound shipments.* With respect to outbound shipments (Table I-1.2), three modal forms—truckload motor carriage, parcel/express land, and railroad—exhibit significant differences between small and large firms. The strongest difference involves truckload motor carriage, in which nearly 50% of the large firms’ outbound shipment volume moves by truckload (TL) carriers, compared to slightly more than 20% by smaller firms.

Both groups rank the different types of motor carrier service—TL, LTL, and parcel/express land—as the three most important modal forms for outbound shipments. Railroads are the fourth most popular outbound form among large firms, compared to ninth most popular among small firms.

Table I-1.2 Modal Allocations of Outbound Shipment Volumes

<i>Modal Form</i>	<i>Percentage of Respondents</i>	
	<i>Small Firms</i>	<i>Large Firms</i>
LTL motor carriage	28.83	21.43
Parcel/express, land	25.46	8.57
TL motor carriage	21.43	47.96
Parcel/express, air	11.26	4.86
Other	6.15	0.04
Air freight	2.37	1.50
Rail-truck intermodal	0.33	1.29
Ocean	0.30	0.32
Railroad	0.22	7.00
Barge	0.00	0.11

Source: Comparing Logistics Management in Small and Large Firms: An Exploratory Study.

“Other,” consisting primarily of automobiles, ranks fifth among small firms, compared to tenth among large firms.

2. *Small and large firms do not share similar patterns of modal usage for inbound shipments.* The information in Table I-1.3 indicates differences between small and large companies in parcel/express air and railroad modes. Both railroad and rail-truck intermodal are ranked higher by larger businesses. However, regarding TL parcel/express land, both small and large firms rank them first and second.

3. *Small and large firms do not share similar inbound (shipment-origin) shipping patterns.* With respect to inbound shipments, small businesses are equally likely to have shipment origins within their home state as to have them in

Table I-1.3 Modal Allocations of Inbound Shipment Volumes

<i>Modal Form</i>	<i>Percentage of Respondents</i>	
	<i>Small Firms</i>	<i>Large Firms</i>
LTL motor carriage	30.69	46.10
Parcel/express, land	27.47	16.94
TL motor carriage	16.49	7.71
Parcel/express, air	13.73	2.29
Other	2.78	2.19
Air freight	2.07	1.26
Rail-truck intermodal	0.62	0.23
Ocean	0.56	11.48
Railroad	0.25	2.68
Barge	0.04	0.10

Source: Comparing Logistics Management in Small and Large Firms: An Exploratory Study.

Table I-1.4 Outbound Shipment Destinations and Inbound Shipment Origins

	Percentage of Shipments	
	Small Firms	Large Firms
<i>Destination</i>		
Home state	49.03	24.79
Other U.S. states	40.64	65.00
Non-U.S.	6.96	9.70
<i>Origin</i>		
Home state	46.22	27.69
Other U.S. states	46.77	59.97
Non-U.S.	5.68	12.31

Source: *Comparing Logistics Management in Small and Large Firms: An Exploratory Study*.

other U.S. states (see Table I-1.4). The most common shipment origin for large companies, by contrast, is other U.S. states.

4. *Small and large firms do not share similar outbound (shipment-destination) shipping patterns.* Small firms are more likely to ship to points located within their home state, whereas large firms are most likely to ship to other U.S. states (see Table I-1.4).

5. *Small and large firms do not share similar usage of select logistical intermediaries (e.g., international freight forwarders, transportation brokers).* Study participants were asked to indicate current usage of five possible logistics intermediaries (Table I-1.5). Not one of the listed intermediaries is used by more than 35% of the small firms. By contrast, four of the intermediaries are used by at least 40% of the large businesses.

On average, large firms tend to use more than twice the number of intermediaries as do their smaller counterparts. In addition, large firms are much more likely to employ the services of both international freight for-

Table I-1.5 Current Usage of Logistical Intermediaries

<i>Intermediary</i>	Percentage of Users	
	Small Firms	Large Firms
Domestic forwarder	35	57
Transportation brokers	26	40
International freight forwarders	19	63
For-hire warehouses	10	43
Steamship lines	9	31
Total no. of intermediaries	1.00	2.34

Source: *Comparing Logistics Management in Small and Large Firms: An Exploratory Study*.

warders and for-hire warehouses. International freight forwarders, the most popular intermediary among large firms, emerge as the third most popular among small companies. On the other hand, transportation brokers are the second most popular intermediary for small firms, compared to the fourth most popular among large companies.

From this research, the hope is that both large and small firms will discover that an increased understanding of logistics management often translates into a competitive edge.

For a copy of *Comparing Logistics Management in Small and Large Firms: An Exploratory Study*, contact Paul R. Murphy, professor of business logistics, John Carroll University, University Heights, OH 44118; James M. Daley, associate dean and professor of marketing, John Carroll University; or A. Michael Knemeyer, assistant professor of marketing, West Virginia University, Morgantown, WV 26506.

WERC STUDY DISCLOSES LOGISTICS MANAGERS' PLANS TO INCREASE INVENTORY TURNS

Data from the Warehousing Education and Research Council (WERC; Oak Brook, Ill.; 630-990-0001; www.werc.org) find that logistics managers are effectively increasing inventory turnover. One reason for improvement is the mandate by top management to reduce inventories.

Warehouse Inventory Turnover: Trends, Change Drivers, Measures, Using the Data reports that, on average, managers increased inventory turns 30% from 1995 to 1998 and were expected to improve another 27% by 2000, despite an increase in stock keeping units (SKUs), increased customer requests to reduce inventory, and marginal improvements in forecast accuracy.

The breakdown: Eighty-three percent report improving turnover between 1995 and 1998, whereas 17% experienced no change or a decline in turns; 89% expected to improve turns between 1998 and 2000, whereas only 11% expected to see turns stay the same or decline. Firms whose turns improved between 1995 and 1998 saw their inventory turnover increase by 38%, whereas those whose turns declined witnessed a 12% decrease. The expected increase by 2000 versus 1998 averages around 35%. Those expecting velocity to diminish forecast declines of 10%. Average turns in 1995 were 7.6; these firms projected that average turns would be 13.1 by 2000—an increase of 76%.

For firms whose turns decreased, top management paid considerably less

attention to inventory reduction than did management for firms whose turns increased, highlighting the influence of top management on the behavior of operating managers.

Manufacturers Show Better Turns

Manufacturers and wholesalers are the firms in the supply chain that have traditionally carried the heaviest inventory burden. On average, however, manufacturers, retailers, and wholesalers have made positive changes in inventory turns and expect improvements by 2000. Fewer retailers experienced an improvement in turns between 1995 and 1998 compared to their wholesaler and manufacturer counterparts. Only 63% of the retailers indicated that turns had increased since 1995. Wholesalers were the most optimistic in turns by the year 2000, as 90% expected to improve turnover. Similarly, 83% of manufacturers and 78% of retailers expected turns to increase by 2000.

Warehouse Combinations Pays Off

The survey indicates that goods flowing through either private or a mixture of private and third-party warehouses have higher inventory turns than do goods moving through third-party operations alone (Figure I-1.2). However, firms whose products flow only through third-party warehouses report the largest percentage increase in turnover from 1995 to 2000—from 5 to 11 turns. The size of a warehouse does not impact inventory velocity (Fig-

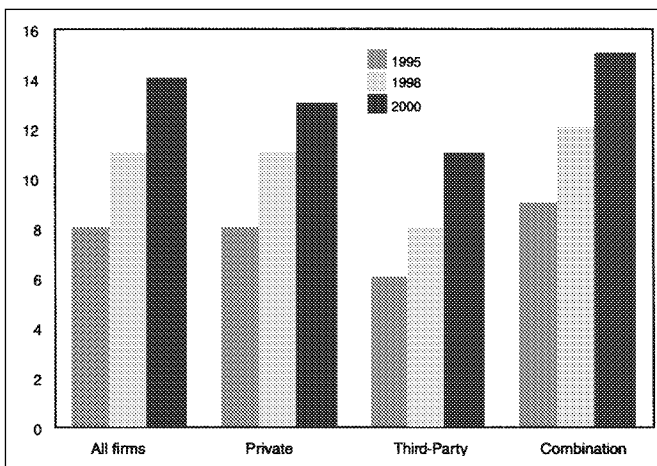


Figure I-1.2 Inventory Turns Based on Warehouse Type

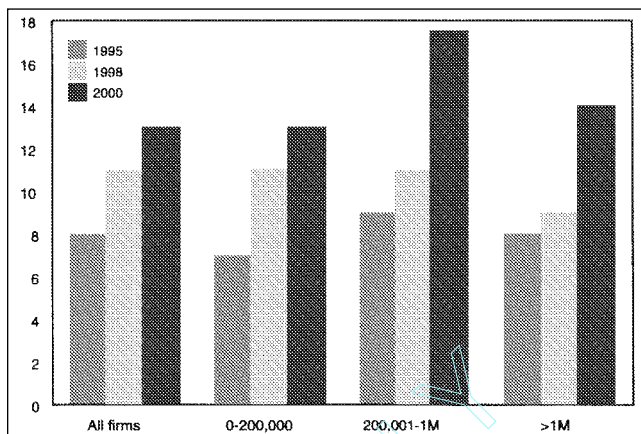


Figure I-1.3 Inventory Turns Based on Warehouse Space

ure I-1.3), although firms with over one million square feet anticipate higher turnover rates than do smaller warehouses.

SKU Impact on Turn Rates

The data also suggest that the wider array of SKUs flowing through facilities (76% report an increase in SKUs from 1995 to 1998) has affected inventory turns (Figure I-1.4). Turns are better when the number of SKUs is below 1,500. The averages for firms in this bracket were 10.9 in 1995, 14 in 1998, and 17.1 expected by 2000. According to WERC, these data support the

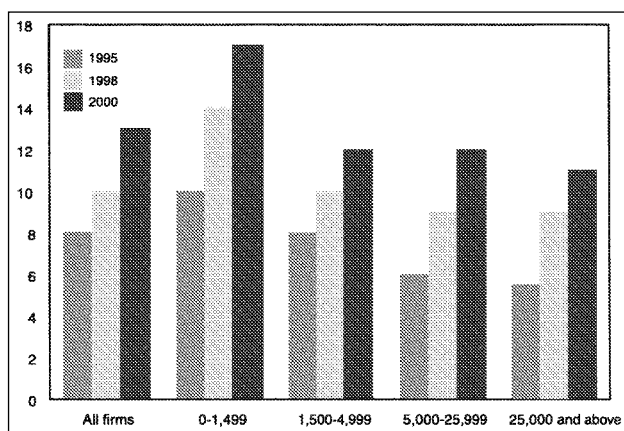


Figure I-1.4 Inventory Turns Based on SKUs

Table I-1.6 Factors Predicted to Drive Change in Inventory Turns by 2000

	<i>Percentage of Respondents</i>
Improved systems, inventory management software, warehouse management systems	16.2
Reduced production/delivery lead time/just-in-time	15.0
Improved forecasting	10.7
Application of supply chain management principles	9.6
More attention to inventory management	6.6
Reductions in SKUs	5.1
Increased throughput	4.0
Elimination of dead inventory	4.0
Inventory costs	3.3
Utilization of cross docking	1.5

Source: Warehouse Inventory Turnover, Warehousing Education and Research Council.

theory that the negative impact of SKU proliferation on inventory velocity increases and eventually levels off.

Food Companies Enjoy Highest Turns

Food companies and food retailers boast the greatest level of inventory turnover. All food companies averaged 14 turns in 1995 and 17 in 1998 and expected 20 in 2000. Conversely, companies in the automotive and repair parts business and those in apparel and clothing report considerably lower results. Hardware/tools and chemicals and consumer household products tended to be on the low side as well, but paper, medical supplies, and consumer electronics were average or above the overall averages of 8 in 1995, 10.4 in 1998, and 13.2 in 2000.

Changes Expected in 2000

According to the responses, software and inventory management tools were estimated to have the most impact in turnover at the end of 2000 (16.2%). Improved forecasting ranked third (10.7%), followed by reduced lead times (15%) and supply chain management principles (9.6%). See Table I-1.6.

COUNCIL OF LOGISTICS MANAGEMENT SAYS THAT THE BEST LOGISTICS METRICS HAVE EXTERNAL FOCUS

Recent research on logistics measurement programs at more than 350 companies finds that although the majority measures the performance of some logis-

tics activities, few measure performance where it really counts. The problem is that most logistics managers focus their measurement internally, on the performance of warehousing, transportation, and other logistics activities. Alternatively, the research team, from the University of Tennessee and Computer Sciences Corporation, insists that metrics should be focused externally on the customers and suppliers. “Logistics measurement itself has focused on monitoring the performance of individual logistics functions instead of tracking the performance of end-to-end logistics processes,” the researchers observe.

Their research has been captured in an excellent resource, *Keeping Score: Measuring the Business Value of Logistics in the Supply Chain* (Council of Logistics Management; CLM). It is a detailed reference and resource of concepts, strategies, and methods for launching the “new” logistics metrics to inspire greater supply chain collaboration efficiency.

Lessons Learned For Good Logistics Measurement

They are based on the successful logistics measurement programs of companies such as 3M, International Paper, Motorola, Welch’s, Tyson Foods, Graybar, Texas Instruments, and Caliber Logistics. The critical lessons include the following:

- *Ensure that logistics measures are in sync with strategy.* Different business strategies have different implications for logistics. For example, being the low-cost provider means having efficient logistics operations, which can conflict with a strategy of providing tailored customer service. Effective logistics measures help managers execute their company’s strategy.
- *Truly understand customer needs.* Do not assume that you know what customers expect or that their needs will remain static. What is important today might not be critical tomorrow.
- *Know your costs in providing logistics services.* Deciding how much customer service to offer and at what price requires comprehensive cost measures. With this information, managers can do sophisticated cost-benefit analyses on different logistics-services scenarios.
- *Take a “process” view of logistics.* Logistics measures must be defined first at the business process level—not the functional level—of an organization. This means grouping all logistics activities into three key processes: sourcing-procurement, fulfillment, and planning-forecasting-scheduling-planning.

“The day when companies across a supply chain use the same measures to monitor their combined performance will be the day when order-of-magnitude improvements in logistics performance across the supply chain will be truly possible,” the researchers insist. However, most industries are not at the point of making this a reality because there is little agreement today in any supply chain about how to measure performance, the team notes. “Companies can start down this road of supply chain improvement by instituting process measures with key customers and suppliers,” they insist.

- *Focus only on key measures.* Although there are hundreds of ways to track logistics performance, about two dozen measures are important (see Table I-1.7). These are process measures. They track overall performance of sourcing/procurement and the fulfillment processes in time, cost, and quality. Measures of logistics functions and activities must be derived from these process measures.
- *Stop ineffective measurement activities.* Measures are ineffective when they are subjective, when they obscure bad performance, and when

Table I-1.7 Process Measure Categories

Time	Cost
On-time delivery/receipt	Finished goods inventory turns
Order cycle time	Days sales outstanding
Order cycle time variability	Cost to serve
Response time	Cash-to-cash cycle time
Forecasting/planning cycle time	Total delivered cost
Planning cycle time variability	Cost of goods ^b
Quality	Transportation costs ^b
Overall customer satisfaction	Inventory carrying costs ^b
Processing accuracy	Material handling costs ^b
Perfect order fulfillment ^a	All other costs ^b
On-time delivery ^b	Information systems ^b
Complete order ^b	Administrative ^b
Accurate product selection ^b	Cost of excess capacity
Damage-free ^b	Cost of capacity shortfall
Accurate invoice ^b	Other/Supporting
Forecast accuracy	Approval exceptions to standard
Planning accuracy	Minimum order quantity ^b
Budgets and operating plans ^b	Change order timing ^b
Schedule adherence	Availability of information

^aContains a time component

^bIndicates a component of a process measure—shown as explanation

Source: *Keeping Score: Measuring the Business Value of Logistics in the Supply Chain.*

they provide misleading statistics. Many measures used today are subjective. For example, rating a supplier's on-time performance on a scale of one to five without data on the percentage of deliveries that arrive as promised is a subjective measure. To be useful, logistics measures must be objective. Customer surveys that average a company's performance across several measures such as on-time delivery, cycle time, and accuracy make it difficult to pinpoint problems. Furthermore statistics can be used to distort reality.

- *Use information technology.* Gathering, processing, and analyzing thousands, even millions, of bits of information every day on logistics performance require advanced information systems. Some organizations do not capture the right information, however. Other companies capture information differently in each business function or business unit. Trading partners usually gather logistics information differently, which makes it difficult to compare logistics information. Fortunately, as the research team points out, several major technology developments spell progress for logistics measurements. Supply chain management systems, enterprise resource planning software, and data warehouses are some of the solutions. Information technology rapidly is becoming a powerful tool for logistics measurement, the research team concludes.

Instituting Effective Logistics Measurement

This study is valuable not only for its identification and definition of effective process measures but also for its recommended methodology of implementing them. To summarize, managers must first assess the measures already in place. The emphasis should be on identifying the measures themselves, and not on the performance level that those measures are indicating. Managers must then develop process measures such as on-time delivery, complete order cycle time, total delivered cost, and quality of product received. The emphasis on the process measures will depend on the company's business strategy.

After prioritizing which process measures to develop first, logistics managers can build a prototype solution to test in the field. This initial model may lack data that will be required later. However, the prototype lets managers work out the bugs before they make major investments in collecting data and developing new information systems.

The measures are revised, sometimes several times, before they are rolled out. Before they institute the measures, logistics managers must educate employees on how to use them. They also must revise incentive systems so that old measures and reward systems do not impede the new measures.

Ten Characteristics of Good Measures

According to the council's 10 basic characteristics of good logistics measures, a measure

1. *Is quantitative.* The measure can be expressed as an objective value.
2. *Is easy to understand.* The measure conveys what it is measuring and how it is derived.
3. *Encourages appropriate behavior.* The measure is balanced to reward productive behavior and discourage game playing.
4. *Is visible.* The effects of the measure are readily apparent to all involved in the process being measured.
5. *Is defined and mutually understood.* The measure has been defined by or agreed to by all key process participants (internally and externally).
6. *Encompasses both outputs and inputs.* The measure integrates factors from all aspects of the process measured.
7. *Measures only what is important.* The measure focuses on a key performance indicator that is of real value to managing the process.
8. *Is multidimensional.* The measure is properly balanced between utilization, productivity, and performance and shows the tradeoffs.
9. *Uses economies of effort.* The benefits of the measure outweigh the costs of collection and analysis.
10. *Facilitates trust.* The measure validates the participation among the various parties.

Keeping Score is available from Publications Department, Council of Logistics Management, 2805 Butterfield Road, Suite 200, Oak Brook, IL 60523; 630-574-0985; fax, 630-574-0989. Price: \$35 for CLM member; \$70 for nonmembers.

BENCHMARKING LOGISTICS: MANAGING LOGISTICS AND WERC SURVEYS POINT OUT WHAT FIRMS ARE BENCHMARKING AND WHY

According to a recent *Managing Logistics* survey of logistics professionals, benchmarking is quickly becoming a standard logistics practice primarily because it is a successful cost-cutting strategy. In the logistics/transportation industry, 45.5% use it as a cost-cutting tool: 26.5% in consumer manufacturing and 23.6% in industrial manufacturing.

The push for quality improvements in overall products or services is another incentive for benchmarking. Approximately 52.4% of respondents indicate this as their motivation in a recent benchmarking study conducted by the WERC. Establishing a management control process (43.5%) ranks as the second most popular reason for benchmarking, followed by top management requirements to reduce costs (34.3%).

The least compelling reason to benchmark was customer suggestion/requirements, with less than 10% of the respondents reporting (see Table I-1.8). Firms that rely on benchmarking state that better management controls and improved standard warehouse operating procedures are the most common benefits (see Table I-1.9).

Table I-1.8 Factors Influencing Benchmarking

	<i>Percentage of Responses</i>
Quality improvements	52.4
Management controls	43.5
Reduce costs	34.3
Best practices	26.8
Competitive pressure	23.0
Customer requirement	9.7

Source: Warehousing Education and Research Council.

Table I-1.9 Primary Benefits From Benchmarking

	<i>Percentage Reported</i>
Improved standard warehouse operating procedures	45.9
Better management controls	45.7
Reduced warehousing costs	41.1
Reduced inefficiencies in material handling	39.7
Improved customer service	34.6
Improved utilization of facilities	33.9

Source: Warehousing Education and Research Council.

Internal Benchmarks Are Most Popular

Companies that describe themselves as small compared to others in their industry are less likely to benchmark warehouse operations than are medium or large companies. Further, companies in the automotive and pharmaceutical/medical industries are more likely to benchmark operations, reporting 82.2% and 71.9%, respectively. The chemical industry was the least likely, with only 26.3% responding.

For most of these companies, benchmarking involves primarily a comparison of internal operations. Approximately 60% of the individuals indicated that a comparison of internal operations was the most popular benchmarking technique, but it is less common for small firms than for their larger counterparts.

Among respondents, 21.2% indicated that their firms regularly compare their performances to similar functions in the same industry or to an industry leader. Benchmarking of business functions across industries was reported by 11.5% of respondents; the remaining 8.9% indicated a specific competitor-to-competitor comparison by product or function.

Three Years Is the Magic Number

Smaller organizations seem less likely to benchmark and are more likely to have started benchmarking later than are medium and large firms. According to the survey, 20% of firms with less than 500 employees are benchmarking, whereas 30% of firms with over 500 employees are using it as a tool.

Most individuals reported that their firms have been benchmarking warehouse operations for three years or fewer (63.7%). However, 57% of all responses were from individuals whose firms have been benchmarking for between one and three years.

The WERC study reveals that only 20.6% of the small firms have been benchmarking for more than three years compared to 36.3% of medium firms and 43.5% of large firms. In addition, large companies are more than twice as likely to have been benchmarking for over five years than are small firms (27.8% vs. 13.2%).

Low Levels of Sophistication

Nearly 80% of respondents indicated a range of two to three on a five-point scale (five being the best) when asked about the level of sophistica-

tion in benchmarking. The average rating was 2.51. Approximately 6.3% considered their firms to be novice, whereas 2.1% rated their firms as expert.

Respondents in the automotive industry reported the highest level of perceived sophistication. The top two mean ratings were 2.89 for the automotive industry and 2.61 for the consumer goods sector. Respondents reporting from the chemical industry possess the lowest level of perceived sophistication, at 2.16.

What and How to Benchmark

No matter what the level of sophistication, the most common areas for benchmarking are at the beginning, middle, and end of the warehousing process. Receiving, order picking/packing, and shipping were the only functional areas benchmarked by more than half of the respondents. As indicated in Table I-1.10, the shipping function received the largest percentage, with 57.6% of the firms reporting.

The areas benchmarked were significantly different depending on the size of the firm. Medium and large firms reported benchmarking more warehouse activities than smaller firms. Specifically, the medium and larger firms were more likely to benchmark the entire warehouse process from receiving to putaway and storage, order picking and packing, shipping and returns. Respondents from smaller firms indicated that shipping and receiving were the two areas currently being benchmarked.

Over half (53.6%) of respondents indicated that they used real input to real output as their measure for benchmarking. This is compared to 41.6% using real output to standard and 29.9% measuring capacity used to total capacity available.

Table I-1.10 Functional Areas Being Benchmarked

<i>Functional Area</i>	<i>Percent Indicating</i>
Shipping	57.6
Order picking/packing	53.2
Receiving	50.9
Quality issues	37.0
Putaway	31.8
Storage	30.4
Returns	22.0
Damage control	20.5

Source: Warehousing Education and Research Council.

People and Technology Are Essential

For those having difficulties with benchmarking, resource issues (people and technology) stand out as one of the top three obstacles by 59.6% of the respondents and as the number one obstacle by 28.3% of all respondents. This far outpaced time constraints, cited by 44% (13.6% reported this as the number one obstacle), and insufficient availability of benchmark data, which had a 39.4% response rate (reported as the number one obstacle by 11.4% of respondents). Other obstacles included lack of proper training, lack of top management support, and the fact that the company sees no value in benchmarking.

Benchmarking will, however, become increasingly common in warehouse operations. Only 1.6% of the respondents indicated they would either

Determining Benchmarking Success

If you're thinking about benchmarking your warehouse operations, ask yourself the following questions and answer "yes," "no," or "don't know."

- Is there currently a focus on the quality improvement process in your company and warehouse?
- Is benchmarking the correct quality strategy for your warehouse?
- Do you have an idea of what needs to be benchmarked in the warehouse operation?
- Do you know what should be measured within the benchmarked areas?
- Is your benchmarking going to have an internal or external focus?
- Do you have any ideas about with whom you should benchmark?
- Do you know where to get the benchmark data required to effectively measure activities?
- Do you have an implementation plan for benchmarking?
- Are there measures of success developed for the benchmarking program?
- Does your company possess the resources to manage an ongoing benchmarking process?

If you answered "no" or "don't know" to more than one of these questions, the success rate for benchmarking is significantly diminished.

Table I-1.11 Benchmarking in the Next Two Years

	<i>Number of Responses</i>
Will not consider	5
May consider	104
Continue current	68
Expand	182
Discontinue	1

Source: Warehousing Education and Research Council.

not benchmark operations or discontinue it. Half of the respondents indicated that they would expand operations (see Table I-1.11).

Industries that expect the most benchmarking expansion are automotive and industrial and office products, with 58.8% and 57.3% expecting to expand the practice, respectively. About 68% of responding companies currently benchmark, and nearly 50% said they plan to expand benchmarking activities in the next two years. Fewer than 2% will not be benchmarking.

**EXCLUSIVE MANAGING LOGISTICS
BENCHMARKING STUDY: LOGISTICS WRESTLES
WITH SERVICE AS SHIPMENT COMPLAINTS DOUBLE**

Key performance indicators (KPIs) help logistics managers track their progress against short-term goals and strategic plans. Because of the many benefits they bring to customer service, they are suddenly receiving increased attention. With this in mind, *Managing Logistics* researched how well managers have done on their KPIs. What it found was for the most part encouraging: Outbound on-time shipments increased from the previous year, as did inventory accuracy (see Table I-1.12). However, there was one major and troubling exception: The percentage of customer shipment complaints more than doubled this year over last. The question is whether customers are more likely to complain today or whether there actually is a growing problem. Whichever the case, customer service is at issue, and benchmarking can uncover individual company service levels.

How and What to Measure

Although there are many supply chain processes to measure (see Table I-1.13), customer service is perhaps the most critical. It is the most robust indication that the enterprise’s internal business processes are working to

Table I-1.12 KPI Results

	By Company Size				
	<i>Up to 500</i>	<i>Over 500</i>	<i>2000</i>	<i>1999</i>	<i>1998</i>
	<i>Employees</i>	<i>Employees</i>			
% inbound shipments on time	86.9	87.3	86.8	88.2	88.6
% outbound shipments on time	93.1	94.8	94.1	93.3	94.0
% inventory accuracy	95.6	93.9	94.6	92.9	94.1
% outbound shipments with errors	4.8	3.2	3.8	2.9	2.9
% customers with shipment complaints	3.7	6.6	5.6	2.6	2.8

	By Company Type	
	<i>Industrial</i>	<i>Consumer</i>
	<i>Manufacturing</i>	<i>Manufacturing</i>
% shipments on time	84.2	90.7
% outbound shipments on time	92.8	94.6
% inventory accuracy	93.8	96.7
% inbound shipments with errors	5.4	5.9
% outbound shipments with errors	8.8	4.0
% customers with shipment complaints	4.3	4.9

Source: *Managing Logistics Readership Survey*.

optimize the needs of the customer and the goals of the enterprise. The survey of logistics managers indicates that KPIs have helped them identify obstacles attaining high customer service performance levels.

“We define and publish logistics key performance indicators to help us understand what the customer issues are and what we need to do about them,” says the logistics manager for a small company in Ohio. “We prepared a complete logistics plan that was SMART [specific, measurable, achievable, realistic, and time-phased],” says a director of logistics for an office furniture manufacturer in Michigan. “This led to clear measures that enable us to track customer service level performance.”

KPIs Are Windows to Customer Satisfaction

Logistics managers also tell us that they measure a series of KPIs to determine how well they are meeting customer satisfaction. These include percentage of shipments on time, percentage of outbound shipments on time, inventory accuracy, percentage of outbound shipments with errors, and percentage of customers with shipment complaints.

None of the managers is reporting high enough percentages (nearing

Table I-1.13 Customer-Focused KPIs

<i>Supply Chain Process Measure</i>	<i>Metric</i>
<i>Customer service goals</i>	<ul style="list-style-type: none"> • Order fill rate • Line item fill rate • Dollar fill rate • Cycle time • Variability • On-time delivery • Back-order duration • Perfect order fill rate • Customer satisfaction
<i>Asset management goals</i>	<ul style="list-style-type: none"> • Inventory days of supply • Inventory accuracy • Inventory turns • Cash-to-cash cycle time
<i>Forecast accuracy goals</i>	<ul style="list-style-type: none"> • Orders vs. sales forecasts • Shipments vs. forecasts
<i>Costs goals</i>	<ul style="list-style-type: none"> • Various costs • Unite product costs
<i>Value-added goals</i>	<ul style="list-style-type: none"> • EVA
<i>Manufacturing resource planning goals</i>	<ul style="list-style-type: none"> • Percentage of complete shipments on time • Actual sales vs. plan • Warehouse receipts vs. orders • Percentage of items completed • Manufacturing cycle time • Conformance to product specification • Percentage of schedule changes • Schedule adherence • Actual production to plan • Conforming product released for shipment • Balanced inventory and production costs

Source: AMR Research, Inc.

99.9%). In addition, according to the data, customer complaints have increased at many companies, indicating that managers are either not relying on enabling technology or not keeping on top of tracking performance. One consumer products manufacturer found that line fill (percentage of units ordered that shipped on time) was a contributing factor in several significant issues. Poor line fill led to empty retail shelves and market share decline because consumers had branded alternatives available to them. Retailers were reluctant to take new product listings because of missed promises on previous items. On-time shipment performance was reduced as orders were held pending receipt of product, and order entry errors and delays led to

higher deductions from customers, resulting in a negative impact on profits. Developing and implementing customer-focused KPIs is now helping this company turn the situation around.

A Customer Focus in Manufacturing

According to Roddy Martin, an analyst with AMR Research, Inc. (Boston; 617-542-6600), companies realize that logistics and manufacturing departments must work together to achieve high levels of customer satisfaction. One leading global food manufacturer focuses on reducing “time and touch” on the product as a basis of building responsiveness and agility. For example, information about inventory replaces physical inventory, and accurate demand and sales information allows the manufacturer to produce to meet market need. Demand-driven product will help manufacturers make accurate forecasts and alleviate problems with excess inventory and shortages.

The improved availability of information helps manufacturers execute global consolidation strategies. Global manufacturers are implementing KPIs based on optimization of global inventory, orders and materials. Consider Nestle SA’s plan to implement mySAP.com as a standard across 233,000 global users in an attempt to harmonize Nestle’s global information technology (IT) infrastructure within its global supply chain. This will allow an integrated global supply chain with KPIs that support processes that increase the visibility of orders, inventory, and commodity purchases across the enterprise.

Why Measure Customer Service

Supply chain consultants at Dechert-Hampe & Co. (Mission Viejo, Calif.; 949-586-6868) believe that whatever KPIs you choose to measure, they should complement your organizational goals and your customers’ goals. To bring about the desired results, make sure you understand why you are measuring customer service performance in the first place.

- *Measure to motivate:* The act of measurement will improve the performance of the process by directing the attention of management and employees to the process. KPIs will motivate individuals to examine their contributions, take corrective action, and drive improvement.
- *Measure to align:* KPIs need to be based on customer requirements that are established first at the company level. Then they must be fil-

tered down through the organization to areas in which employees have a “line of sight” on the impact of their performance on the objective.

- *Measure to improve:* Business processes need constant refinement to reflect changing requirements. Thus, measurements should be established to improve the output of a particular business process.

Implementation Considerations

Once you know which KPIs you will measure and understand the reasons why you have chosen those particular metrics, consider the following:

- *Data sources.* Matching the appropriate data to your metric can be a challenge. Often, the data required do not reside in the same system. The various data sources should be identified and mixed and matched for each metric.
- *Data extractions.* If queries are required from multiple systems and databases, how the data are extracted and merged is a concern. Database managers and functional leaders need to understand the data’s source and composition.
- *Data elements.* There may be issues with the way in which transaction-processing systems capture data versus the data elements that are required for the measurements. Before you implement any measurement, validate what data are available.
- *Assigning responsibility.* Will IT or a functional user be responsible for generating reports to get the required information? Who will have responsibility for converting data to formats for analysis? These responsibilities need to be clearly assigned and understood.
- *Commitment.* Both management and those directly responsible for delivery against the metric must follow up on the measurement’s message. By searching for root causes and then following up with appropriate corrective action to implement solutions, you achieve sustained metric improvement.
- *Presentation.* The metrics must be displayed in a simple, meaningful way. Reformatting data into a graphical display is very important.
- *Hierarchical approach.* Measurements should exist at the enterprise level and drill down to the other levels of the organization. Maintain a

line-of-sight relationship between the metric and the organizational level's ability to improve the metric.

- *Appraisal and compensation.* These activities should be tied to the metrics. This assures that all associates understand the importance of organization improvements and the evaluation of their own performance.

TAKE A BOW: INVENTORY-TO-SALES RATIO DECLINES TO ITS LOWEST IN HISTORY

It's been banner times for inventory management. "Business logistics costs were equal to 9.9% of U.S. gross domestic product (GDP), and investment in inventory became much more efficient than ever before," reported Robert V. Delaney, vice president of Cass Information Systems, a subsidiary of Cass Commercial Corporation (Bridgeton, Mo.; www.casinfo.com).

Commenting in the *11th Annual State of Logistics Report* (cosponsored by Cass Information Systems and ProLogis of Aurora, Colo.), he ventured that the "growing use of the Internet and the trends in electronic commerce appear to be improving the visibility of inventory and its location within our supply chains."

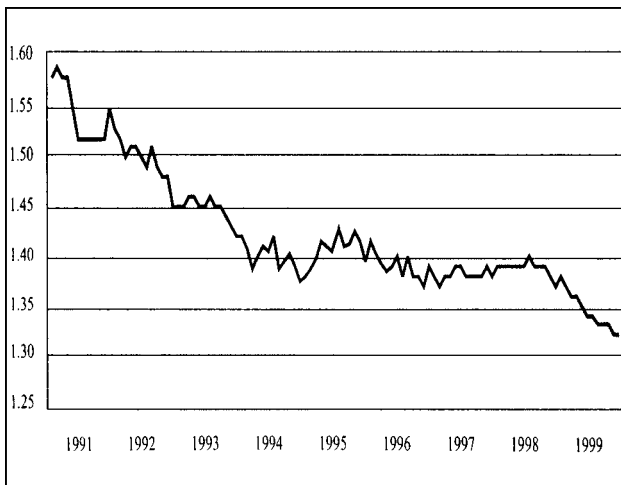


Figure I-1.5 Inventory-to-Sales Ratio Plumets to Record Low

Source: *11th Annual State of Logistics Report*.

What a Difference a Year Makes

“We were disappointed to report previously that the inventory-to-sales ratio had been stuck in a band between 1.38 and 1.40 months of supply since 1996,” Delaney said. “We did not appear to be taking inventory out of the system—merely shifting where inventory was held within the supply chain.” Further, disappointment was registered with estimates that some 40% of U.S. companies planned to stockpile items as part of their contingency planning.

Instead, the inventory-to-sales ratio steadily declined from 1.38 months of supply in January to 1.32 months of supply at year-end (see Figure I-1.5). Delaney also observed, “The ratio fell even further, to 1.31 months of supply, in April of the next year.” These data are based on the revisions to the National Income and Product Accounts by the U.S. Department of Commerce (see sidebars).

“This was a record low in the history of the revised data,” he noted. To

Storm Clouds on the Inventory Horizon?

The U.S. Department of Transportation’s Federal Motor Carrier Safety Administration has proposed revisions to its hours-of-service regulations that could sap all of this current enthusiasm and send inventory levels spiraling. One of the proposals would limit long-haul and regional drivers to no more than 12 hours on duty in a 24-hour workday, with 2-hour breaks. Also, the driver would not be allowed to work for more than 60 hours in any workweek.

According to Robert V. Delaney of Cass Information Systems, who calculated a “best efforts estimate” of new regulations, the following might be the effects over a three-year period:

- \$50 billion increase in expenditures for trucking services, because as many as 20% more trucks could be on the nation’s road system, with the new regulations increasing costs by about \$.20 per pound
- \$100 billion of unneeded inventory, as the proposed regulations would require additional safety stocks at each point of the supply chain system, which could increase even higher with the ever-shortening procurement cycles
- \$25 billion of additional inventory carrying cost

“This analysis reveals how transportation and inventory costs are integrated,” Delaney concludes.

Government Revises the Data: What It All Means

The U.S. Department of Commerce's Bureau of Economic Analysis has responded to data about information technology and productivity. A fundamental improvement is that business and government purchases of software, as well as their internal production of software, will now be recognized as investment.

"With the benefit of the comprehensive revision, we can now see that our business logistics system was more productive than previously reported," Robert V. Delaney of Cass Information Systems maintains. The National Income and Product Accounts (which form the basis of Delaney's Annual State of Logistics analysis) have been revised back to 1959. Based on the revisions,

- The value of nominal business inventory investment has been reduced by about 3.0% annually.
- The annual cost of business logistics in relation to nominal GDP has been reduced by 0.3% to 0.5%.

The bottom line is that logistics costs were below Delaney's target of 10% on nominal GDP in 1993 (9.9%), and they dipped to that level once again in the latest year. "We are encouraged," he declared. "We may be able to maintain U.S. business logistics costs at the goal that we set in 1990—namely 10%, or lower, of nominal GDP."

be sure, inventory investment did increase during the year. However, according to the data, it moved at a slower rate than in the prior year, except for the fourth quarter. "There may have been some stock building during the fourth quarter among wholesalers, but we cannot overlook the surprisingly strong level of sales," he observed.

During the entire year covered in the report, inventories increased by 4.6%, but sales increased by 9.2%, or "twice as fast as inventory," as Delaney declared. "And we know that fourth quarter sales were so strong that they powered quarterly GDP above 7%."

A Deeper Look into the Statistics

Transportation consultant Rosalyn Wilson, president of R. Wilson, Inc. (rosalyn@transopolis.com), revealed that the cost of the business logistics system increased to \$921 billion, or the equivalent of 9.9% of nominal GDP (see Table I-1.14). The average investment in all business inventory in agriculture, mining, construction, services, manufacturing, wholesale, and retail trade was \$1,376 trillion.

Table I-1.14 Performance of the Cost of the Business Logistics System in Relation to Gross Domestic Product in the 1990s
(in \$billion except as noted)

Year	Nominal GDP (\$trillion)	Values of all			Inventory			Total U.S.			Logistics Costs	Logistics (% of GDP)	Inventory (% of GDP)	Transportation (% of GDP)
		Business Inventory	Inventory Carrying Rate (%)	Inventory Carrying Costs	Transportation Costs	Administrative Costs	Logistics Costs	Logistics (% of GDP)	Inventory (% of GDP)	Transportation (% of GDP)				
1990	5.80	1041	27.2	283	351	25	659	11.4	4.9	6.1				
1991	5.99	1030	24.9	256	355	24	635	10.6	4.3	5.9				
1992	6.32	1043	22.7	237	375	24	636	10.1	3.8	5.9				
1993	6.64	1076	22.2	239	396	25	660	9.9	3.6	6.0				
1994	7.05	1127	23.5	265	420	27	712	10.1	3.8	6.0				
1995	7.40	1211	24.9	302	441	30	773	10.4	4.1	6.0				
1996	7.81	1240	24.4	303	467	31	801	10.3	3.9	6.0				
1997	8.43	1286	24.5	315	503	33	851	10.1	3.7	6.0				
1998	8.76	1327	24.4	324	529	34	887	10.1	3.7	6.0				
1999	9.26	1376	24.1	332	554	35	921	9.9	3.6	6.0				

Source: 11th Annual State of Logistics Report.

The cost of carrying inventory includes interest at the annualized commercial paper rate of 5.1%. The cost of taxes, obsolescence, depreciation, and insurance follow the Alford-Bangs formula that is used in this methodology. Obsolescence accounts for nearly 40% of total inventory carrying cost in this methodology.

“This is consistent with the challenges facing inventory managers in our fast cycle procurement, just-in-time world,” Wilson observed. She further reported the following:

- The trucking industry continues to dominate the business logistics system with an 81.2% share of the nation’s freight bill, as trucking costs increased by 5.9%.
- Railroad revenues increased by 1.0%.
- Water and oil pipeline services were flat.
- Domestic airfreight revenues increased by 6%, and international air freight revenues increased by 8%.
- Logistics administration is estimated at 4% of total logistics cost.

Since 1982 the improvements in inventory efficiency have been dramatic, according to Wilson, “as we replaced inventory with more versatile and responsive transportation services.” However, she cautioned, “We will be challenged to keep transportation costs stable at 6.0% of GDP as we have for the past seven years. Inventory management will be the key to maintaining business logistics costs at 10%, or lower, of nominal GDP.”

Demand for Warehousing Services to Continue Even with Improvements in Inventory Efficiency

Delaney countered the investment analysts’ traditional assumption that more efficient management of inventory will reduce the demand for warehousing services. “That is not the case, and never has been,” he declared. Even though it is more efficient, Delaney explains, “inventory investment comes into the economy quarter after quarter, and it has to be warehoused.” In fact, the annual increase in square footage of warehouse space has been increasing steadily since 1996, following a slump in the early 1990s.

Services Performed within the Warehouse Are Changing

In addition to storage, handling, and inventory management, warehousing companies are assembling products, organizing kits, bar coding, labeling, and providing a range of other value-added services.

“Warehousing companies are even providing fulfillment services to support the requirements of e-commerce companies,” he notes. “Despite the improvements in inventory management, we believe that the demand for warehousing services will continue to grow consistent with industrial production and consumer spending,” Delaney projects. “Logistics decision makers will continue to make changes reflecting trends in automation, favorable locations, building design, operating methods, and procedures. And, it will all happen faster and with greater visibility because of the Internet and e-commerce,” Delaney declares.

HOW WHIRLPOOL AND GENERAL MOTORS CREATE MEANINGFUL LOGISTICS AND INVENTORY BENCHMARKS

In today’s supply chain environment, the primary focus is on performance metrics. However, the discussion is often long on what to measure but short on the rationale for selecting a specific measure. That’s why it’s refreshing—and informative—to hear from industry leaders who do focus on defining meaningful and useful measures. For example, Dennis Dreyer, director of logistics and service parts operation at General Motors (Grand Blanc, Mich.; 812-606-4215) acknowledges, “When we look at a measure, the first question we ask ourselves is: ‘What really is a meaningful measure, and what element am I looking for in it?’”

J. Paul Dittman similarly declares, “When we think about setting standards to judge our performance metrics, we insist that they have to capture the elements of what’s really important to us, and reflect our global supply chain strategy.” To get a fix on Dreyer’s and Dittman’s thinking, we caught up with both at recent conferences.

Whirlpool’s “Overarching Principles”

“We set up a series of overarching principles for our supply chain measures,” Dittman explained at the Proven Performance Metrics in Logistics Conference (Institute for International Research, New York; www.iir-ny.com). Essentially, each proposed measure has to conform to the following before being implemented:

- Globally common measures to facilitate sharing of best practices (i.e., to have the same supply chain measures in all regions of the world to set up a common framework for a common dialog to share best practices)

- Interlinkage to avoid suboptimization (i.e., if a measure is created for inventory, an offsetting one is established for customer service to maintain balance)
- External linkage to economic value-added metric (i.e., it combines balance sheet and income statement in one measure to avoid being one-dimensional)
- A focus on assets, cost, quality (customer service), and cycle time
- Common-shared measures across all functions
- Full communication and understanding throughout the organization (e.g., “if not done, it’s all a waste of time,” as Dittman asserts)

General Motor’s Meaningful Metrics

Dreyer insists that most of the measures have been around for a long time and that they do not fundamentally change (see sidebar). “You can put these measures into three categories, cost, quality and speed,” he itemized at an Interlog conference (Worldwide Business Research, New York; www.wbresearch.com).

Cost, Quality, and Speed Indicators Typically Measured across General Motors’s Supply Chain

Cost Measures

Inventory turns
Warehouse productivity
Outbound transportation cost
Redistribution transportation cost
Inbound transportation cost

Quality Metrics

Unshipped customer orders
Carrier damage
System line fill
PDC line fill
Order errors
Carrier equipment availability

Speed Indicators

Carrier transit times
Carrier on-time pickup
Order response time

“When we look at a process, we want to make sure that we understand the cost, the speed, and the quality issues within a particular piece of the supply chain network.” To accomplish this, Dreyer outlined their approach:

- *Timeliness of the data.* This is one of the first considerations. The question under deliberation is “What really is the timely way to look at the specific data?” In explanation, he recalls that when he first started in service parts the financial people would provide him with a report at the end of the quarter to tell him how he did. “Now, we can pick up this information monthly, weekly, or daily,” Dreyer explains. “This certainly changes our ability to look at our business.”
- *What do the data support?* Do they support a strategic, tactical, or operational issue? “We may be talking about the same issue, but we may need to look at it from three different perspectives and time frames,” he says. When considering the strategic versus the tactical and operational measures, the difference is related to time. For example, when discussing strategic metrics, Dreyer is referring to monitoring trends. “When we get down to the tactical and operational measures, we’re looking at a more current type of information,” he explains.
- *Provide data with sufficient amount of detail.* Technology is allowing end users to drill down further and further for information. “What we need to do is look at the highest level and ask how far do I want to drill down on a regular and timely basis,” says Dreyer. However, he reflects, “I may still need access to that finer detail in case I want to answer a question that I may have, or to provide information to someone else who raises a question.”
- *Relevancy of the data and the problem with financial-oriented metrics.* “Typically, we’ve looked at things the way accountants have told us to look at them,” Dreyer mentions. “Now we’re looking at our measures with a logistics focus, and there’s a difference between a financial perspective and a logistical one.”

According to Ted Farris of the University of North Texas (Denton, Texas; 940-565-4368), “The key advantage to using nonfinancial measurements, such as those now being used by logisticians, is that they are directly traceable to success factors and strategies. These are often hidden through the agglomeration of reporting areas on financial reports.” However, inventory managers must recognize that the greatest downside to the use of

The Criteria for Effective Measurements

Ted Farris of the University of North Texas (Denton, Texas; 940-565-4368) recommends the following criteria for evaluating an effective measure:

- *Validity.* Does the measure track the true customer requirements or real productivity?
- *Coverage.* Does the measure track all of the relevant factors?
- *Comparability.* Can the measure be compared across time or indifferent locations?
- *Completeness.* Are all-important sources that yield an output tracked by the measure?
- *Usefulness.* Does the measure guide action?
- *Compatibility.* Is the measure compatible with existing data and information flow?
- *Cost effectiveness.* What are the tradeoffs between the cost of measurement and the potential benefits to be gained?

“Also avoid overmeasuring as a means of managing,” he advised at the Council of Logistics Management Annual Conference. “Instead, focus on a limited set of high-impact measures.”

nonfinancial measures is that they don't directly translate to profits and the bottom line.

“Nonfinancial measures may conflict with financial performance measures during the short-run,” Farris declares. This, in turn, could make it difficult to implement an improvement without having support of a direct financial benefit (see sidebar).

Whirlpool's Dittman agrees: “The financial benefits from what we do in logistics accrue in a nonlinear, nontraditional, intricate-to-predict manner. The curve is relatively flat in the early going, but it rises quite sharply when the installation is further along.” He too observes that “most traditional accounting systems cannot be used to predict the impact of world-class logistics on costs. In fact, many traditional accounting systems can actually work to prevent adoption of the concepts,” he charges.

In conclusion, Dittman explains, “Build a framework by which you can judge the performance metrics first; don't just throw them out there to be used.”

Chapter I-2

Distribution

TEN LOW-TECH WAYS TO CUT CARGO THEFT

Although high-tech solutions to protect merchandise shipments are increasingly feasible, they are not the quickest or cheapest strategy. In fact, even the most sophisticated cargo tracking systems attack only 15% of the problem, according to Louis Tyska, managing director for Pinkerton Consulting and Investigations Services.

Speaking on the topic of high value logistics and global supply chain protection, Tyska told logistics managers that sophisticated access control and shipment tracking systems are a viable option, but that they take aim at large-scale theft, which is not the biggest problem.

Shipment hijack and after-hours burglary make up a small percentage of the goods that never make it to their final destination. In fact, an overwhelming portion of all shrinkage—85%—comes from old-fashioned pilferage. “It’s basic. When somebody is touching merchandise, somebody is going to develop a conspiracy to steal,” says Tyska. And to attack *that* type of theft, there are better ways to protect an investment than by tagging shipments for satellite tracking.

Eliminate the Confusion

How do crooks get away with lifting merchandise in shipping and receiving (S&R) areas? First and foremost, they take advantage of the confusion that is inherent at S&R bays. Tyska cites these 10 ways to regain at least some control:

1. *Separate shipping and receiving.* It's the most practical solution to cut confusion, says Tyska, but it also requires local management commitment.

2. *Develop a chart identifying cargo flow.* Looking at a flow chart will help you identify risks and the points at which people are exposed to the process (and at which you are at a risk for loss).

3. *Get your hands on controller letters.* These are company documents that report on the state of your business and track losses, damages, and claims. CFOs have them, and you need them, too. The only way to cut cargo theft is to know what theft is going on, and auditors frequently have records that they do not readily share. Other sources of information that can help you understand the threat you face include the following:

- *Local authorities.* They will have an understanding of what warehouse items are hot on the local market.
- *Risk managers.* Whenever you go above a certain level of loss, other people in your company are tracking it.
- *Manufacturing.* If they are being slowed in production because parts haven't arrived, that can alert you to small amounts of cargo theft that you might not otherwise be able to track.

4. *Conduct director-to-security background verifications.* "Passing the garbage" is common in trucking, and laws protecting teamsters make it difficult to uncover the handling of your shipments by unscrupulous drivers. "HR [human resources] to HR doesn't get it done," says Tyska.

5. *Improve housekeeping.* Broken cartons, debris, and piles of cardboard add to the confusion that thieves use as cover. Try shrink-wrapping or banding cartons to reduce casual theft of small amounts of merchandise.

6. *Provide a secure area for high-value goods.* Separate them from the less valuable merchandise that moves through your S&R areas. If warehouse managers tell you, "It's all valuable," use that ammunition to enforce stricter controls all around.

7. *Provide a driver waiting room.* If you don't, "they'll wander your cargo exchange area and shop," says Tyska. If a room is not feasible, paint a line that drivers are not allowed to cross.

8. *Ensure that perimeter controls are used.* This means keeping cargo doors closed when you are not actively receiving. If employees need the doors open for air, purchase drop-down chain gates.

9. *Tighten receiving controls.* Use an inbound register that requires the following information: carrier's name and truck number, driver's name, com-

modity and quantity, date and time of arrival, and inspection verification. Keeping this record on file will help your team conduct an investigation in the event of theft.

10. Investigate how documentation is handled. No cargo should move without documentation, even if it's being shifted within the warehouse itself. In addition, make sure that documentation is complete and always signed in ink.

Although these steps should come first, some cargo is valuable enough that it needs constant tracking. For a primer on the option of a satellite track-and-trace system, see the accompanying sidebar.

How to Make Satellite Tracking an Effective Tool

Some transportation and logistics managers oversee the transport of merchandise that is so valuable that a satellite tracking system may be part of the loss control solution.

The Basics of a Track-and-Trace System

1. A device (usually referred to as a global positioning system, or GPS) is placed in a truck or ship and is capable of making a fix of its position using satellite signals.
2. The fix is then transmitted through a mobile/cellular communication device to a central station.
3. The central station is equipped with hardware and software that enables it to identify where the subject is on a detailed digitized map (the accuracy should be less than 5 meters).
4. If the line of communication remains open, a new fix will be provided every 5 to 10 seconds. This makes it possible to check the speed, direction, and behavior of the vehicle being tracked. Depending on the received signal and the type of alarm or emergency, the central station will follow procedures that were previously agreed upon.

Developing an Effective Track-and-Trace System

1. *The black box.* This is the unit that contains all the devices for positions, communications, and connections to inputs and outputs. Options include

(continued)

- A connection to the vehicle's alarm system.
 - A panic button that allows the driver to generate a signal in an emergency.
 - Digital ports that can be used to action any number of signals to the vehicle, such as locking doors, closing windows, activating sirens, lights or signals, reduce fuel, and so on.
 - Analog ports that are used to connect to analog information, such as engine temperature, oil pressure, and trailer temperature. This is helpful in instances of temperature-sensitive cargo.
2. *The network of service stations.* Make sure your system provider
- Guarantees that they can position, maintain, and repair devices in any location in which your vehicle or cargo will travel in the global logistics system
 - Does not disturb the logistics processes of your company
 - Signs agreements to safeguard your company's integrity
 - Offers adequate training and instruction to staff
3. *The central monitoring station.* It needs to track and trace signals 24 hours a day, throughout the year, and can be organized in one of three ways:
- *Corporate control without third parties.* Use when needed to protect sensitive freight if you have the infrastructure to integrate into an existing control station. Before you do, consider national/state standards for control stations; staffing required for all-hours repair; legal issues related to mistakes; cost of purchasing software, hardware, and digital maps; and staff required to upload or download from the system.
 - *Split functionality.* This is the most common setup for the GPS. The security monitoring station handles all signals coming from the track-and-trace device according to agreed-upon procedures. Firms have a mirror system enabling them to track and trace vehicles, to use the system for logistics, such as route planning, and to exchange data, such as downloading bar code readers.
 - *Outsourcing.* All central station activities are outsourced to a private security monitoring station, an option for companies with a limited number of devices that require bottom line functionality. Monitoring stations inform companies of an activated alarm or panic button for the company to address at its convenience.

Source: Excerpted from "How to Make Satellite Tracking an Effective Tool," Lou Tyska, Pinkerton Global Logistics.

FOUR STEPS TO OPTIMIZE YOUR DISTRIBUTION NETWORK

Imagine what you would save if your distribution resources were always in the right place at the right time. Unfortunately, improving your distribution network requires a thorough understanding of your customers, your products, and your business strategy. Chris Munro, senior vice president of Exel Logistics, shared his four steps toward optimization with attendees at a recent Logicon conference.

1. *Understand your customers' business requirements.* Munro says that the first step toward optimization is to know what values you provide your customers and which they consider most important. In other words, why do your customers buy products from you? Some values to consider are the service you offer, the range of product selection, your price, and how unique your products are compared to others in the marketplace.

Part of understanding customers' business requirements is anticipating their future needs. Are they changing their order profiles, wanting smaller, more-frequent orders, customer-specific labeling, or promotional packaging and displays? Do they demand that you improve your information systems, or are they looking for you to provide electronic commerce? Will your future acquisitions plans impact how you service your customers in the future? "The opportunity for logistics to add value increases with the complexity of customer requirements," says Munro.

2. *Generalize logistics flow into segments.* There are basically three ways to segment your business: by product type, by customer type, and by order type. If your business is broken out by product type, for example, you probably focus on stock keeping unit (SKU) velocity or product families. If your organization is customer-focused, however, it may make logistics decisions based on number of customers or on their location or type of industry. Companies organized by type of order make decisions around transportation modes, sizes of the orders, and their priority status. Munro recommends looking at each segment individually as well as looking for similarities to see if any logistics activities that are required to carry out decisions overlap.

3. *Create a strategy for each segment; overlay and compare networks.* Based on information gathered in Step 2, you will discover ways to reduce costs, improve service, and address customer requirements in the most efficient way.

4. *Create groups of logistics channels.* Munro defines a logistics channel as the portion of a logistics network that adds value by making products avail-

able in the way that customers demand them. Different parts of the business—customers, products, and orders—require different logistics channels. “The overall goal of logistics channels is to figure out a way to meet the majority of your customers’ needs without having to mass-customize on a customer-by-customer basis.”

A Case Study in Optimization

Using the four steps just described, Munro relates the case study of a multi-divisional company organized by product type. The company decided to optimize the distribution network that supplies parts for repair work. The firm offers around 140,000 SKUs and strives to ensure next-day delivery for critical parts and timely delivery for other parts. All parts are stored and supplied by one distribution center (DC) in California to 12 regional hubs across the country. Although it was easy to manage one DC, risks were associated with that single-source network: Using air parcel 100% of the time was costly; having all inventory in one facility could have led to inventory loss; and regional hub inventories represented redundant safety stocks, driving up inventory carrying costs.

Experts devised a strategy for each segment in the repair division—PC/printer parts, electronic parts, medical equipment, server parts, and testing equipment—and determined the logistics activities required to carry out the service requirements in each. When the segments were compared, similarities were discovered, such as the fact that flexibility was necessary to carry out the logistics flow of the product segments consisting of electronic parts, medical equipment, and testing equipment (see Table I-2.1).

Table I-2.1 Overlaying Drivers, Logistics Flows, and Identifying Segments

<i>Logistics Flow</i>	<i>Required Logistics Driver</i>	<i>Typical No. of SKUs</i>	<i>Typical Value</i>	<i>Service Level</i>	<i>Shipment Size (lbs.)</i>
Electronic parts	flexibility	100,000	low	3-day	5
Medical equipment	flexibility	50	medium	3-day	30
PC & printer parts	cost	350	low	3-day	65
Server parts	service	175	high	next-day	20
Testing equipment	flexibility	800	medium	3-day	35

Note: The company in the Exel case study compared its various product segments to determine whether any logistics similarities existed. From the data in the table it became clear that repair segments for electronics, medical equipment, and testing equipment parts require a high degree of flexibility in meeting the customer demands. In addition, the majority of the product segments require three-day delivery windows, so it was decided that ground transportation could be negotiated instead of the prior use of air parcel.

They decided to provide next-day service to server parts customers, to minimize inventory carrying costs by centralizing high-value server SKUs, to ensure high fill rates for medical/testing/electronics parts customers, and to reduce freight expense for PC and printer delivery by two-thirds using ground instead of air parcel delivery.

Munro says that optimizing the distribution network will affect your business at the customer, strategic, financial, and internal levels. The best way to quantify the impact is to use modeling software to address the different variables at once. "You need to truly understand the relationships between the various components to determine where you make your investments," says Munro.

HOT LOGISTICS PRODUCTS SHOWCASED AT RECENT DISTRIBUTION/COMPUTER EXPOS

Recent sessions of the annual Distribution/Computer Expo (D/C Expo; produced by C. S. Report, Inc.; Uwchland, Pa.; 610-458-6410) showcased the latest in innovation and high-tech solutions for logistics managers walking the show floor with clear purchasing goals in mind. Our pick of high-lights from recent events include the following:

Current Year Shopping Lists

Topping logistics managers' lists are warehousing and warehouse management systems (WMSs; 40% want them), inventory handling systems (31%), and bar code or automatic identification systems (40%). In the newer technologies, 48% are looking for e-commerce solutions, and another 40% are looking for supply chain management systems (see Figure I-2.1). And most logistics managers at D/C Expo came ready to buy: 66% already had budgets approved to buy the systems on display. Around 10% will make their purchases within three months, 49% within six months, and 90% within one year.

- *Transportation Solutions Inc. features Trans2000 Plus.* This logistics management system provides the information needed to manage logistics processes and lower expenses. The company touts its ease of both integration and customization. The system contains modules for freight bill payment, batch auditing, loss and damage claims, less-than-truckload (LTL) carrier

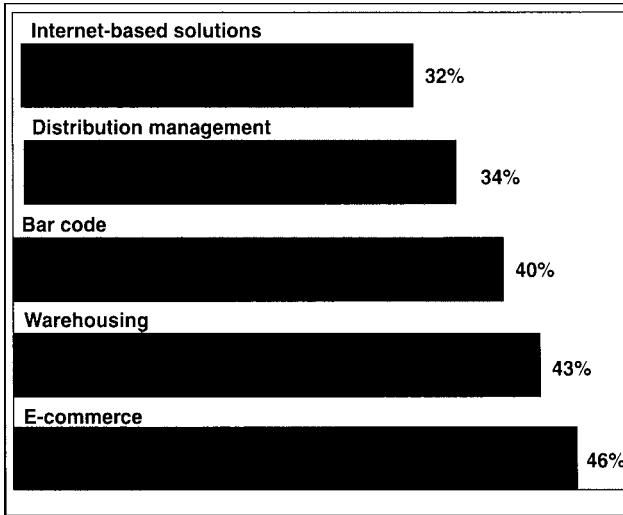


Figure I-2.1 E-Commerce and Internet Solutions Top Logistics Pros' Want List

Source: Logistar.

price matrix, overcharge claims, pricing analysis, rate shopping, vendor charge-backs, and reports with mapping and graphing capabilities.

For information: Transportation Solutions Inc., 285 Country Club Drive, Stockbridge, GA 30281; 770-474-1555; fax, 770-474-3040.

- *Sonica and Voxware announce system collaboration.* Sonica Software and Voxware, Inc., will provide customers with warehouse management and voice-based solutions to increase the productivity and accuracy of mission-critical DC operations, including picking, returns processing, receiving, and other value-added logistics activities.

For information: Sonica Corp., 1401 N. Batavia, Suite 104, Orange, CA 92867; 714-288-8800; fax, 714-288-8805; www.sonica.com.

- *SeeCommerce enters supplier management market.* SeeCommerce has introduced SeeChain Supplier, an enterprise application that spearheads the company's entry into the supplier relationship market. The developer claims that the solution can help manufacturers and distributors reduce total expenditures on materials by 10% while improving suppliers' performance and collaboration. Measuring supplier services based on timeliness of order fulfillment and quality of goods downstream, SeeChain analyzes supplier performance data and presents it daily on the Web. Applications include SeeChain Supplier, Demand, Materials, Production, Inventory, and Fulfillment.

For information: SeeCommerce, 3401-B Hillview Avenue, 2nd Floor, Palo Alto, CA 94304; 650-213-1800 or 800-255-9520; fax, 650-812-3990.

- *The Lyte Group demonstrates networking software.* Spotlyte 2000 supply chain network-planning software from the Lyte Group simulates and analyzes the details of a company's current and future operations to determine the best DC locations, manufacturing sites, and flow paths.

For information: The Lyte Group, 2842 East Grand River, East Lansing, MI 48823; 517-351-2900; fax, 517-351-0569.

- *Maddocks Systems Inc. releases transportation system.* TruckMate for Windows version 3.2 includes an integrated carrier system for interlining freight and matching payments to third-party carriers, local dispatch capability, manifesting program, addition of LTL quick-billing information, and a mapping program. TruckMate has fully integrated operations and accounting modules, as well as other modules for electronic data interchange (EDI), mobile communications, fleet maintenance, and Internet tracing.

For information: Maddocks Systems Inc., #211-20644 Eastleigh Crescent, Langley, BC; 800-663-0626; fax, 604-533-8562; www.maddocks.ca.

- *Majure Data Inc. features Web-enabled radio frequency (RF) solution.* The latest release of Majure Data's standard warehouse management software features browser-based front-end architecture, advanced interface capabilities, and distribution functionality. To coordinate overall supply chain operations, RF Navigator v11.0 has been redesigned to be more user friendly, to facilitate supply chain integration, and to provide visibility into the system by suppliers and vendors via remote access. Also incorporated into RF Navigator are enhanced cross docking, advanced shipping notice, compliance labeling capabilities, the ability to perform whole-order delivery, factory-direct shipments, and automated carrier selection.

For information: Majure Data Inc., 993 Mansell Road, Roswell, GA 30076; 800-353-2520; fax, 770-594-9224; www.majuredata.com or rfnavigator@majure.com.

- *Renaissance Software, Inc., introduces a Java-based Internet system for supply chain management.* Renaissance Software's next generation of product, e-Supply Chain Management (e-SCM), consists of warehouse management, order management, and distribution management modules. The Web-based suite offers manufacturers/distributors the ability to link with suppliers and customers through their own network or over the Net. Java's Internet capabilities and platform independence were key factors in using the programming language.

For information: Renaissance Software, Inc., 1983 Marcus Avenue, Suite 125, Lake Success, NY 11042; 516-466-5190 or 800-281-2639; fax, 516-466-3341; www.rensoftinc.com.

- *Radcliffe Systems Inc. showcases WMS.* Radcliffe Operation Control (ROC) 8 is a warehouse management and distribution system designed to cut operating costs and improve customer service. The enhanced version is fully GUI (graphical user interface) and supports Web browsers, enabling customers access via the Internet. ROC is now offered via an application service provider model, whereby Radcliffe hosts the WMS application and data on a server farm. Customers make no commitment to capital expenditure because Radcliffe buys the server and hardware and supplies the system for a monthly fee.

For information: Radcliffe Systems Inc., 200 Consumers Road, Suite 305, Toronto, Ontario M2J 4R4; 416-493-3844; fax, 416-493-1616; www.radsystems.com.

- *Ann Arbor Computer shows midsized warehouse solution.* The Ann Arbor Computer division of the Jervis B. Webb Company showed off PC/AIM, a Windows NT-based WMS designed specifically for midsized warehouses and DCs. Using the Microsoft SQL database, PC/AIM is a client server warehouse management solution for midtier manufacturing and distribution applications. It complements virtually any existing or planned enterprise resource planning (ERP) system. Paper-based, batch, or RF versions can provide scalability to automate virtually any warehouse. Other available options include a parcel manifest system, transportation management system (TMS), PC and RF equipment, and interfaces to material handling equipment.

For information: Ann Arbor Computer, 1201 E. Ellsworth Road, Ann Arbor, MI 48108; 734-973-7875; fax, 734-971-6267.

- *National Traffic Service features freight auditing and payment software.* TrafficPro freight auditing and payment software is a Windows-, PC-based solution that allows companies to audit and pay their truckload (TL), LTL, air-freight, and parcel shipment bills in-house. Logistics activity and expenses can be tracked through a number of management reports. The system is designed to eliminate all duplicate payments and overcharges to ensure that invoices are paid once, correctly, and on time. TrafficPro operates as a client-server application and can support up to 30 simultaneous users. Oracle or Microsoft SQL Server is used to store the freight data. Invoice data can be inserted via EDI transmission from your carriers. TrafficPro operates on the

Windows NT 4.0 operating system. Hardware requirements include a 586/Pentium processor, 33.6 KB modem, 3.0 GB of disk space, and a laser printer.

For information: National Traffic Service, 151 Audubon Parkway, Amherst, NY 14228; 800-775-8253.

- *Manugistics Group, Inc., develops partnership to offer online transportation marketplace.* Manugistics has partnered with FreightWise, Inc. (www.freightwise.com), a new e-commerce initiative of the Burlington Northern Santa Fe Corp. Manugistics' e-business solutions will enable FreightWise to offer an online marketplace for buyers and sellers of transportation services and information.

For information: Manugistics Group, Inc., 2115 East Jefferson Street, Rockville, MD 20852-4999; 301-984-5000.

- *Kinetic Computer Corporation features newest Internet-based service.* eTruck.net is an Internet-based, real-time fleet management service, offering managers enhanced communication between dispatch and drivers. Using a standard Web browser, dispatch can access a detailed map showing where vehicles are located, exchange electronic messages with vehicles, and obtain daily reports on driver performance. Tracking driving versus non-driving hours, collecting fuel tax information, and monitoring for engine faults are additional system capabilities.

For information: Kinetic Computer Corporation, 76 Treble Cove Road, Billerica, MA 01862; 978-439-0500; fax, 978-439-0501; www.etruck.net or www.kin.com.

- *HK Systems releases module for its TMS suite.* Express Ship Version 7.2 is a new module for HK's SCM/Enterprise Transportation Management suite. Designed for companies employing multiple carriers to ship small package freight and LTL and TL shipments, Express Ship offers carrier selection and freight rating capabilities. Working with other HK modules, the suite delivers high-volume shipment consolidation, freight auditing and reconciliation, damaged goods claims management, and export documentation.

For information: HK Systems, P.O. Box 1512, Milwaukee, WI 53201-1512; 414-860-6715.

- *MicroAnalytics releases network version of routing/scheduling system.* A network version of TruckStops operates with one execution key that is configured to the number of licenses purchased and installed on a computer, node,

or server. Multiple users can then access the system simultaneously to edit or update data or run routing solutions. Available for Windows 95/98/NT.

For information: MicroAnalytics, 2200 Clarendon Blvd., Suite 1002, Arlington, VA 22201; 703-841-0414; Mainc@erols.com; www.bestroutes.com.

- *Celerity Solutions, Inc., launches new division and products.* Celerity Solutions, Inc., has formed a business-to-business e-commerce division: Slingshot ecity. Slingshot is developing a version of Celerity's existing MS Windows-based applications. Slingshot's browser-based suite of applications enables mid-sized businesses to model and manage a global supply chain.

For information: Celerity Solutions, Inc., 270 Bridge Street, Dedham, MA 02026; 781-329-1900; fax, 781-329-1655.

Previous Year's Broadened Scope

The best-of-breed solutions featured a year earlier at D/C Expo focus on user friendliness, fast implementation, and customer service. A key similarity among most of the packages was their broadened scope. No longer are products exclusively targeted to inventory, warehouse, or transportation management. Rather, vendors are introducing products that offer a greater view of the supply chain so that logistics pros can manage their operations from end to end. Another common product feature is the integration of electronic commerce and Internet technology to facilitate faster and more reliable information sharing.

- *Applied Tactical Systems, Inc., announces ATS Continuum for the Warehouse.* This configurable warehouse information management system uses the latest in RF mobile data collection to improve inventory accuracy and direct employee activities. ATS Continuum for the Warehouse operates independently but in concert with the ERP/host system. A unique feature of the software is the use of a standard Web browser interface to conduct warehouse transactions. Workstation-based users can use familiar hyperlink navigation with either Microsoft Internet Explorer or Netscape Navigator to access all ATS Continuum information and data entry screens.

For information: Applied Tactical Systems, Inc., 22 Audrey Place, Fairfield, NJ 07004; 973-808-1750; fax, 973-808-1776; www.atsworld.com.

- *TECSYS Inc. premiers EliteSeries 6.2.* This e-commerce-based distribution and warehouse management software solution offers end-to-end

integrated functionality for the entire distribution enterprise. EliteSeries 6.2 combines customer-centric order management with distribution and WMSs. It includes automated merchandise drop-shipment capabilities, enabling distributors to take an order and have a supplier deliver it directly to the customer. Release 6.2 also incorporates a number of EDI capabilities.

For information: TECSYS Inc., 1840 Trans-Canada Highway, Dorval, Quebec, Canada H9P 1H7; 514-333-0000; www.tecsys.com.

- *Haushahn releases 5 series WMS.* New features and functions available in the 5 series include multilingual capability, GUI, user-configurable shipping documents, and Oracle RDBMS support. The WMS can be used and operated in any language using standard character sets. Users also have a graphical, PC-based tool to modify the format of shipping documents produced by the WMS. Shipping documents can be created in-house.

For information: Haushahn, 5460 Corporate Grove Boulevard, SE, Grand Rapids, MI 49512; 616-285-3311; fax, 616-285-3312; www.haushahn.com.

- *EXE Technologies, Inc., introduces Exceed Cross-dock Facility and Exceed Cross-dock Component.* Exceed Cross-dock Facility, a new addition to the Exceed product line, is designed to operate in dedicated cross-dock/flow-through facilities that do not employ classic WMSs. It provides the full spectrum of prereceipt planning tools and postreceipt execution processes necessary to move goods rapidly from point of receipt to point of shipment. The Exceed Cross-dock Component adds significant tools for the classic warehouse and DC to handle cross dock and flow through. It is meant for pre-planned movement of goods from point of receipt to point of shipment.

For information: EXE Technologies, Inc., 8787 Stemmons Freeway, Dallas, TX 75247; 214-775-6000; fax, 214-775-6080; www.exe.com.

- *Distribution Resources Company debuts XPDT distribution technology.* XPDT is a Windows NT-based distribution management solution that is completely Web-enabled and object-oriented to facilitate order capture from virtually any e-commerce or traditional source. The product is a total operational platform for distribution operations, including order management, inventory management, business entity management, warehousing management, financial management, and commerce interface management. Implementation takes approximately three to six months.

For information: Distribution Resources Company, 5340 S. Quebec Street, Suite 300, Englewood, CO 80111; 303-889-4500; fax, 303-889-4533; www.xpdt.com.

- *Optum, Inc., inaugurates Action Optimization.* This strategic e-business fulfillment initiative helps companies anticipate and respond to dynamic delivery expectations. Optum will drive Action Optimization with its new Optum SCE Series advanced supply chain software. It includes three components: SCE Response Center, which provides dynamic deployment capabilities to maintain real-time visibility and control overall supply chain operations; SCE Demand Center, which manages warehouse processes and inventory for fast order fulfillment; and SCE Transportation, which manages the complete transportation execution life cycle, from enterprise planning to postshipment audit.

For information: Optum, Inc., 2550 West Tyvola Road, Suite 500, Charlotte, NC 28217; 704-423-7200; fax, 704-423-7176; www.optum.com.

- *Auto-Soft Corporation releases MCS Two Thousand.* An integrated supply chain execution system, MCS Two Thousand integrates manufacturing, warehousing, distribution control, and scheduling within a single product. It provides dock-to-dock visibility of material as it moves through a facility. The fully scalable Windows NT-based system with a seamless GUI offers a distribution/WMS for inventory control at every operational stage: receiving, storage, retrieval, order picking, consolidation, and control of both manual and automated systems. It can be used as a stand-alone product or fully integrated with ERP and Advanced Planning and Scheduling (APS) systems.

For information: Auto-Soft Corporation, International Center, 5245 Yeager Road, Salt Lake City, UT 84116; 801-322-2069; fax, 801-322-1846; www.autosoft.com.

- *HK Systems, Inc., demonstrates SCM/Enterprise Architecture and SCM/Express.* SCM Enterprise Architecture facilitates the easy integration of HK's SCM/Enterprise application suite of order management, warehouse management, transportation management, and equipment management applications with third-party software vendors.

SCM/Express, a rapid implementation supply chain execution product, is a single solution scaled to fit a growing business, packed to be cost effective, and installed quickly. It is coupled with expert training and support services and features a fixed, predictable cost of licensing and installation.

For information: HK Systems, Inc., 2855 S. James Drive, New Berlin, WI 53151; 800-HKSYSTEMS; www.hksystems.com.

- *Descartes Systems Group launches Energy DeliveryNet.com Mobile Business Operator (MBO)*. This supply chain solution enables companies and their customers to monitor delivery activities via real-time messaging, gain instant awareness of changes to plans, reoptimize delivery activities, and remit new delivery details to field personnel and customers via the Web. Energy DeliveryNet.com MBO utilizes DeliveryNet.com to connect shippers, carriers, customers, and delivery vehicles electronically via the Internet and other networks.

For information: Descartes Systems Group, 120 Randall Drive, Waterloo, Ontario, Canada N2V 1C6; 519-746-8110; fax, 519-747-0082; www.descartes.com.

- *Kinetic Computer Corporation announces PC/Piranha and PC/Rover*. A highly integrated, thin client platform, PC/Piranha is specially designed for warehousing operations. The Windows CE-integrated vehicle computer is equipped with a versatile touch screen and voice-recognition input capabilities. PC/Rover is a Windows 95/98/NT vehicle- or fixed-mount computer system that facilitates the flow of warehouse and vehicle freight. It also provides up-to-the-minute tracking of customer shipments.

For information: Kinetic Computer Corporation, 76 Treble Cove Road, Billerica, MA 01862; 978-439-0500; www.kin.com.

- *INNOLOG unveils AssetIQ*. The integrated solutions suite captures, manages, optimizes, and reports transactions throughout the life of an asset. AssetIQ blends client/server, Web, and data warehousing technologies to link the management of mission-critical assets to their overall business management processes. The five components of AssetIQ (Asset Transaction Engine, Asset Business Intelligence, Asset Optimization, Asset Dynamic Location Monitoring, and Asset Call Center) can be purchased together or separately.

For information: INNOLOG, 2010 Corporate Ridge, 9th Floor, McLean, VA 22102; 703-506-1555; fax, 703-506-4559; www.innolog.com.

- *Adonix launches X3*. Designed for middle market companies, Adonix X3 ERP system integrates all functions to ensure seamless information flow. It includes modules for sales order management, purchasing and inventory control, warehousing and quality control, manufacturing planning and execution, and finance. It can be scaled to match company size and accommodates different distribution processes at multiple facilities.

For information: Adonix, 1380 Old Freeport Road, Pittsburgh, PA 15238; 412-963-6770; fax, 412-963-6779; www.adonix.com.

EXPERT TIPS ON HOW TO NEGOTIATE THE BEST PARCEL DELIVERY DEALS

The unique characteristics of small packages present new and different challenges for transportation and logistics professionals. Moreover, the need for in-depth knowledge of the parcel environment is amplified by the trend of just-in-time inventory, as well as smaller, more frequent shipments. To help prepare logisticians to manage parcel transportation, Joe Sudar, executive vice president with SmartTran (Pittsburgh, Pa.; 724-934-0626) and a presenter at a Council of Logistics Management (CLM) annual meeting, outlines how this market works.

Pricing Isn't Competitive

Unlike the LTL or TL industries, in which there are many players and pricing is based on competition, small package shippers are members of a small niche. Typically, there are only two ground carriers: United Parcel Service (UPS) and the FDX subsidiary of Roadway Package Service (RPS). As a result, there is not as much competition among the carriers, so their pricing structure is not as competitively priced as is that of the LTL industry.

However, parcel carriers can offer greater discounts and have more leeway in offering discounts to the shipper. "We understand what it costs the carrier to handle a particular shipper's business and help the shipper determine that cost," says Sudar. "This gives the shipper increased leverage in pricing negotiations, instead of the carrier coming to the negotiating table with only their number."

Although volume can play a part in the cost of a parcel shipment, other cost drivers go into making the final pricing determination. For instance, parcel characteristics, such as its physical dimensions, its destination, and how many packages the carrier is picking up and delivering, all come under consideration.

Don't Set Yourself Up

Understanding the cost drivers that will help you set up a mutually beneficial contract with your parcel carrier, says Scott McLean, traffic manager at Hallmark Cards, Inc. (Liberty, Mo.), and Sudar's copresenter at CLM. Hallmark relies heavily on parcel carriers to deliver large volumes of shipments to its retail stores, as well as to mass merchants like Wal-Mart. McLean says

that negotiating a parcel carrier contract can be very different from the LTL and TL contracts with which many more managers are familiar.

In addition to understanding the cost drivers, McLean recommends establishing longer-term contracts with the carriers, as opposed to the typical contract that only maintains pricing for one year.

Manage Through Knowledge

“We choose to do business with carriers that truly try to understand our business,” says McLean. Hallmark purchases its parcel delivery services from both UPS and RPS and has worked closely with both to form a strategic alliance. “We know where each has the strengths to address our business needs,” he says.

McLean also advises that logistics professionals take some time to understand how their business impacts the carrier. Finally, he recommends that you don't rely on the carrier to provide all the information you need to make the most informed delivery decision: “I see too many of my counterparts relying on what the carrier tells them, but I prefer to gather information on my own and draw my own conclusions. This has helped Hallmark build a more meaningful distribution network.”

Your Customers Benefit as Well

Because the parcel shipping industry has fewer carriers than the LTL environment, shippers are able to establish solid relationships with each carrier in their network. This niche industry also enables the carriers to distinguish themselves from their competition and work more closely with the shipper to solve individual problems. “As a result, we are able to offer our customers better service that they might not get from our competitors,” says McLean.

And if your company is among the growing group looking to ship direct to consumers, parcel carriers may in the future refine their services for that segment of the business. For example, although most parcel deliveries currently occur at residences between the hours of 8 A.M. and 5 P.M., when most consumers are working, the carriers may soon offer expanded service hours, in the evening, when more people are home. “This is being driven by both the customer and the shipper,” says McLean.

Finally, as global distribution becomes more prevalent and your firm expands its overseas network, small package carriers will make a dent in this arena in the near future.

Whom to Contact

Ground Parcel Carriers:

- RPS, 800-762-3725
- UPS, 404-828-7593

Expedited Parcel Carriers:

- Airborne Express, 800-247-2676
- DHL Worldwide Express, 800-225-5345
- Federal Express Corp., 800-463-3339 or 800-332-0807
- Parcel Plus, www.parcelplus.com
- Roberts Express, 800-762-3787

EIGHT SITE SELECTION TIPS THAT WILL STRENGTHEN YOUR DC NETWORK

Designing a DC network can be a painstaking process. To help logistics managers travel this path, we recently spoke with several managers who revamped their networks to accommodate customer demand and gained a competitive edge in the process. From their experiences, we present these eight hard-won tips to site selection.

1. *Define on-time standards.* The DC network must deliver products to customers according to their standards of timeliness, says Gene Marino, vice president of national accounts for GATX Logistics, Inc., of Tampa, Fla. (www.gatxlogistics.com).

2. *Rank distribution markets.* The two most important criteria for distribution markets are proximity to customers and the quality of transportation providers. Other factors to consider include the cost of serving customers from a particular market, the quality of the workforce in a particular market, and the quality of a market's intermodal infrastructure.

3. *Determine the optimum size of your DC network.* If yours is a regional business, a single DC may be all you need to keep customers well supplied. However, serving a national or international customer base will probably go

beyond the capabilities of a single DC. Consider satellite locations in markets such as Chicago, Los Angeles, Atlanta, and Dallas. Then, if the nature of your business requires local distribution capability, you may also consider smaller DCs in secondary markets such as Seattle, Charlotte, or Tampa.

Depending on the nature of your products and the requirements of your customers, your DC network may consist of two or three large (700,000 sq. ft. to 1 million sq. ft.) facilities, or one large DC that supports a number of smaller (20,000 sq. ft. to 50,000 sq. ft.) facilities.

4. *Compare available facilities.* After you determine the size of each DC and the markets in which they'll be located, the site selection process comes down to searching for and comparing individual facilities. Here are some of the most important criteria:

- easy access to major roadways
- proximity to parcel carrier hubs
- proximity to other modes of transportation
- clean, well-sealed environment to filter out dust
- climate control for temperature-sensitive products

5. *Compare costs.* "Too many decision makers commit the mistake of allowing a seemingly good price get in the way of good judgment," says Marino. "They automatically assume that the lowest rent equals the lowest cost, and that's not necessarily so." Marino says it is common to choose a location in a less expensive, more remote area of town without factoring in the cost for additional transportation. "In order to find the DC that is truly the most cost-effective," he says, "you must be sure to look at the big picture while factoring in all the potential costs and benefits."

6. *Consider information systems.* Many site selection software packages enable a company to pinpoint its optimum distribution markets based on its preferences, performance standards, and budget parameters. In addition, they allow managers to compare any number of scenarios, such as a two-DC network versus a three-DC network, or a primary market location versus a secondary market. "Computer systems and software have significantly affected how and why professionals choose certain distribution sites," says David Poitevint, manager of marketing research and analysis for GATX (904-858-4406). "These technologies have made the process easier, enabling logistics site selection professionals to do a considerable amount of legwork right at the computer terminal."

Here are some ways that information systems can help logistic managers:

- *Position centers in ideal locations.* Information systems have raised the bar regarding on-time logistics performance. “This puts a huge burden on the outbound logistics process because unlike data, products can’t move via cyberspace,” Poitevint notes. “They still have to move via truck, plane, train, or ship.”

Although logistics professionals can’t change how fast these transportation modes move, more are looking to improve products’ speed-to-customer by strategically locating their logistics centers in places that will enable them to reach their customer base within one or two days. The concept is simple: “Position centers in such a way that even a last-minute order can be in a customer’s hands before he can even think about buying product elsewhere,” says Poitevint.

- *Keep track of products to reduce stockouts.* Information systems have also enabled logistics professionals to keep a better handle on inventory and raw materials and, as a result, to have a higher confidence level that materials will be where they need to be when they need to be there. Thus, the need to stockpile extra product has been reduced.

- *Improve decision making.* Recent statistics state that the average company operates four DCs ranging between 124,000 sq. ft. and 136,000 sq. ft., but there is no general rule of thumb for exactly how many centers companies should operate. Using data on a company’s shipping requirements, manufacturing points, and customer locations, software programs can help compare distribution networks of various sizes.

Other software programs create highly detailed facility blueprints so that companies can figure out how their DCs should be designed, laid out, and equipped.

Systems have also made sticker shock far less common. Although logistics professionals have always been able to make fairly accurate ballpark projections about what potential facilities will cost, various electronic spreadsheet packages now offer precise line-item detail about proposed operations. These spreadsheets are particularly helpful because they cover the total cost of running a facility. Companies also get a more realistic view of how long it will take them to get a center up and running.

7. *Be willing to compromise.* In large markets such as Atlanta, Dallas, and Los Angeles, where large-size facilities are in great demand, the distribution market is very competitive. In this case, Marino suggests three options: continue to search for sites in other comparable markets, build your own facility, or hire a logistics design consultant who can make the best of a less-than-perfect facility in a good location.

8. *Be ready to go through the whole exercise again and again.* Creating efficiencies in procurement and distribution to produce the total lowest cost to customers is a continuous process. “Tomorrow’s customer-focused supplier will be able to deliver small runs of a few hundred units while maintaining the capability to ramp up to mass production if demand takes off,” says Marino. “And their distribution network must reflect that same flexibility. For this reason, many logistics folks must reevaluate their DC network whenever new products enter or obsolete products depart the pipeline.”

Trends Changing Site Selection

So much is changing in logistics that companies would be remiss if they did not revisit the issue of site selection quite frequently, advises Marino. One of the first trends changing warehousing site selection is consolidation. As a result, the location of these facilities has become more critical. Each must offer quick access to large segments of suppliers or customers.

Globalization has also had an effect on site selection. Port cities such as Seattle and Los Angeles for Asia and Miami for Latin America are becoming more logical warehousing sites.

Marino says that the most influential trend shaping site selection is the billions of dollars worth of purchases made over the Internet. Not only does this change the way society buys products, but it also changes the way businesses distribute them. It will also change both the size of typical orders and the way those orders are filled.

Instead of using TL or LTL delivery methods, both of which rely on high-volume shipments, more products will travel part of the way via small parcel delivery services. This could make proximity to parcel consolidators’ hubs a vital site selection issue.

MAKING MULTIVENDOR CONSOLIDATION WORK IN THE LOGISTICS ENVIRONMENT

It is not uncommon for logistics providers to experience traffic jams on their loading docks. Third-party providers, their customers, and even their customers’ customers often pull up at the same time to load products that will be delivered to the same destination. Besides the physical delays of gridlock, this can cause duplications in the supply chain and therefore unnecessary costs.

“We knew there had to be a better way to flow product through the

supply chain, but the question was *how*,” said Ryan Donovan, director business development for third-party provider ServiceCraft Corp. (Buena Park, Calif.; 714-994-0821), at a recent CLM annual meeting.

The answer was a multivendor consolidation program. By shipping similar products of LTL quantity on the same truck, it brings manufacturers and third parties together to ensure a clean flow of product. “One point to make is that multivendor consolidation programs require critical mass to create truckloads of multiple vendor product,” says Donovan.

ServiceCraft already had that critical mass built into its operation; 25 out of the 60 manufacturers it serves are in the grocery and consumer goods business, shipping to the same retailers and distributors. This made it easy for the third-party logistics provider (3PL) to develop its multivendor consolidation program called SCORE (“shipping consolidated orders for replenishment efficiencies”) in 1996.

LTL Deliveries at TL Prices

SCORE was the result of several conversations between ServiceCraft and the retailers to which it delivers. “We realized that a single common carrier could be used for the 25 manufacturers,” says Donovan. “Ultimately, the retailers get truckloads worth of LTL product delivered to their facilities at truckload prices.” In addition, the retailers would no longer have to worry about maximizing transportation or minimum order requirements placed on them by manufacturers, he adds.

Lead Times Reduced by Days

Prior to SCORE, Donovan says, retail and distributor purchase orders were sent to the manufacturer, who in turn sent a copy to ServiceCraft. ServiceCraft then contacted the recipient to schedule delivery appointments. “The whole process, from the time the purchase order was received to final delivery, took 11 days.”

Using SCORE, the distributor creates a purchase order (PO) and sends it to the manufacturer as well as to ServiceCraft. “We now have several days lead time to allocate labor to handle the order, set up the trucks, and consolidate the product,” says Donovan. “We also have standing appointments with the retailers. The total lead time is now only three days.” He adds that all of the orders can be customized for the retailer as they are pulled off the shelf.

Benefits to ServiceCraft

Donovan says that since incorporating SCORE, the 3PL has increased inventory turns 50% (11 days to 3 days) and reduced inventory levels by 45%. On-time delivery has reached 100%, and case fill levels are above 95%. Unload times have decreased from 5 hours to 1.2 hours at the delivery dock, and ServiceCraft is saving \$293 per load.

Other tangible benefits are the elimination of delivery date discrepancies, reduced safety stock, reduced shipping costs, decreased administration costs, increased productivity, and the elimination of lumpers on the dock. All in all, the numbers show a reduction of pounds shipped, from 714 before SCORE to 695 after SCORE. Total loads went from 58 to 24; average weight went from 12,000 pounds to 28,000 pounds; orders per load increased from 1.3 to 3.5; and total orders jumped from 76 to 84.

In addition to ServiceCraft's gains, Donovan explains that 2 of his 25 participating manufacturers have also attained significant savings. One LTL carrier ships 971,000 pounds, 121 orders (two per week), and 8,000 pounds. Prior to SCORE, the total was around \$25,000, but it is now \$5,820 under the SCORE program.

Another larger manufacturer that ships 667 orders at 11,600 pounds was spending \$141,000 and is now spending \$63,000 per year. Donovan expects \$744,000 in total LTL shipping costs for the group now, compared to \$1.6 million prior to SCORE.

SCORE at Nabisco

One of ServiceCraft's predominant manufacturing customers participating in SCORE is Nabisco, Inc. Gerald Cantwell, Jr., director of customer service and logistics for Nabisco (Parsippany, N.J.; 973-682-7427), explains that the company uses SCORE to ship direct from the manufacturing plant to the retailer. Previously Nabisco had shipped full truckloads to a 3PL DC and then shipped LTL to a customer's DC and then to the retailer. Shipping direct works well for single-product groups and has saved \$342 per hundredweight in total logistics costs.

Also, Nabisco contracts with other manufacturers that make products for Nabisco and private labels. Formerly, these products shipped from the plant in TL or LTL to the 3PL DC and then trucked LTL to the customer DC and then to the retailer. Now, Nabisco is bypassing the 3PL altogether.

The result has been improved inventory turns, lowered costs, and a reduced number of trucks for the retailer.

“We tracked this model for six months with one retailer and found that over that period we shipped 589,000 pounds,” says Cantwell. “This would have taken 13 Nabisco trucks and five trucks from our copackers, averaging about 39,000 pounds of truckload weight. Now, we use only 14 trucks and the weight is 42,000 pounds. We gain revenue because we bypass some of the DC costs.”

Other savings include a 30% reduction in transportation costs, increased inventory turns, reduced order cycle time, a 3.5-hour decrease in unloading time, and improved truck use (Nabisco is now able to get three times the number of orders on its trucks).

Getting Started at Nabisco

Cantwell is quick to point out that multivendor consolidation is a process change with specific requirements. Before you begin, make sure you

- *Have a mix of product.* The greater the mix of product, the easier it is to get the program started, according to Cantwell. Nabisco, for instance, produces and ships more than just cookies. Steak sauce, dog bones, and candy are included in the mix.

- *Realize savings potential.* “If you will only save a little bit, there will be little excitement in the organization; but the bigger the number, the greater the excitement.”

- *Have a champion.* Such a person is needed within your organization, with your trading partners, and at the 3PL. “You need someone to drive this through because a process change is difficult to make happen,” says Cantwell.

- *Make sure the program is customer driven.* “If the customer doesn’t want to participate, the program won’t work,” he says. “The big thing that makes SCORE work is that customers place their orders with the intent of consolidation. In the past, that never happened. Consolidation was driven by manufacturers or carriers, and the customer was left out.”

- *Align with trading partners.* You need critical mass to make this work, so try to find three or four willing participants within the 3PL warehouse environment.

- *Invest in technology.* Cantwell says that technology is not required, but it will help get over organizational barriers that may exist between you and your trading partners.

HOW TO AVOID A LEGAL ENTANGLEMENT WHEN TERMINATING A DISTRIBUTOR

Thinking of terminating your distributor? It may not be as simple as giving notice of intention to end the relationship. In fact, it could very well lead to an antitrust action filed by the distributor against your organization. Termination of distributors is one of the most troublesome areas of antitrust law. According to *The Antitrust Counselor* (Business Laws, Inc.; 440-729-7996), the reasons include the following:

- Termination of a distributor is a specifically identifiable event that usually gives rise to at least the threat of a lawsuit. “The terminated distributor usually suffers a financial loss, and he or she is usually a businessperson with a lawyer, a bad combination for the one causing the loss.”
- The present state of the antitrust law is not understood by many businesspeople. Even some business counselors are of this classification, the publication insists: “They think that every refusal to deal by a manufacturer is a violation of the antitrust laws.”
- When all the facts are gathered, it frequently turns out that some salesperson or field rep has made comments that could be interpreted as suggesting anticompetitive reasons for the termination. It’s usually just enough to get most termination cases to the jury. “This situation is always dangerous for a large manufacturer being sued by a small businessperson,” *The Antitrust Counselor* cautions.

Thoroughly Analyze the Specifics

Because the termination process is so sensitive, manufacturers will, in all likelihood, be working closely with corporate counsel. To prepare you for this mission, we offer the following guidelines developed by *The Antitrust Counselor*.

1. Closely examine the distribution contract. The basic idea is to evaluate any possibility for a breach of contract lawsuit by the distributor. This should include the following
 - Obtaining a copy of the written contract
 - Obtaining any information that might lead someone to allege that the written contract has been modified in any way or that certain of its provisions have been waived

- Identifying all of the obligations that the company undertook in the contract and ascertaining whether they have been met
- Reviewing all provisions concerning damages

2. *Examine all issues concerning territorial or customer restrictions.* The law is favorable to manufacturers when the termination results from a distributor's violation of the rules against tying, territorial, or customer restrictions. However, manufacturers still need to obtain all the facts relating to possible problems in those areas.

Keep in mind that tying, territorial, and customer restrictions are not illegal per se, but are judged under the rule of reason analysis. "Even under that lower standard, it is still possible to have a violation in a situation with extreme facts," as the guidelines note.

3. *Identify any relevant state unfair competition laws.* Many of these deal with unfair practices against consumers. However, some either expressly govern business-to-business transactions or have been judicially interpreted to apply in that context.

4. *Identify relevant state franchise statutes.* Some state franchise statutes define franchise very broadly. In fact, some "inartfully" drafted distributorship contracts would be swept within their definition. Because these state franchise statutes often restrict terminations, they could be highly relevant to your analysis, according to the checklist.

5. *Determine whether you plan to offer any of the distributor's employees a job.* The idea here is to identify any possible claim of "employee raiding" by the distributor.

6. *Evaluate the possibility of the distributorship's bankruptcy.* If likely, it increases the likelihood of a suit as well. If termination will be effective at a future time, an intervening bankruptcy of the distributor may operate to extend the agreement as an "executory contract," and in any event the "automatic stay" would apply.

7. *Examine arbitration clauses carefully.* If there is an arbitration clause in the distributorship agreement, it should be carefully examined to see if it covers termination. If so, this affects risk analysis. Your counsel also needs to analyze the relationship between the arbitration clause and the choice of law clause to resolve any potential conflicts.

8. *Look into your company's pricing practices.* Could there be a Robinson-Patman Act violation? Ask the following questions:

- Have all the "meeting competition" situations been properly documented?

Procedures for Terminating a Distributor

DO

- Give the longest possible notice.
- Consider stating the reason for the termination in the notice of termination even if you are not required to do so.
- Explain in an honest but firm and unequivocal way why you have no other business choice but to do this. Avoid any ambiguous actions in the termination process.
- Refrain from mentioning any other distributors.
- Give the distributor a chance to minimize any financial losses.
- Give the distributor a chance to complete any short-term deals and to retain anticipated profit.
- Make certain that the field people send in all papers bearing on the termination and give the complete story.
- Limit employee contact or communications with the distributor; you do not want the salespeople issuing threats or engaging in coercion or other questionable activities.
- Keep a record of all contacts and communication with the distributor.
- Obtain legal advice on any termination case.

POSSIBLY DO

- Give the distributor a temporary supply of goods but be precise in this situation. State exactly what you will do and for how long.
- Arrange for other means for this distributor to obtain products, such as buying them from another distributor. This is especially important if you are replacing one distributor with another.

DO NOT

- Rely on the contract for short notice on termination.
- Send a heavy-handed letter to the distributor.
- Send a letter that includes anticompetitive or other problematic language.
- Agree to any promises for the distributor regarding pricing, territory, customers, and so on, brought about by the threat of termination. Make a decision and stick to it.
- Leave unanswered letters in the file to cloud the record as to the real reason for termination.

Source: *The Antitrust Counselor*.

- Has the company been selling at different prices to different classes of customers? If so, will these different classes hold up in court?
- Have the company's advertising and promotional programs been structured to comply with the appropriate sections of the Robinson-Patman Act and the relevant guidelines?

9. *Examine all issues relating to damages.* Remember that you and your counsel should not be too quick to minimize any potential liability concerns. The many different theories of liability can often lead to different types of damage awards or recovery. "All termination decisions should be made with an eye toward possible litigation and the damages that the company might sustain," it advises.

10. *Remember the key word when considering termination: fairness.* The *Anti-trust Counselor* offers a series of procedures to follow (see sidebar) if the analysis recommends a termination of the distributor. The publication stresses the importance of a fair termination procedure. However, your analysis and that of your counsel might reach two other potential outcomes as well:

- Do not cut off the distributor. The distributor may really be doing a pretty good job. Or, even though it has some faults, it is not hurting the company or standing in the way of better distribution. In this case, do not terminate the distributor if there is any potential antitrust risk.
- You want to terminate the distributor, but you cannot afford the risk. Here, you find that the distributor is really troublesome. However, there are overriding dangers from an antitrust point of view. In this case, wait and build a better record. Document all problems and establish meaningful quotas for the distributor.

APQC STUDY ANALYZES DISTRIBUTORS' BEST INVENTORY PRACTICES

A comprehensive study—*Inventory Management: Enhancing Profits by Controlling Distribution*, by the American Productivity and Quality Center (APQC; Houston, Tex.; www.apqc.org)—identifies and examines innovations, best practices, and key trends in inventory management. It found that the following characteristics are common to all participants:

1. *Inventory and purchasing management requires more effort than ever before despite the introduction of new technology.* Lower profit margins in almost every

industry demand better management of assets, and inventory is usually the largest asset of a distributor. The skills required of inventory/purchasing people continue to increase and must continue to be enhanced.

2. *Inventory is expensive.* Decisions on stocking new products require careful evaluation. Therefore, stocked inventory is regularly reviewed to identify and liquidate dead or obsolete material.

3. *Communication with customers and salespeople is necessary to evaluate and react to changing customer demand.* Inventory/purchasing management departments do not operate in a vacuum. They view others, inside and outside of the organization, as valuable resources for information.

4. *Companies are attempting to reduce the amount of maintained, stocked inventory by encouraging suppliers to improve lead times.* All study participants try to negotiate yearly purchase discount agreements with vendors instead of receiving better prices based on the size of a single order. They also place replenishment orders more frequently.

Research on Four Macro Areas

The benchmark study enables companies to direct their own inventory management process more effectively and to identify any performance gaps. Nine companies participated in the study. Four were sponsors, whereas five participated as “best practice” companies.

Practices of the five best practice (partner) companies (Caterpillar, Peoria, Ill.; Fairmont Supply Company, Washington, Pa.; Graybar Electric Company, Inc., St. Louis, Mo.; LCR-M corporation, Baton Rouge, La.; and Panduit Corporation, Tinley Park, Ill.) are a model for others to emulate. Best practices include the following:

- *Customer service level and carrying cost of inventory.*
 1. All partner companies carefully measure customer service on a monthly basis. Several classify customer service failures to improve their internal processes.
 2. All partner companies use the economic order quantity (EOQ) service formula. Although EOQ was used by all, it was not universally applied.
 3. Acceptable customer service levels range from 90% to 98%, and several partner companies guarantee to certain customers a specific service level.

4. Each partner company was most concerned with the service level of its "A" (fast-moving) items.
 5. There is no standard methodology or set of formulas for demand forecasting and determining safety stock quantities.
 6. All partner companies use min/max replenishment for some items, mostly those that are slow moving or stocked for specific customers.
 7. All calculate inventory carrying cost. However, there is no consistency in the carrying cost percentage used. Each partner considers a different set of elements in calculating carrying cost. Because the carrying cost percentage is an integral part of the EOQ formula, this inconsistency may explain why each participant found the EOQ formula to be lacking in certain circumstances.
- *Inventory turnover and return on investment.*
 1. All partner companies consider turnover to be a less important measurement of inventory performance than customer service level or return on investment.
 2. All study participants are attempting to assign a single source of supply to as many products as possible. This not only improves the consistency of the products offered to customers but also reduces the number of products that must be maintained in inventory.
 3. Most partner companies added more items to inventory than they discontinued. Although they are reluctant to stock duplicate items from different suppliers, they are eager to expand their product offerings to serve their customers better.
 4. All partners had specific criteria for adding items to inventory. For instance, a special-order item would have to be sold a minimum of two to six times in a 12-month period to be considered for stock.
 5. No one was willing to stock an item based on a customer's "promises." They all wanted commitment.
 - *Excess inventory and shrinkage.*
 1. All partner companies view excess inventory as a major challenge and have a program in place to remove and liquidate excess inventory and dead stock. All partners' excess inventory is considerably below the national average.

2. Each partner identified maintaining inventory accuracy as major challenge. All but one have a perpetual cycle-counting program in place.
3. All partners have similar strategies for handling excess inventory/dead stock, including the following: return to vendor, transfer to other locations where needed, reduce the price, and throw in trash (a last-resort method).
4. The most common reason for excess inventory/dead stock is changing customer demands. Not one partner mentioned bad demand forecasts for new inventory items.
5. Some companies are just starting to explore advertising excess material over the Internet.

The complete report is available from the American Productivity and Quality Center, 123 North Post Oak Lane, Houston, TX 77024; 713-681-4020; fax, 713-681-8578; www.apqc.org. Price: \$185 for members of APQC's International Benchmarking Clearinghouse; nonmembers, \$395.

USE VIRTUAL TRANSPORTATION CONTROL CENTERS TO INTEGRATE CARRIERS

True supply chain integration requires a centralized approach to transportation management. With multiple carriers all operating on different systems and offering multiple modes, however, integration can be difficult to attain. By applying a virtual transportation solution, you can centralize and coordinate shipments from multiple carriers to create an optimal distribution network. This approach can save a minimum of 10% on your annual shipping bill.

A virtual transportation control center offers shippers all the benefits and functionality of a true network—selection, negotiation, and management of carriers; tracking and tracing; and freight audit processing and payment—without requiring investment in the infrastructure. These activities and more are turned over to a third-party logistics provider that offers a virtual transportation control center as a value-added service.

Getting Started

Roger Lowther, vice president of transportation services for USCO Logistics (Naugatuck, Conn.; 888-246-USCO; www.usco.com), told attendees

at a recent annual meeting of the Warehouse Education and Research Council (WERC; 630-990-0001) how to establish a virtual transportation control center.

First, determine if your company is even a candidate for a virtual transportation center. Lowther says that typical participants serve multiple markets in multiple geographies. These tend to be companies in high-tech, retail, and pharmaceutical industries. Next, the third party that you are considering should offer to analyze your transportation network. USCO, for instance, performs an opportunity assessment to determine how much the shipper is currently spending on transportation over at least a three-month period and whether the virtual transportation solution would be financially worthwhile. If the analysis recommends moving forward, the shipper can expect to obtain the most efficient and affordable transportation services, says Lowther, sometimes saving more than 10%.

How It Works

In the case of USCO, a customer's sales order is received by the client's ERP system. The ERP transmits the order to the USCO WMS. The WMS then sends the order to the USCO TMS, which, based on the best carrier's cost and service to deliver the order, instructs the WMS how to route the order. A central server at USCO has access to their client's inventory in all 18 USCO shared-DCs to ensure that the order can be filled. A carrier interface system receives the information from the WMS and uploads data about the shipment to the carrier for pickup. Once the order is picked up, an electronic confirmation is sent to the WMS, TMS, and client ERP.

The TMS is essential to the process, says Lowther, because it keeps a record of what actually shipped, signals if there was any change in the load plan, tracks and traces the shipment, sets up a freight-payable file based on what actually did ship, and provides a wide range of management reports.

Two Types of Virtual Networks

Lowther says that logistics managers can opt for either a centralized or decentralized virtual transportation control center, depending on the size and complexity of their transportation requirements. In a centralized environment (multiple USCO clients in a shared facility), the transportation control center is centrally located in USCO's headquarters to distribute product to

all clients' customers quickly. Centrally coordinating multiple carriers across multiple USCO facilities optimizes service and cost, says Lowther.

For firms that have the critical mass, a dedicated transportation control center (one company in one facility) may be the best way to go. However, expect to spend more for the operation of the transportation control center because the dedicated center is a stand-alone operation that can be located anywhere.

FOUR THINGS TO KEEP IN MIND WHEN OUTSOURCING FREIGHT PAYMENT

Given the hundreds of 3PLs that provide freight payment services, it can be tough to narrow the field and find the right one for your needs. Here is a shortcut: By concentrating on the following four areas, the right choice can be easy.

1. *The Price of a Provider*

Price is an important factor when choosing a freight payment management provider, according to Aims Logistics (Collierville, Tenn.; 901-854-5777; www.aimslogistics.com), a third-party freight payment provider. To get the most accurate pricing structure, the provider needs to understand your operations. The following will give the 3PL a better picture of your operations:

- What does your company do?
- How many dollars do you pay to carriers annually?
- What volume of shipments do you make annually for each mode?
- How many invoices do you pay manually and electronically?
- Do you rate your shipments with a Freight All Kinds (FAK) or actual class rating?
- What parameters do you use to rate shipments?
- Why do you want to outsource? What issues are you facing?
- What is your timeline for changing your process?
- Are you looking for a provider for U.S. domestic shipments only, or are you also looking for an international provider? If you want international processing capabilities, in what countries are you located?

- Is your company centralized or decentralized?
- Do you follow the same account coding conventions across your organization?
- What EDI transaction sets do you use?
- Which, if any, of your primary carriers are set up on EDI?

2. *Payment Practices*

Many components make up the freight payment process. Make sure you know how the 3PL carries out the process so that you know what you are paying for, recommends Cass Information Systems, Inc. (Bridgeton, Mo.; 314-506-5500; www.cassinfo.com). Some questions regarding payment practices include the following:

- Does your system have a specific day-of-the-week close out?
- Are you currently doing multiple closeout days for any of your clients?
- If a special closeout is needed, could your system handle it, and would there be an additional charge?
- What is the frequency of payments to carriers, and by what means can payment be made?
- Describe the information flow during the payment process. What is your funding/reconciliation process?
- Discuss how your company can be flexible in meeting different payment terms (30/45/60 days) and providing cash management services.
- How do you handle payment in foreign currencies? Do you pay carriers outside the United States? If yes, in what countries? Do you pay international carriers in currencies other than U.S. dollars? If yes, what international currencies do you support?
- By what method do you pay international payees?
- Describe your company's strategic plan for implementing the Euro while maintaining support for legacy currencies.
- Describe your company's strategies for hedging currency risk and re-denominating transactions in foreign currencies into USD.

3. *Uses and Sophistication of Technology*

One reason you choose to outsource freight payment is that you expect an expert to have the technology to carry out the task more efficiently. To assess providers' technological capabilities, address the following:

- Describe your system and database capabilities. How far back does your online payment history extend?
- What type of operating platform strategy do you use?
- Describe your capabilities to transmit/receive data via FTP as well as high-speed modem connections.
- What is your application software, and when are received bills visible to clients/carriers?
- Can you access processed data online via modem or the Internet?
- Discuss current and planned technologies, including database development, enhancements, and maintenance of applications.
- Describe your abilities to marry U.S. domestic and international data together for global site analysis.
- What EDI versions do you handle? Will you continue to support non-Y2K versions of EDI translations?
- Do you support UN/EDIFACT data receipt and translations for EDI processing?
- Do your applications handle multicurrency?

4. *Researching Financials*

According to Aims Logistics, many shippers overlook a potential provider's freight funds management. Consider these items to understand the provider's commitment to the safe management of your freight funds. Remember that a provider's length of service is not necessarily an indication of stringent financial controls.

- Does the provider have audited financial statements and written opinions from an independent auditing firm? Through these statements, you can confirm that the provider is financially healthy, that financial controls are in place, and that financial controls meet generally accepted accounting

principles, any related party transactions, and the company's investment policies.

- Does the provider have fidelity bonding to protect freight funds from dishonest employees? These steps will help in researching fidelity bonding protection: Verify the bonding company. Then ask the provider to send you an original Certificate of Insurance from its bonding company. When you receive the Certificate, contact the bonding company to confirm the amount of coverage and any exclusions from coverage. For instance, if company officers and check signers are excluded, cost of coverage is reduced. However, these employees can more easily circumvent the financial controls that protect your freight funds.

- Does your provider offer written investment policies? Third-party payment providers control your freight funds for a short period of time. During that time, those funds can earn float revenue. Understand the provider's investment instruments and what risk is involved. That level of risk should mirror the level of acceptable risk of your company's treasury department.

Some Final Points

In your search for a freight payment provider, take the following two points into consideration. First, make sure that freight payment is the provider's core competency and not just another service it offers, advises Teena Sorensen, a consultant with the Sorensen Group (Chagrin Falls, Ohio; 440-543-6354; sorensengp@aol.com).

Second, decide what level of control you want over the process once it is outsourced, she advises. "Some shippers want to keep their hands in the process, so they like being close to the provider's premises." Just remember, as she continues, "You can't outsource all responsibility because it is still up to you to manage the relationship with your carriers. Work with the freight payment provider to avoid carrier conflicts."

NINE WAYS THAT LOGISTICS PROS CAN MINIMIZE EXCISE AND TRANSPORTATION TAXES

The hidden logistics costs of domestic and international shipments can greatly skew what managers think they are paying for goods. The most pervasive of these hidden costs is taxes. Keen logistics managers can identify

these costs and uncover other tax-saving opportunities with the creation of a tax program.

“Logistics managers have the chance to capture savings that have unknowingly been overlooked,” says Richard Janis, partner with KPMG LLP’s Washington National Tax practice (McLean, Va.; 703-747-3164). It just requires knowing where to look.

Partnering Up with the Tax Guy

To find and reduce taxes, logistics managers should seek the support of tax experts. The reality of the situation, however, is that tax specialists are not included in business meetings or in decisions about supply chain activities, such as transportation, according to a recent survey from KPMG. The survey found that the vast majority (84%) of tax departments are not involved with transportation and logistics. Only 16% are included in management meetings with transportation leaders (see Figure I-2.2).

Together, managers and tax pros should develop a transportation and excise tax minimization program focused on developing and implementing tax-saving strategies. Some of the taxes that a transportation tax minimization program should focus on are sales tax, fuel tax, license fees, property tax, workers’ compensation, and federal excise tax.

Identify Opportunities

Some of the tax-saving opportunities that a tax minimization program can identify are in the following:

- *Customs duties and tariffs.* Two ways to look at customs are compliance and planning, says Mark Neville, partner at KPMG LLP’s Trade and

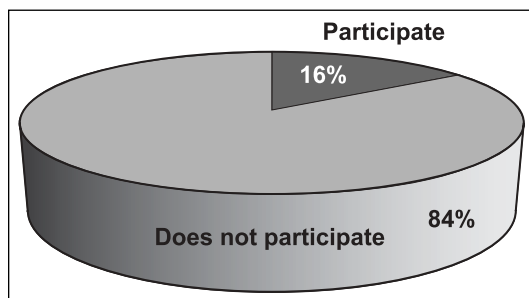


Figure I-2.2 Participation in Transportation and Logistics Meetings

Customs practice. From a compliance perspective, a company should ensure that its operations are in accordance with applicable laws and regulations to avoid the risk of penalties. Planning techniques are typically aimed at changing the tariff classification—and, thereby, the rate of duty collected or the dutiable value—lowering the tax base against which the duty is applied.

- *Sourcing.* This can be shifted to low-tax/duty jurisdictions. Domestically, companies need to look at the differences in state and local taxes between states. Globally, various options must be considered. For example, most inbound goods from the European Union are dutiable, whereas the same goods are duty-free if sourced through Israel.

- *Income-based shifting.* Companies can establish a structure in which income is shifted from high-tax jurisdictions to low-tax jurisdictions. This is achieved by unbundling services to identify pockets of profitability and then placing those pockets in appropriate tax jurisdictions, explains Janis. The mechanism through which this is achieved is by transferring goods, services, funds, technology, and intellectual property between related parties and establishing arm's-length transfer pricing for the value of such items.

Just make sure that you are working with people who are knowledgeable about transfer pricing as well as with people who have legal, financial, operational, and tax experience. These people must work together to take into account all the factors that go into this and the effect that shifting could have on the business as a whole.

- *Trucking fleets.* Most firms that operate their own trucking fleets use a separate operating division, whereas other firms include the truck operations in a separate legal entity. The proper operating structure and Interstate Commerce Commission (ICC) authority is key to reducing the overall operating costs of your fleet. For example, obtaining ICC authority to operate as a for-hire carrier may allow for significant sales and use tax savings, plus a reduction of other operating costs through increased backhauling revenue.

According to the KPMG respondents, in most cases (71%), responsibility for transportation and excise taxes falls outside the tax department (see Figure I-2.3).

- *Distribution centers.* In addition to minimizing truck fleet operating taxes, opportunities exist to reduce taxes associated with owning and operating a DC. Some of the tax-related opportunities include property taxes, incentives for DC location, duty drawbacks, and foreign trade zones.

The key to taking advantage of various depreciation rates is knowing ex-

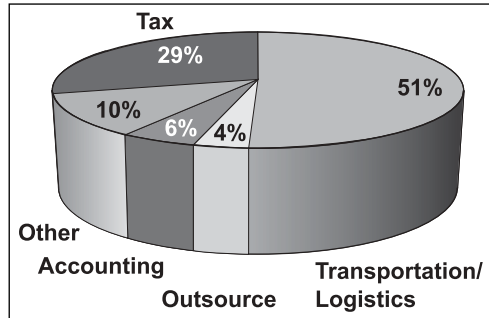


Figure I-2.3 Department Responsible for Transportation and Excise Taxes

Source: KPMG/IMRA Research.

actly what categories the IRS allows for warehouses. According to tax consultants at PricewaterhouseCoopers (800-528-5816), properly categorizing property costs can result in better depreciation rates. Better rates can result just by how you classify the DC structure itself. For instance, one common strategy is to build a rack-supported warehouse, in which the racks are part of the building's support system. The idea is to classify the entire building as a piece of equipment that is used to store products.

- *Foreign trade zones.* At its simplest, a foreign trade zone (FTZ) permits a duty deferral because it is deemed to be outside the customs territory. If goods are reexported, duties are eliminated because they never enter the customs territory.
- *Virtual warehouses.* A virtual warehouse can provide savings in manpower, centralize accounting, improve cash flow through deferring duty, and improve customs compliance.
- *Regional trade agreements.* A regional approach to trade, in the form of customs unions or free trade areas, allows goods from participating countries to be shipped duty-free within the region.
- *Charity donations.* If you have excess or slow-moving inventory, you might consider donating it to a charitable organization. The federal Internal Revenue Code allows donations to tax-exempt organizations as long as the property is used solely for the care of infants or of the ill or needy. How much a tax deduction your company can expect is a question better put to a tax specialist; generally, however, the writeoff should be equal to the lesser of twice the cost of the inventory, or the cost of the goods plus one-half the difference between the cost and the inventory's fair market value.

ACHIEVE PERFECT ORDER FULFILLMENT OVER THE INTERNET AND REDUCE COSTS

If industry statistics are right, it is imperative that logistics departments simplify their e-business order fulfillment process. Between 2000 and 2001, the value of orders placed over the Web is expected to increase sixfold. By the end of 2000, companies booked an estimated 12% of orders via the Web, up from 2% in 1998. They expected electronic inflows of orders to grow to 47% of orders, up from 27% in 1998 (see Figure I-2.4).

All of this boils down to the fact that you will wind up reducing the number of staff dedicated to traditional order management (taking orders by phone, fax, mail, or e-mail) and rely more heavily on automation to handle incoming orders via the Internet. Here are some great ways to facilitate that process.

- *Coordinate initiatives to improve delivery performance.* A survey from the Performance Measurement Group (PMG; Waltham, Mass.; 781-434-1279), *Supply-Chain Management Benchmarking Series*, finds that best-in-class performance in perfect order fulfillment has improved 5% since the mid 1990s. Late shipments account for the number one failure toward achieving perfect orders. Other reasons include incorrect documentation, incorrect items being shipped, damaged goods, and incorrect quantities (see Figure I-2.5).

Organizations can reduce these errors by coordinating efforts throughout the supply chain. “The industry is moving beyond simple delivery reliability to a holistic view of complete, on-time, and accurate order fulfillment,” says Steve Geary, chief analyst with PMG.

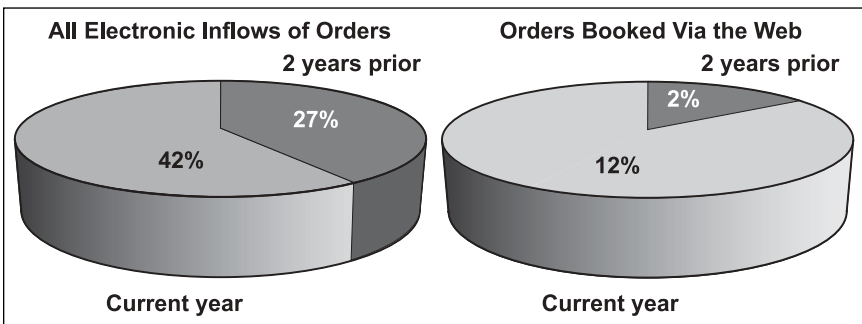


Figure I-2.4 Electronic Orders

Source: The Performance Measurement Group

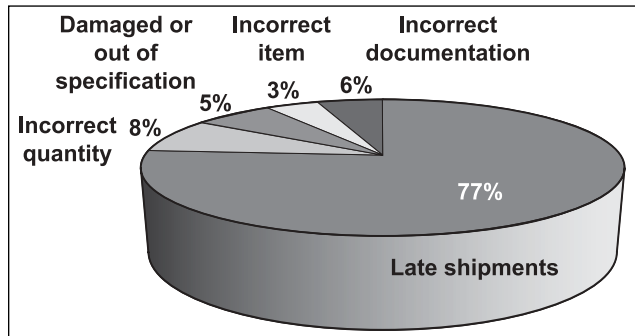


Figure I-2.5 Distribution of Failure Modes

- *Invest in automation.* PMG's survey results show that although the use of automation is growing at a rapid rate, half of all orders placed still arrive in a manner that requires manual order entry. Geary says, "Companies must simplify their order management processes," and they are beginning to do so with Web and EDI technologies. He adds, "Companies are starting to invest heavily in the development of electronic order receipt mechanisms with far-reaching implications for the entire order fulfillment process."

- *Implement order-tracking systems.* Such systems can compare requested versus actual dates at the line-item level and give customers better visibility to their inbound orders.

- *Put yourself in their shoes.* Imagine what issues the customer faces and align your operating strategies to accommodate them. This might include being more flexible or improving on-time performance. Or it might mean having to disperse inventory to regional DCs for faster delivery, configure orders, or have your computers talk to their computers. "All of these are reacting to what the customer needs," says Geary. "Companies are starting to view the customer delivery process as a bundle of services that maximize the customer experience."

- *Share information with customers.* Survey results indicate that today's customer relationships require a great deal of data transfer between companies. Findings show that the Web is being used for customers requesting shipment status notifications and inventory status updates, and that customers and suppliers are exchanging product sales activity data, as well as planning and forecasting data over the Web.

- *Partner with suppliers.* A key issue confronting managers is how to continue reducing material constraints without increasing on-hand inventory.

Best-in-class companies are working with their suppliers to reduce cost and uncertainty. “Companies that can reduce their delivery time without building large costly pools of inventory and inform all tiers of the supply chain instantly of customer demand changes will put slower movers at a significant disadvantage,” says Robert Pethick, Pittiglio Rabin Todd & McGrath (PRTM) director.

This primarily revolves around improved forecasting and transmitting that information throughout the supply chain. Eliminating uncertainty allows you to be more flexible and reduces lead times. “It is a guessing game as you look up and down the supply chain to determine what tidal wave is coming next,” says Geary.

- *Improve cash cycles.* Part of streamlining order management is receiving payment more quickly. PMG points out two effective payment options. First, consider implementing online purchasing and EDI. This will help reduce the time and overhead needed to process paperwork. A “pay on receipt” approach for selected products can minimize time-consuming matching and reconciliation of customer invoices.

Another option is “cash release” agreements for blanket orders. For companies concerned with cash flow, you might want to explore third-party reconciliation and payment relationships. This puts the third-party in charge of providing cash management in exchange for notification from the customer that shipment has been received. Companies adopting this approach can achieve single-digit receivables periods (within 10 days), helping to achieve cash-to-cash cycle times that are one-third to one-half that of their competitors’.

All of these strategies have a common thread: the customer. “The Internet lets you focus on what your core competency is and find ways to add value to the customer’s ordering experience,” says Geary. “Understand your role in the total supply chain and how it relates back to the customer so that their order fulfillment needs are met.”

FIVE WAYS TO RAISE THE EFFECTIVENESS OF YOUR FLEET MANAGEMENT PROGRAM

The challenges facing fleet supervisors and their staffs range from how to control expenses to choosing new information systems and setting the right maintenance levels. On top of all this, the whole process has gotten harder

with the rising cost of fuel. Ultimately, the key to effective fleet management is a sound transportation program focused on five main areas.

1. Improved Overall Management

Transportation managers must develop a higher skill level in order to attain a successful fleet program. Richard Kochersperger, Gerald Peck Research Scholar for the Erivan K. Haub School of Business at Saint Joseph's University (Philadelphia; 610-660-1616), recommends that management adopt the following practices toward managing its fleets:

- Hire professionally educated and trained personnel. In-house educational programs should be introduced to improve the skills and knowledge of staff.
- Give transportation a higher profile in the company. Develop a five-year action plan that details how the transportation department will continue to overall profitability and performance of the company. Identify specific objectives and goals to be accomplished.
- Integrate benchmarking into the management process. Specific weaknesses and opportunity areas should be identified, and a plan to correct any faults should be implemented.
- Adopt activity-based management practices. Management needs to know which customers are subsidized because they cost more to service, which processes are inefficient, which products are more expensive to handle, which equipment costs the least to operate, and which routes are most expensive.

2. Effective Use of Information

Companies should develop and implement an effective benchmarking strategy that measures all areas of fleet performance. The program should involve all associates. Some suggestions for accomplishing this goal include the following:

- Get the entire logistics team involved in reporting on performance measures. Have them measure performance over time, identifying positive developments and new opportunities.

- Identify which metrics to measure. Start with the basics such as on-time deliveries, percentage of orders delivered, total cost per mile, and expenses as a percentage of sales. As you begin to learn and understand the details of these metrics, consider adding other measurements such as cost per case, pounds/cube per delivery, percent of backhaul trips, empty miles, scratches, damage, and equipment utilization.

Kochersperger says that a report should be generated every day that looks at delivery performance and on-time deliveries. This information should be made available to all associates so that they understand how the company is performing.

3. Information Systems and Technology

The use of information systems is growing, and there is more interest on the part of transportation managers to purchase such technology for their fleet programs. According to Kochersperger, the solutions that pose the greatest benefit to managers in their fleet management programs are trip recorders, computer routing systems, and radio and satellite communications. "Trip recorders offer great potential, but many fleet managers are not using the information effectively," he says. Trip recorders are useful for determining the following information: off-route miles, on-time delivery, actual trip miles, store unloading, speed, and engine idle.

Technology is also crucial to fleet maintenance. Computers, either main-frame or personal, can assist in information management. Kochersperger says that there is a developing need to move to bar code systems for parts and tire management and to integrate vendor information systems for engines, tires, and refrigeration units. "The fleet maintenance facility in the 21st century will employ much information technology that will contribute to significantly lower repair costs and road failures," he says.

4. Maintenance Strategy

Rising fuel costs are just one reason for managers to find ways of controlling fleet costs. According to Kochersperger, fleet maintenance costs such as repairs, tires, labor, and overhead can also be kept to a minimum by strictly adhering to the following:

- Emphasize preventive maintenance. Use the best mechanics to complete this process, which will go a long way in reducing equipment downtime and preventing major component failures. Ensure that the preventive maintenance schedules are completed in a timely manner and are conducted regularly.
- Keep the maintenance area clean and organized. Have a place for everything. Make sure the workspace is well lit and laid out efficiently. Label parts clearly. Do not store remains and leftovers on the property, such as batteries, old parts, and paints.
- Control the inventory. Audit parts movement and fuel consumption regularly. Check invoices for correct pricing and require multiple supply points.

5. *Fleet Safety*

Probably the most important part of any fleet management program is the driver and how safely that person operates the vehicle. Finding skilled drivers in today's labor pool continues to be a chore for many supervisors, and retaining them once they are onboard is even more difficult. Here are some of Kochersperger's recommendations in the realm of human resources:

- Hire the best people. Drivers are the ambassadors of the company because they see the customer the most. Seek transportation personnel who have experience in the industry.
- Expect professional results. Give them the tools to do a great job, such as uniforms, quality equipment, and technology. Provide training to improve competencies and skills.
- Pay for performance. Award drivers for outstanding effort. Meet with the group on a regular basis to listen to their view on operational issues.
- Implement an effective driver program. Encourage them to think safe and promote safe driving habits.
- Participate in an accident prevention program. Several facilities around the country are available to train for accident prevention. These operations put drivers through controlled skids, which enable them to learn what to do when a serious problem develops.

HOW LUCENT'S MERGE-IN-TRANSIT PROGRAM CAN CUT YOUR LOGISTICS COSTS

Coordinating shipments from multiple manufacturing sites usually adds transportation, warehousing, and inventory costs. This, in turn, is causing many logistics managers to look for a less expensive but reliable means of consolidating multiple shipments for final delivery to customers. For many like Lucent, that answer has been merge-in-transit. Merge-in-transit is the practice of moving freight manufactured from multiple locations to a single location near the final delivery site. It is especially suited to companies looking to take advantage of just-in-time deliveries.

One company that has found success with merge-in-transit is Lucent Technologies in Westminster, Colo. Lucent receives manufactured parts from its own manufacturing site, as well as from outside suppliers. All of those components were being shipped from their original manufacturing site to a Lucent warehouse and then shipped to the end user. Gary Sahr, general manager logistics for Lucent, says that the company realized that there was little value added in shipping to the warehouse.

In an effort to cut out transportation time and ship products closer to the end customer, Lucent set out to implement a merge-in-transit program. After an extensive request-for-proposal process of various service providers, Lucent chose to work with GeoLogistics Americas, Inc., in Denver.

According to Darryl Barker, vice president for business development at GeoLogistics, Lucent's manufacturers and suppliers ship their products to a consolidation point close to the end user. Without putting those parts in storage, GeoLogistics consolidates the shipments and makes a single delivery to the customer. A Lucent crew awaits the arrival of GeoLogistics at the customer site and directs the unpackaging of the equipment. Lucent technicians then install the technology. In some cases, Barker points out, staged deliveries can be made to the customer site, whereby certain components are delivered at certain times. "This requires close coordination with Lucent," says Barker.

Sahr says that direct shipment to the consolidation points, of which Lucent has around 40 throughout of the country, has helped improve three business areas: on-time customer deliveries of complete orders; reduced inventory carrying costs; and savings in warehousing, transportation, and distribution.

Eliminate Redundant Transportation

Barker says that redundant transportation movements and costs are virtually eliminated when merge-in-transit is utilized. In the case of Lucent, for example, he explains how the company used to transport components from the original manufacturing site to a warehouse. The parts were then consolidated and sent to the customer. Now, the transportation to Denver is eliminated.

Reduce Inventory Costs

Merge-in-transit also means that products are handled less frequently. Additional receiving and putaway are not required because the product does not actually go into inventory, thus reducing inventory carrying costs. Because inventory is not being pulled from shelves to fill orders, cycle time is reduced.

React to Forecast Changes

Barker says that merge-in-transit opens up opportunity for logistics managers to react better to changes in forecasts. “Let’s say Lucent’s engineers forecasted that so many batteries would be needed to fill customer orders, and then the customer changed the nature of its orders that a different battery would satisfy,” Barker explains. “The shorter interval that exists from the manufacturing site to the consolidation center allows Lucent to adjust the forecast, fulfill the order, and get the batteries to the customer in a timely fashion.”

Moving Information, Not Material

Sahr and Barker agree that the transportation element of merge-in-transit takes on less importance than does the information required to carry out the task. You have to make sure that the information technology (IT) systems between your company and the service provider are linked and reliable.

Lucent requires GeoLogistics to track shipments at the item level, which, according to Barker, is more complicated than tracking at the shipment level. Thus, the IT connections become critical. “We need the relevant information from Lucent’s systems to do that tracking,” says Barker. “At

that point, transportation becomes secondary to the movement of the information.”

He says that any company looking to carry out merge-in-transit with an experienced service provider should be willing to openly share that information or else “the program won’t be successful.”

Didn't Do It for the Money

Sahr says that since implementing its merge-in-transit program in April 1998, the service improvements are worth noting: 40% improvement in inventory reductions, an \$8 million dollar reduction in finished goods inventory, shortened delivery times, and on-time deliveries of complete orders. “Really, we did not begin this project to save money,” says Sahr. “This was an opportunity to advance our customer service capabilities.”

M&M/MARS TARGETS GOAL OF SHIPPING ONLY PERFECT ORDERS

Achieving a premiere position among your competitors really comes down to one thing: sending out perfect orders to your customers. One sure way to find out if this is happening is to perform a measurement of your orders, tracing them from beginning to end. One company that is in the middle of such a process is M&M/Mars. Donald Jacobson, national logistics manager for the company, explained how he is carrying out this task at a recent Logicon meeting.

So far, M&M/Mars can claim the following improvements with regard to its perfect order status: a 4% increase in direct shipments, a 70% increase in indirect shipments of less than 70 pounds, a 28% decrease in accessorial charges, reduced ship-to points by 61%, reduced number of orders by 41%, reduced number of invoices by 45%, and decreased the number of shipping/pricing deductions by 47%.

Perfect Order Cycle

The Perfect Order Measurement Cycle that M&M/Mars established will measure failures in three areas: order, delivery, and settlement.

Order failures include

- Wrong customer number
- Invalid purchase order number
- Insufficient lead time
- Incorrect/missing promotion number
- Incorrect/missing special instructions
- Incorrect item number
- Quantity variation
- Ordered over allocation
- Insufficient inventory at order entry
- Incorrect price
- Incorrect customer terms

Delivery failures include

- Insufficient inventory at the warehouse
- Appointment problems
- Overage/shortage/damage
- Wrong item picked/shipped
- Accessorial charges

Settlement failures include

- EDI invoice transmission error
- Customer check/transfer not automatched
- Customer takes a deduction
- Customer ignores terms of sale

Tracking Failures

Jacobson explains that in order to determine where any of the above failures were occurring—from order entry to final delivery—a project team consisting of logistics, customer service, finance, sales, technical development, and warehousing and transportation followed an order through the entire process. The team documented all possible breakdowns and manual interventions.

“We found that some failures were internal and some were the fault of our customers,” he says. The reported failures will be used to develop process improvements. Dedicated teams for the company’s top 15 accounts will institute the improvements.

A Test Case

After identifying its potential failures, M&M/Mars ran a seven-month test with one of its partners. It was set up so that the company would ship approximately three shipments per week.

Perfect orders accounted for only 6% of all orders shipped. Most failures were due to incorrect or missing promotions, insufficient inventory at the warehouse, automatch problems, and deductions.

Jacobson says that this test case will allow M&M/Mars to move forward in its quest for the perfect order. A phased approach will be implemented because it is both simpler and more cost effective to justify.

The Benefits

Once M&M/Mars reaches its goal of shipping perfect orders, Jacobson expects to see benefits in the following areas:

- *Customer service.* Service measures will be integrating beyond order fill and physical distribution to include all possible failure points.
- *Customer business development.* “There will be a focus on eradicating zero value-added activities by using tools to identify business processes that cause inefficiencies and failures, allowing us to determine the root cause for those failures and allow proactive interaction with customers,” says Jacobson. “Ultimately, this will help us establish rapport and trust with key accounts.”
- *Activity-based costing analysis.* “This will provide the ability to understand our selling, logistics, and administrative processes and costs and their impact on profits.”

Buying From Larger Distributors

In addition to tracking orders, the candy giant made some changes to its pricing and ordering structure to increase the percentage of perfect orders. The purpose is to ensure that customers receive their orders faster and correctly.

Key to this was forcing the smaller distributors to buy from the larger

ones, explains Jacobson. “This was met with some resistance by those who thought they would wind up buying from their competitors,” he says, “but they are getting better lead times, anywhere from three to five days versus the seven that we could promise them. We only do three to five days lead time for our top customers.”

The Price of Perfection

To date, M&M/Mars has spent \$150,000 on its project, and future expense estimates are high. “I don’t think we’ll get all the funding at once,” says Jacobson.

DAIMLERCHRYSLER REVS UP PARTS DELIVERY TO BOOST CUSTOMER SATISFACTION

You never want your customers to wait for product, especially if it jeopardizes whether they satisfy *their* customers. This ripple effect on the supply chain can have devastating results unless you have a system aimed at combating stockouts and distribution errors.

Nowhere is this more critical than in the automotive aftermarket service parts business, where providing timely, hassle-free delivery of parts to dealers and customers can be leveraged as a strong competitive advantage. Unnecessary complexity under an old system kept DaimlerChrysler from realizing this benefit. Thanks to a new system, however, dealer satisfaction ratings are higher than ever.

Order Fulfillment Gone Awry

For more than 20 years, Mopar—the division of DaimlerChrysler that provides service parts and accessories to dealers—used a traditional order fulfillment system of strategically situated parts distribution centers (PDCs) to provide service parts to a group of dealers in a designated region. Orders were quickly filled by the PDC and delivered to the dealer the following morning using a dedicated delivery system (DDS).

However, if an ordered part was not available at the dealer’s PDC, it was referred to another PDC in the network. This extended delivery time by three to five days. Furthermore, referral parts were often damaged due to multiple handlings in the shipment process.

The referrals robbed the shipping PDC of inventory intended for its own dealers and, as a result, created a series of stockouts and maldistribution. At any given time, as many as 20,000 parts on order could be referral parts. As a result, processing referral part orders was cumbersome and costly, so dealers had to wait without any way of tracking the status of their order.

Telephone calls for referral order tracking and expedited shipping requests were frequent. "It set off a chain reaction that ultimately affected the car owner," says Doug Zopfi, North American Free Trade Agreement integration manager for DaimlerChrysler (Center Line, Mich.; 810-497-0515). "Dealers' repair schedules became unpredictable, affecting their ability to service customers."

Zopfi says that although referral parts accounted for only 6% of the total volume of parts that Mopar shipped, they made up nearly 50% of out-bound transportation costs. "The old referral process was ineffective and costly to operate," Zopfi explained to attendees at a CLM annual meeting. "We couldn't tell dealers exactly when they would receive their critical parts orders. Consequently, they couldn't tell their customers with certainty when they could complete repairs. We needed a more predictable and reliable system that also reduced the cycle time of deliveries to our dealers."

Another difficulty of the old network was the single-line order system. Although the dealer had placed one order, the parts were picked, packaged, metered, and shipped as individual line items, so each different part came to the dealer in different boxes at different times.

A Two-Pronged Solution

Mopar's Dealer Satisfaction Index suffered under the old system, and in 1998 DaimlerChrysler realized it was time for a change. The company partnered with UPS Worldwide Logistics (UPS WWL; 734-542-9560) to create a comprehensive supply chain and order fulfillment solution. "We needed a single-point provider that could manage everything from end to end," says Zopfi. "UPS WWL offered us facilities, value-added services, and shipping and tracking systems that allowed us to streamline our process, reduce damages, and improve our service levels."

First, WWL looked at ways to boost efficiency. The processes in place for the PDCs were reviewed to cut activities that failed to add value. Packaging options to consolidate multiple line items for the same dealer were designed to eliminate the need for single-line order processing. Traditional transportation methods were redefined to reduce order delivery cycle times

with less damage. Finally, the total system costs of the old process—labor, transportation, damage claims—were identified.

Next, two order consolidation centers (OCC) were created in Detroit and Milwaukee and were staffed and managed by UPS WWL. The locations are near Mopar's national PDCs and several regional centers and are convenient to contract packagers who ship some dealer orders.

Mopar changed its order fulfillment system to shift most referrals through its national PDCs and DCs near the OCCs. This reduced the number of stockouts and maldistribution effects. The OCCs also provide transportation management, dedicated transportation, processing capabilities, and call center support services.

The primary function of the OCCs is to expedite dealer orders. Stock order referrals and oversized parts are consolidated and shipped to the dealer's PDC for final delivery on Mopar's DDS trucks. More critical and car-down orders are consolidated by the dealer and are shipped using next-day ground or air delivery.

OCC Equals Expedited Shipments

By combining items into overpacks, many of the inefficiencies of the old single-line processing method were eliminated. Dealers now receive their critical parts the next day in one consolidated shipment. Because of the faster delivery times, the need for order tracking and expedited shipment requests have also dropped off significantly. However, when an order does need to be traced, a full system of tracking information and reporting mechanisms has been established to monitor every step of the process for every referral part.

Dealer Satisfaction Rises

The response from dealers has been enthusiastic, with satisfaction scores rising 20% since the new system was implemented. "The system is working out well," says a parts manager in Anchorage, Alaska. "We have no damage to report."

DaimlerChrysler has expanded the new system to referral parts orders from dealers in Mexico, reducing the cycle time by nearly two weeks. Plans are now underway to include Canadian dealers in the program. "We took a giant step in customer service," says Zopfi. "We've increased efficiency throughout the network and provided dealers the consistency of delivery that they deserve. Now dealers can schedule repairs with greater confidence because they know when they'll have the parts they need."

Chapter I-3

International Logistics

HOW TO PREPARE YOUR LOGISTICS DEPARTMENT FOR NEW EURO-BASED OPPORTUNITIES

Have you considered how the euro is going to affect you and your logistics operations? The good news is that the emergence of the Eurodollar will bolster your ability to evaluate international suppliers and vendors by standardizing price comparisons against a common currency. The bad news is that getting there will require adjustment to a euro-compliant software system. We recently interviewed a number of euro experts to find out what logistics managers should be doing to get ready for this change.

One Big Happy Family

The introduction of the euro creates one European domestic market that is almost as big as the U.S. market. Consequently, American companies doing business in Europe will not have the headaches of dealing with fluctuating currencies. Any logistics manager who is selling or purchasing products in Europe will feel the effects of the euro, according to Karin Bursa, vice president of marketing at American Software (404-238-8338).

The euro may even cause companies that are not involved with European import or export to reconsider their trade strategies. "Companies that don't have European suppliers or customers today may choose to in the future because it will be easier to transact business with them," Bursa explains.

With an expanded European market comes increased competition among European suppliers. That means more choices for logistics managers. For example, if a European subsidiary currently uses a third-party ware-

housing provider in Lisbon, a manager might opt to move distribution operations to a facility in Rotterdam. The euro will enable logistics managers to compare the costs of each more easily, argues Mark Root, project manager at QAD, Inc. (805-684-6614). "The euro will have a competitive and logistical impact," Root says. A single European currency will enable logistics managers in the United States to compare all suppliers and vendors under the same currency. Therefore, the array of choices when importing and choosing a European logistics services provider will grow.

Preparation Is Fundamental

Unfortunately, most American companies are not ready to tackle the euro and its changes. American businesses that are taking advantage of the euro currently operate subsidiaries in Europe, Root says. He recommends that logistics managers begin by taking a strategic—rather than a tactical—look at the euro. "Logistics managers should begin evaluating the European market for suppliers," Bursa says. They should look for competitive bids from logistics vendors and suppliers to determine how cost-effective it is to continue to do business with their existing European partners. Furthermore, logistics managers who currently use only domestic suppliers should look outside U.S. borders. "They may actually decide that it's easier and cheaper to work with nondomestic suppliers," Bursa says.

All Systems Go

Managers must ensure that their supply chains and accounting systems can support euro transactions. "Logistics managers have to prepare for the ability to conduct transactions," Bursa advises. Keep in mind that the euro creates more than an accounting issue. Electronic data interchange (EDI) transactions, inventory management programs, and shipping and receiving applications all include monetary values.

Not only must the systems be able to handle bills, invoices, and payments, but they also must be able to support triangulation. Because domestic currencies will not become obsolete until 2002, software systems must be able to recognize domestic currencies and U.S. dollars as well as the euro. "It's different than simply adding one additional currency to the application," Bursa says. For example, to determine the exchange rate between the U.S. dollar and the deutsche mark, software must convert the dollar to the euro and then the euro to the deutsche mark. Although currency

triangulation is only a temporary necessity, it is a fundamental function of any software program today.

To ensure that logistics software applications are euro-ready, turn to the software provider itself, Bursa recommends. Simply ask if the application is euro-enabled. If it is not, find out when an upgraded version will become available. "You're in for a big challenge if your application isn't euro-enabled," she says.

Next comes the migration strategy, which offers two options, Bursa says. Either run parallel transactions using domestic currencies as well as the euro or conduct a phased implementation of the euro into operations.

The Effect the Euro Will Have

How long a manager's preparation takes depends on the speed with which one starts, the determination to accommodate and take advantage of the euro, and software readiness, Bursa and Root explain. Regardless of how prepared managers are, however, they can be sure that their logistics operations will feel the euro's effects.

"The jury is still out on how quickly the euro will actually begin to affect American companies," Bursa says. Some experts expect the impacts to hit immediately, but others estimate that the ripples will take a couple years to hit America's shores. By 2002, it will be a very competitive marketplace, Bursa says.

FREE ELECTRONIC FILING OF EXPORT DOCUMENTS SPEEDS PROCESS AND ENSURES SECURITY

Sending documents over the Internet is a great way to eliminate delays and errors as well as fraud and forgery. Currently, logistics and shipping managers have several *free* Internet options for sending bills of lading, shipping export declarations, and many other documents.

Free Internet Bills of Lading Systems

Several major carriers, including American President Lines (APL; www.apl.com), Orient Overseas Container Line (OOCL; www.oocl.com), and the newly merged Maersk (www.maerskline.com) and Sea-Land (www.sealand.com), have introduced systems that allow shippers and forwarders to

download a bill of lading (B/L) from the carrier's internal documentation computer systems via the Internet. The B/L can be printed directly from a desktop, allowing the shipper to control both the delivery speed and the accuracy of the documents. The systems can also print waybills. To use these free services, shippers must sign a terms and conditions (T&C) contract with the carrier. When authorized, the carrier sends blank B/L forms to the shipper. The Internet B/L printing facility enables exporters to view it in a foreign country while having it printed in the U.S. home office, eliminating time spent sending B/Ls from source country to destination country.

Roadway Express, Inc. (Akron, Ohio) has released E-Z Export, a single online document combining the basic international documentation needed to ship between the United States and Mexico. Customers can log onto the Roadway Web site (www.roadway.com), click on the Mexico section, and prepare a B/L and commercial invoice in one step. The Web site then creates for the customer a PDF file in Adobe Acrobat. Customers who do not have Adobe Acrobat will have to enter the Roadway Express Web page, use the hotlink to Adobe Acrobat, and download the program before using E-Z Export; there is no charge for the download. The file has instructions for completing the required information for customs in Mexico, and it can be printed or downloaded to the user's computer once completed.

Finally, Canadian Pacific Railway (CPR) will soon be introducing a means for submitting electronic B/Ls. A notice on the CPR Web site (www.cpr.com) says that "customers can easily submit a bill of lading online using CPR's e-commerce engine, which is designed to let companies safely exchange business documents that are not connected through an EDI value-added network." An online demonstration of the service is available from the Web site.

Benefits of Electronic Bills of Lading

The advantages of switching to electronic bills of lading include the following:

- Ease and speed give exporters an edge over the competition. Timeliness of B/Ls affects customer satisfaction, just-in-time inventories, and speed of payment.
- The possibility of lost B/Ls is eliminated.
- The need for the exporter or forwarder to collect B/Ls from the carrier's office and for the courier to mail or courier them to customers is eliminated.

- B/Ls will be error-free and will conform to matching letters of credit (L/Cs).
- Problems such as fraudulent presentation of counterfeit documents at dockside are reduced.
- Electronic signatures may be used on B/Ls for L/Cs via the International Chamber of Commerce's UCP 500 rules on documentary credit. Note that banks in some nations may not accept validity of B/Ls with electronic signature.

A Paperless Bill of Lading

Bolero International Ltd. is a joint venture of SWIFT, a Belgium-based banking telecommunications consortium with 3,000 member banks worldwide, and Through Transport Club, the mutual cargo insurance organization headquartered in London. Bolero (www.bolero-project.com) plans a full commercial launch of its system this fall. The system will allow secure electronic transmission not only of straight B/Ls but also of negotiable B/Ls (which can be bought, sold, or traded while goods are in transit), L/Cs, certificates of origin, and insurance certificates. The pricing structure for Bolero's services is available on its Web site.

Bolero uses central electronic registry and encrypted digital signatures to replace B/Ls. Receivers of goods will no longer appear at ports with B/Ls; instead, Bolero participants will carry out electronic exchange of ownership through a computerized registry. Users will be able to communicate with Bolero over public or private networks. Connection during the launch phase will be via Netscape Navigator browser. Free downloadable plug-ins and freeware are provided. Connection via automated gateways and third-party bureau services will be possible following the commercial launch.

SEDs Find Way onto the Internet

In addition to B/Ls, shipper's export declarations (SEDs) can now be sent electronically over the Internet to the Census Bureau and the U.S. Customs Service as part of the agencies' Automated Export System, developed in 1994. When users log on to the new Web site (www.AESDirect.gov), they are asked to register, and that information is then sent to the government so that Customs can accept future data from the filer. Once the SED is keyed in, users receive an internal transit number to confirm acceptance of the SED. This confirmation is sent via e-mail.

According to the Commerce Department, the new system reduces the paperwork burden on the trade community, makes document storage and handling less costly, improves the quality of export statistics, and facilitates exporting in general.

Even the Internet Illiterate Benefit

Companies looking to send important business documents electronically can take advantage of a new solution from United Parcel Service (UPS) and Hewlett-Packard Company (HP). The two companies have developed a secure, trackable delivery service for digital documents. Using the HP 9100C Digital Sender, physical documents can be sent electronically. Users simply place the relevant document on the 9100 scanner and send it over the Internet to the UPS Web site. The scanning process for a black-and-white image will be approximately 15 pages per minute, and a color document will take up to four pages per minute. Documents will arrive at the UPS site (www.ups.com) in a few minutes. Senders must provide the recipient's e-mail address with the transaction.

Files are sent as either PDF (portable document format) or TIFF (tagged image file format) files and can be in text or picture format. Once the document is sent to UPS, the recipient is notified via e-mail that a document is waiting to be picked up at the Web site. The e-mail message will include an active URL address, on which the recipient can click and go right to the UPS location. Although there is no sign-up fee for the service, the cost to send a digital document is \$2.50 per transaction, and the cost of the scanner is around \$3,000.

CAPS REPORTS ON ETHICS ISSUES IN OFFSHORE SOURCING

As sourcing activity moves toward a more global perspective, purchasing professionals are naturally concerned about ethics. Are the rules different when negotiating with an offshore supplier? Can you expect major differences among the ethical activities of suppliers in different countries?

Not really. That's the conclusion that we reached after reviewing an enlightening new research study, *Ethical Issues in Global Buyer-Supplier Relationships*. Under the auspices of the Center for Advanced Purchasing Studies, Craig R. Carter of the Robert H. Smith School of Business at the

University of Maryland examined how ethical activities differed when purchasing from various countries and defined ethics as it relates to issues in global buyer-supplier relationships.

What Is Unethical Here, and There?

In a surprising finding, the researcher reports the “activities viewed as unethical are consistent across national cultures, at least when foreign suppliers are dealing with American buyers.” Carter’s other findings include the following:

- *Foreign suppliers identified the same categories of unethical activities as did U.S. buyers.* One possible explanation is that buyers and suppliers judge the identified activities similarly because they involve fundamental core values that cross cultures. “A more realistic explanation for this similarity is that ethical expectations and standards have been established and communicated as part of the buyer-supplier relationship,” Carter offers. Another factor is the international supplier’s previous affiliations with other American companies.

- *Ethical issues appear to be the same as in domestic sourcing.* The analysis of the survey data finds that activities such as bribery and the use of grease (facilitating) payments, which have typically been associated with international transactions, were not included in either of the two buyer categories of unethical practices or unethical supplier practices (see sidebar).

As Carter hints, this suggests that U.S. buyers are not engaging in these activities “nearly as often” as might have been the case in the past. Furthermore, international suppliers appear to realize that these activities are unacceptable when dealing with American buyers.

- *Buyers and suppliers differed significantly in their perceptions of the other’s involvement.* It is important to realize that even the appearance of an unethical action can affect a party’s perception of how ethical the other party’s behavior really is. Therefore, it is important for both buyers and suppliers to communicate their intentions and all relevant details of the purchasing transaction openly in order to minimize the gaps that can occur between each party’s perception of the other’s behavior.

- *Deceitful practices of buyers are minimized when companies communicate ethics policies to suppliers—and have an ethics hot line.* Other organizational factors, such as top management’s “walking the talk,” or providing training appears to have no impact on the degree to which purchasing managers are

Defining Unethical Behavior

An analysis of the survey data from buying firms indicates that unethical activities of buyers fall into broad categories.

1. *Deceitful practices.* This first category consists of behavior involving deception and includes survey questions addressing the following activities:
 - Purposefully misleading a sales person in a negotiation
 - Exaggerating the seriousness of a problem to gain concessions
 - Using obscure contract terms to gain an advantage over suppliers
 - Inventing (making up) a second source of supply to gain a competitive advantage
2. *Subtle practices.* The second category of unethical actions includes more subtle activities such as the following:
 - Writing specifications that favor a particular supplier
 - Allowing personalities of suppliers to impact decisions
 - Giving preference to suppliers preferred by top management

A further analysis suggests that unethical activities of *suppliers* consist of a single set of activities, including the following:

- Knowingly overcommitting resources or production schedules
- Lying or grossly misleading customers in a negotiation
- Using obscure contract language to gain an advantage over suppliers
- Asking for information about competitors
- Offering gifts in excess of nominal value
- Increasing prices when there is a shortage
- Using backdoor selling techniques such as approaching personnel in engineering, manufacturing, or other departments outside purchasing
- Using less competitive terms or prices for buyers who purchase exclusively from the supplier

Finally, it is interesting to note that an analysis of the supplier survey data revealed that suppliers identified the same sets of unethical activities (for both buyers and suppliers) as did buyers.

Source: Ethical Issues in Global Buyer-Supplier Relationships.

involved in this dimension of unethical buyer activities. Therefore, the only practical deterrent appears to be the fear of getting caught or reported. This would be more likely to occur when policies are communicated to suppliers and when firms have an ethics hot line.

- *Less obvious unethical practices are affected by ethics training and evaluation.* Ethics training can help make new, inexperienced, and even seasoned buyers more aware of the less obvious, unethical behaviors. In turn, including ethical issues as part of a buyer's formal evaluation can help to reinforce material and policies covered during training.

- *Buyers that are under pressure to perform and that want to advance are not more likely to engage in unethical behaviors.* Similarly, there is no relationship between pressures felt by foreign supplier representatives and their involvement in unethical activities. "It appears that both buyers and suppliers realize that employing unethical practices will result in short-term success at best, but will inevitably culminate in damage to both their careers and the buyer-seller relationship," explains Carter.

- *There is no relationship between nationality and the level of unethical activity in buyer-seller relationship.* One explanation for this finding is that behavior and activities considered unethical by American purchasing managers have been well communicated. Also, they are understood to be unethical by their foreign suppliers. Norms and expectations regarding ethics also may have been established through the foreign supplier's prior relationships with other U.S. buying companies. "It is important to note that these findings apply only to U.S. buyers and their foreign suppliers," adds Carter. "Interviews with purchasing managers suggest that different scenarios may exist when purchasing occurs outside the United States for a foreign-based plant or subsidiary."

- *There is no link between unethical practices and the length or type of relationship that exists.* Once norms and behavior are established in a relationship, it is unlikely that time alone will change those practices. Similarly, the nature of the buyer's relationship with its suppliers is not related to the level of unethical behavior found in those relationships. Apparently, if purchasing managers or suppliers decide to act unethically, they will do so regardless of the type of relationship that they have established. Conversely, firms that choose to conduct business in an ethical manner will do so regardless of whether the relationship consists of a one-time transaction, a long-term contract, or a strategic alliance.

- *Buyers that are least satisfied with supplier relationship perceive their supplier to be involved in unethical practices.* Buyers were also the least satisfied if their

own organizations were involved in deceitful practices. Although deception may allow buyers to achieve short-term gains, they will be less satisfied with the relationship in the long run, as suppliers increase prices or refuse to re-new contracts.

- *Buyers that perceive suppliers as being involved in unethical practices also believe that they are performing less effectively.* Buyers begin to wonder whether suppliers are trying to mask problems with production or quality and believe that the supplier's performance is reduced in terms of service and price.

For a complete copy of *Ethical Issues in Global Buyer-Supplier Relationships*, contact Center for Advanced Purchasing Studies, Arizona State University Research Park, 2055 East Centennial Circle, P.O. Box 22160, Tempe, AZ 85285; 602-752-2277; fax, 602-491-7885; www.capsresearch.org. A \$20 donation per copy is suggested.

GOING GLOBAL? CHECK OUT THESE SOURCING TIPS FIRST

A *Supplier Selection and Management Report* Cost Control Survey clearly demonstrates the acceleration in global sourcing activity. This category experienced the greatest increase among the 25 cost control categories listed in the survey. A surprisingly strong contingent—almost 20% of purchasing professionals in the small to midsize classification—also cited the practice as one of their most successful efforts.

But all is not as perceived in the world of foreign sourcing. Although most of the responses to the survey cited the benefits received from moving to offshore suppliers, many spoke of the challenges and problems that have been encountered. Furthermore, they were not confined to the purchasing professionals in the small and midsize companies. Complaints were also voiced by those employed in larger organizations. The following comments from practitioners and leading authorities offer answers to the more common problems cited by readers.

It's all about culture, and not strictly business as usual. “Perhaps the most difficult obstacle to overcome in the global supply chain is the vast array of cultural norms and ethical frameworks,” reasons Mark A. Crowder, CPM, supply management specialist at John Deere CWP (Loudon, Tenn.; 423-458-8462).

“Successful interpersonal relationships are a prerequisite for doing business internationally,” agrees Albert L. Linderman, president of Interpersonal Business Solutions, Inc. (St. Paul, Minn.; 612-423-3533). “Cultural bonding and friendship building—not acquaintance building—are indispensable parts of successful international business relationships,” he told a recent International Purchasing Conference of the National Association of Purchasing Management (NAPM; see sidebar).

An ISO-type solution for sourcing relationships? Based on his own experience advised at the NAPM conference, Crowder notes, “Different peoples have far different frames of reference and have been brought up under quite different value systems. However, a global economy will necessitate the formulation of a generally accepted set of ethical norms akin to the push for ISO quality standards that has swept the global quality management community.” Leading-edge practitioners and companies will have to drive the process toward aligned ethical standards, he believes.

On building the business process and network for global supply chain management. Steven M. Purdy, vice president at Herbert W. Davis and Company (Fort Lee, N.J.; 201-944-5580) comments, “Companies sourcing large portions of their product lines offshore must seek to establish supply chain management business processes and information networks. These will include support for setting supply chain performance standards, planning extended supply chain operations, gathering information on products location, producing documentation to expedite movement, and reporting on performance to standards,” he said at the same NAPM conference.

Determining the total cost is a challenge. When the supply chain is very long, Purdy maintains, “it is essential to know what the total cost of getting product to the customer will be, or should be.” This is probably the most significant difference between manufacturing and buying products domestically, and sourcing globally.

Logistics costs, as an example, are a significant controllable element in purely domestic operations and are being managed more closely than ever, Purdy cites. “But even locally, getting the data needed to manage well from third-party service providers is not easy. In offshore operations, it is that much more difficult.”

How to get the most value from your offshore investment dollar. “Are you buying from the best place in the world?” asks Robi Bendorf, C.P.M., consultant at

Factors for Developing Relationships Internationally

In international relations, certain attitudes and approaches lead to appropriate behaviors. These include the following:

1. *An approach that demonstrates a learner's posture.*
 - Always be observant.
 - Ask questions about the country and culture.
 - Always read and learn something new about the country and culture, customs, history, religious practices, and political situation.
 - Be willing to make mistakes and learn from them.
 - Remember that your resources are people inside the culture, rather than just books.
2. *An approach of vulnerability and humility that leads to knowing when and how to ask for help.*
 - Note that learning to speak their language is best done socially.
 - Be able to laugh easily at yourself.
3. *Respect for the local culture.*
 - Observe, participate and learn; don't be afraid to take notes (discreetly) about your observations.
 - Learn appropriate greetings and leave-takings (ways of ending a visit or conversation).
 - Always consider yourself an active learner of the language; it may be inappropriate sometimes to interrupt and ask for language tips, but those times are rare.
 - Be willing to adopt customs and local foods, as well as manners of eating, sitting, standing, and responding.
 - Learn about the appropriate use of personal space in different situations.
 - Learn about the culture's use of time, color, numbers, light, and touch.
4. *Care about the friendship.*
 - Note that although most businesses do not encourage friendship building, it is a natural part of business. With international business it can be even more crucial. Working overseas, you are in a more dependent, trust-requiring setting. Friendship can make the difference between success and failure.
 - Seek for culturally appropriate ways to enhance your friendship.

Source: Albert L. Linderman.

Bendorf & Associates (Monroeville, Pa.; 412-856-4453). Based on client experience, he outlined the following guidelines for those new to global sourcing:

1. *Select specific products.* A method for evaluation and selection of parts should be developed. One such methodology includes the following:

- *ABC analysis.* “Only the A category parts, those usually making up 80% of the dollars, but less than 20% of the parts, should be considered,” Bendorf advised. “As a general rule there is usually insufficient savings to justify the cost and risk to go global on items with less than \$100,000 in annual activity.”
- *Group by process.* Organize the selected parts by manufacturing process (casting, stamping, assembly, and so forth).
- *Rank by potential savings.* Develop potential savings by cost analysis.
- *Select parts for request for quote (RFQ).* Select one or two of the highest potential savings parts from each group for the pilot RFQ.

2. *Initiate “come-to-know” analysis.* “Most of the difficulties in taking parts made domestically to foreign locations occur because of the many things that you and the present supplier have ‘come to know’ about the item that never made it to the drawing or specification,” explains Bendorf. “It is essential that you define what they are before the RFQ package goes out.”

Hold a come-to-know meeting with everyone who has anything to do with the part. At this meeting compare actual parts to the drawing and specification, identify inspection methods that must be used by the supplier, and confirm that the same method and equipment will be used by your company.

3. *Perform supplier evaluation.* Many companies place orders with overseas suppliers without formal supplier evaluation. However, most experienced international buyers would find placing business with overseas suppliers without an on-site evaluation to be unconscionable. Make sure that the right people go to make the evaluation. “All too often the company’s big-wigs go and leave behind those who really know the product and are in the best position to evaluate the supplier,” Bendorf said.

4. *Resolve technical, commercial, and quality issues.* “A good time to do this is during the on-site evaluation visit,” Bendorf explains. It is really important to resolve these issues in writing even if the supplier’s personnel seem to have a good grasp of English. Remember, some cultures are reluctant or em-

barrassed to say that they do not understand you and therefore will agree even when they are not sure what was said.

5. *Order administration.* Know the supplier's production process and schedule and check frequently for status. "When checking status," according to Bendorf, "be sure to ask questions that can only be answered with data that would indicate that the particular production step had been completed."

6. *Maintain country and supplier surveillance.* Because the supplier's financial and capacity conditions can change quickly, particularly in developing countries, it is important to monitor these closely. "Maintain an awareness of the country's economics, political issues involving economics and trade, and currency exchange rates that can change quickly, sometimes overnight, and affect the price you pay," Bendorf concluded.

TEN STEPS TO SUCCESSFUL GLOBAL LOGISTICS RETAILING

World-class products are no longer sufficient. You now also must be a supplier of world-class services, managing your customers' inventory, marketing, and distribution. In addition, you will be required to provide your suppliers and even other retailers with information that helps sales to grow: data on consumers, categories, the product pipeline, and merchandising concepts. To apply these strategies, managers must ensure system integration among distant customers, categories, and the production line.

A new industry report issued by the Voluntary Interindustry Commerce Standards (VICS; 609-620-4562), *Global Retailing in the New Millennium: An Industry Briefing Paper* (order online through the Resource Center link at retailsystems.com for \$395), calls for logistics folks to enact 10 key steps to achieve global retailing success:

1. *Initiate global thinking.* Look where you can create synergies across multinational and transmultinational operations through partnerships with suppliers, customers, and transportation companies.

2. *Focus on delivering customer value.* Shift emphasis from product and process to customer wants and needs and recognize customers' increasing awareness and knowledge.

3. *Initiate changes in the corporate culture.* Start preparing the organization for changes and new ways of doing things, all in an effort to obtain a customer and global focus.

4. *Simplify products, processes, and policies.* Look for duplication to eliminate and fix situations that interfere with transparency and root out inefficiencies with the help of partners.

5. *Implement systems standards.* Upgrade systems where necessary and adopt and implement standards for communications and data exchange. Reinforcing this point, Bob Martin, former CEO international at Wal-Mart, said that global standards have proven their effectiveness for Wal-Mart, which communicates with more than 8,000 suppliers via EDI and has 5,000 users on its communication system. In 1998 the company processed 93% of its orders and 85% of its invoices through EDI. In addition, thanks to standards, Wal-Mart has decreased the lead time for the supply of basic products by 60% and for the supply of promotional articles by 75% over the last decade.

6. *Participate in industry initiatives.* Take an active part in various standards bodies, trade alliances, and globalization forums. Dirk Jager, CEO of Procter & Gamble, points out that “today our industry needs to establish standards for information exchange on a global basis. This includes basic EDI and product identification as well as radio frequency identification and other product-embedded electronic components, and the development of a global industry intranet.”

7. *Initiate partnerships and relationships focused on sharing.* Participate in coplanning initiatives with suppliers, customers, and transportation companies. Implement comanaged inventory and dynamic replenishment. Integrate and synchronize systems.

Ultimately, says Janice H. Hammond, professor at the Harvard Business School, there is a greater emphasis on cooperation, and the value of coplanning and replenishment far exceeds the risks. “The trust issue has declined in importance over the past 10 years as companies have recognized that the benefits of cooperation outweigh the risks.”

8. *Explore new business models.* Analyze centralized and decentralized approaches to global retailing and assess grow-your-own and acquisition/consolidation strategies for global expansion.

9. *Reevaluate pricing and terms.* Reassess pricing in global terms, simplify pricing models, unbundle options, understand customer pricing requirements, and identify pricing constraints.

10. *Analyze sourcing strategies.* Reassess sourcing for global retailing, understand transportation and logistics constraints, and balance local and central sourcing.

POLAROID'S THREE-STEP APPROACH TO SUCCESSFUL GLOBAL LOGISTICS

Handling domestic logistics issues can be cumbersome enough, but when your operations are global, the obstacles are even greater. With a solid logistics strategy and an understanding of your priorities, however, international logistics does not have to be a headache.

Massachusetts-based Polaroid has spent the last two-and-a-half years revising its global distribution network to improve shipping activities to and from over 20 different countries. Abbott Weiss, vice president of worldwide logistics for Polaroid, describes three main steps toward overcoming global logistics obstacles: establish objectives, set a strategy, and understand the barriers to successful implementation.

Establish Primary Objectives

A three-year objective was put in place, focusing on customer service, inventory turns, and operating efficiencies, explains Weiss. He recently told Logicon attendees that these objectives were set around best-in-class standards. "We got a sense of how good good was and where we were," he says. "And we saw that there was room for lots of improvement on our end."

The objectives were as follows:

- A 95% delivered order fill rate for customers and 90% to all others
- A 50% reduction in items on backorder for more than 10 days
- Doubling of total average inventory turns to 4 by 1999
- An improvement in operating efficiencies to 10% in the first year, 8% in the second year, and 6% in the third.

Determine the Logistics Strategy

Weiss says that Polaroid focused on four strategic areas toward improving global logistics:

Strategy 1: Integrate

Here, the company placed an emphasis on the worldwide coordination of transportation, distribution, production planning, inventory, and freight and duty management. Historically, explains Weiss, Polaroid's distribution function has not focused on global logistics at all. "We were suboptimized because we were not linking logistics to other departments, such as manufacturing," he says. "Now we look at the entire system and are optimizing ourselves internally."

Negotiating freight rates, in particular, has benefited. By bringing together freight managers from Europe, Asia, and the United States, the company has been able to pool purchases for more reasonable freight rates.

Although Polaroid has found a way to integrate its departments internally, Weiss admits that the firm is not yet at the point to do the same with its suppliers and customers.

Strategy 2: Differentiate

The objective here was to tailor distribution and delivery services to meet the needs of different kinds of customers and product lines in the most profitable manner. Polaroid divided its products into four categories: pipeline, which are high-volume, low-cost, long-lived, and highly predictable items; short life cycle goods, which have a market lifetime of less than 18 months; just-in-time products, which are low-volume, high-cost, long-lived, and unpredictable; and customized, which are built for an individual customer.

Strategy 3: Rationalize

The warehouse and distribution networks are optimized worldwide to handle the work that they do inside. For instance, Weiss says that the company handles a lot of product and handles it well, but handles it too often: "A total cycle time study of how we process certain products showed us that we could eliminate unnecessary steps."

Strategy 4: Flexibility and Agility

Polaroid set out to develop logistics processes that are demand-driven, can survive fast cycle times, and are ready to deal with unexpected customer requirements. This has proven particularly successful in the area of postponement, says Weiss. "We used to build to forecasts, which became expensive and left us with high inventory levels." By implementing a packaging strategy that would allow Polaroid to stock generic product in the warehouse

and configure it based on customer orders at the time of fulfillment, the company realized it could save significantly. Weiss says that a third party carries out the postponement activity within Polaroid's facility.

Overcome Barriers to Implementation

"You will stumble through your objectives and strategies if you haven't prioritized your goals and you don't take on too much at once," warns Weiss. "You have to constantly revise your plan."

Polaroid worked through implementation barriers through a variety of methods. One worth noting is establishing a pilot project. "We wanted to do direct shipments to Asia from our factory in Massachusetts to save money and time," relays Weiss. The company decided to test this out with its digital products because of their low volume and spiky demand.

Although the concept seemed to work on paper, Weiss says it became problematic because of customs delays, international paperwork requirements, and local carrier issues. As a result, he says that the company revamped the process to attain its time and cost saving goals and still deliver to Asia in the most efficient manner. It was ultimately decided to ship from the United States to a local warehouse in the region and then to the customer.

Another way to overcome barriers is through communication. Polaroid sends an executive summary of its projected goals and actual data to managers throughout the company via e-mail. "This not only lets them see what is working and what isn't," says Weiss, "but it also offers them the opportunity to see what their role in the process is and how we can all work together."

Comparing Objectives to Reality

By following its objectives and strategies, Polaroid has realized improvements in service levels, network costs, and inventory management, says Weiss. On a worldwide scale, order fill rates have improved from 89% to 91% in the two-and-a-half years since beginning the program. Line fill rates have increased from 85% to 94% during the same time, and \$13 million in freight and warehousing costs have been removed from the network. Finally, despite a \$134 million reduction in inventory, inventory turns have not increased.

"We are competitive, but we are working toward getting even better," says Weiss.

Chapter I-4

Controlling Logistics Costs

EXCLUSIVE SURVEY REVEALS FIVE BEST PRACTICES TO CONTROL LOGISTICS COSTS

Logistics managers looking to control costs should focus first on renegotiating shipping rates, reducing freight costs, and streamlining operations. A recent *Managing Logistics* survey of hundreds of logistics professionals shows that working with suppliers and making use of logistics technology are also hailed among the top five ways that managers can successfully control costs (see Figure I-4.1).

Conversely, reducing warehouse storage and inventory costs slipped out of the number five spot that it had held in previous surveys—most likely because the payoff is so much faster on renegotiating rates and because inventory may have been cut as far as possible. With the top five cost-controlling methods clearly identified, then, we asked logistics pros exactly how they put these techniques to work and the savings they have generated.

Renegotiated Shipping Rates/New Carriers

One of the more prevalent themes to come out of the survey is managers' desire to concentrate on regional transportation. They say that they are willing to change carriers to meet that goal. "We are using a third-party provider for truckload and LTL [less-than-truckload] shipments, which has allowed us to reduce our vendor base, lower costs and increase the number of carriers we use to regional markets," says the manager of distribution for a specialty chemical manufacturer in Connecticut.

"We looked at regional carriers who offered faster service," explains a di-

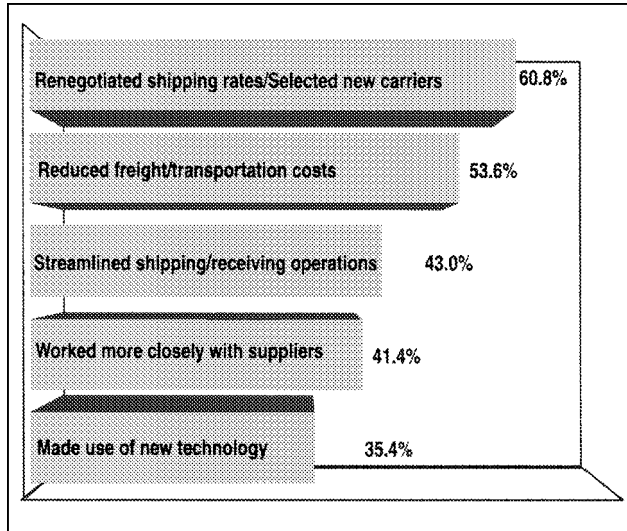


Figure I-4.1 Most Successful Logistics Cost-Controlling Strategy

Source: ML Survey.

rector of distribution. This reduced Freight All Kinds (FAK) from 85% to 77.5% and reduced transportation costs by 7.5%.

Reduced Transportation/Freight Costs

Whether for domestic or international freight, managers are teaming up with their carriers to achieve savings. “We convinced our main carrier to implement zone billing without a minimum,” says a national freight logistics manager in the automotive aftermarket. Per hundredweight, this process created a 10% cost savings based on \$19,000 annual freight cost.

Logistics folks are also teaming up with other departments in their organizations to facilitate reduced transportation costs. “We are working with sales personnel to coordinate product delivery, which has saved us \$250,000 in freight costs in just five months,” declares the manager of corporate logistics for a large computer manufacturer in Colorado.

Streamlined Shipping and Receiving

It is apparent that logistics managers have instituted simple but significant methods for streamlining their inbound and outbound processes. For

instance, managing dock operations of incoming and outgoing goods as well as mandating delivery appointments reduced dock-to-stock time from 18 hours to 7.75 hours in just three months for an electrical distribution wholesaler.

On the outbound side, reusable, compressed airbags for bracing outbound chemical shipments will save a New Jersey-based company \$50,000 this year, claims its logistics manager. Furthermore, a traffic manager achieved some good results with a shipping label program. He says that the outbound error rate went from .16% to .05%, and the incident rate dropped 50% from 22 to 11 per month.

Worked Closely with Suppliers

Logistics managers agree that in working more closely with suppliers they can generate clearer forecasts, solve supply chain issues, and assess supply chain processes for improvement. In addition, building a more solid supplier partnership helped one operations manager gain credibility with his customers because he could plan more definitively for outbound orders.

One supply chain manager says that a tighter supplier partnership is enabling his company to produce in a just-in-time environment. "We have asked raw material vendors for reduced lead time so that production schedules could be based around current sales figures, enabling us to make exactly what we need."

Made Use of Logistics Technology

Clearly, the Internet has had a dramatic impact on logistics operations. From real-time order tracking to automated export documentation, as one manager puts it, the Internet is freeing up logistics personnel to do more valuable work. Just consider the following examples.

"We formed a strategic alliance with a system provider to enable Internet technology for returnable packaging," says a vice president of operations. "This enables us to manage large accounts with fewer people and at a lower cost." "We are scanning documents and preparing them electronically with electronic signatures and then e-mailing them to our international forwarders," says a distribution manager. "This is a huge improvement over faxing."

However, managers have not overlooked the benefits that more tradi-

tional technology can offer. One warehouse manager claims that bar coding made all the difference. “We installed bar coding software that allows for EDI transmission of our shipment information to the customer. This has reduced manual processing by 20%.”

USE ACTIVITY-BASED COSTING TO IMPROVE SUPPLY CHAIN MANAGEMENT AND REDUCE LOGISTICS COSTS

To cut costs, managers need to know exactly what they now spend on warehousing, shipping, receiving, order processing, and other key logistics functions. However, most logistics managers frequently encounter major obstacles when attempting to extract this cost information from traditional management systems.

As a result, many have turned to activity-based costing (ABC). ABC assigns the activity costs on a consumption basis (cost/output) to the customer, product, or supply chain. At a Council of Logistics Management (CLM) annual meeting, Bernard La Londe, professor emeritus of transportation and logistics at Ohio State University (614-292-5233) and Terrance L. Pohlen, chief business analysis division at the Defense Supply Center in Columbus (616-692-7173), explained that ABC can also analyze how proposed changes in logistics processes may impact customer service.

Is ABC Too Costly?

The application of ABC to logistics has traditionally lagged behind implementation in other areas. According to a survey of ABC adoption in the logistics industry, conducted by La Londe and Pohlen, the level of ABC use suggests that most of the respondents had considered and made a decision regarding whether to implement ABC (see Figures I-4.2 and I-4.3). Eighteen percent reported that ABC was completed and in use.

Several reasons were cited for not considering ABC. The primary reason centered on not having sufficient resources to support ABC implementation. The reported costs for ABC may support this position, as 42% indicated costs of less than \$100,000 with 34% reporting implementation costs between \$100,000 and \$500,000; 14% said they could not justify the cost.

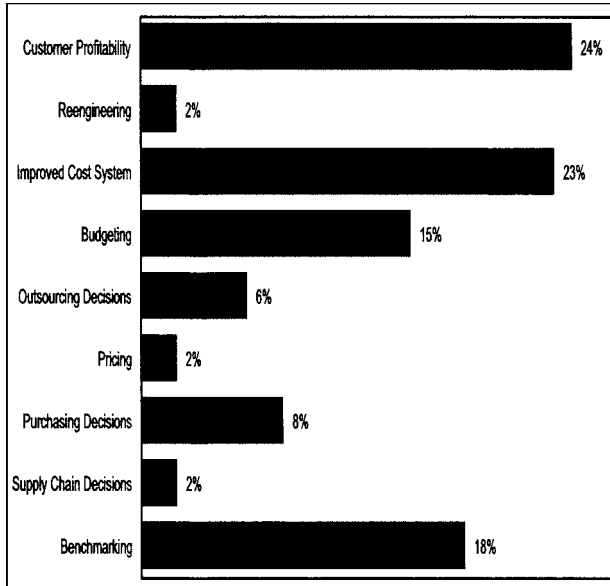


Figure I-4.2 Motivation Behind ABC Implementation

Source: 1998 Survey of Activity-Based Costing Applications within Business Logistics.

ABC Makes Improved Logistics Decisions

Despite the potential start-up costs, ABC continues to gain acceptance. Most respondents identified customer profitability as the primary motivation for implementing ABC. Improved cost information ranked second. Once implemented, ABC initiatives will benefit logistics, says Pohlen. “Cost reductions will result, helping to eliminate non-value-added activities, begin reengineering projects, and outsource those functions not pertinent to the organization.

“Logistics can particularly benefit from ABC due to a wide diversity in the performance of activities and the major differences in how individual customers or products consume activity outputs,” continues Pohlen. “Customers frequently require tailored services to reduce cycle time and costs or to improve support. The tailoring of logistics services adds additional activities and costs to the supply chain. Logistics managers should have the knowledge to accurately assign these costs to understand how these additional service requirements impact profitability.”

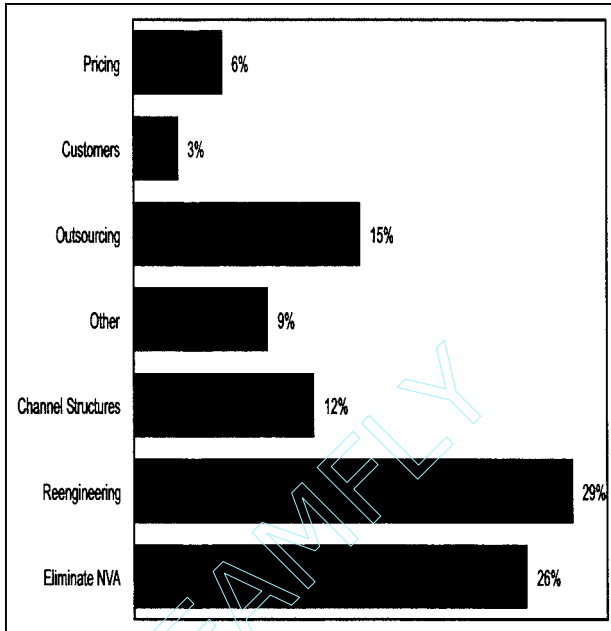


Figure I-4.3 ABC Helps Make These Decisions

Source: 1998 Survey of Activity-Based Costing Applications within Business Logistics.

Obstacles to Implementation

Problems can occur during most ABC implementations. Inadequate accounting systems are most frequently cited as the cause. Technical expertise and cost driver information appear to be the next most frequently cited problems. Employees and middle management also represent potential obstacles to ABC implementation.

ASSESSING THE BENEFITS AND DANGERS OF LOGISTICS DECISION SUPPORT SYSTEMS

A decision support system (DSS) is an analysis tool designed to help cut costs in logistics and distribution operations. By analyzing elements such as time and costs, this tool allows you to weigh various delivery, inventory, and warehousing options. Although many logistics managers and software

vendors are singing the praises of DSS, it does not come risk-free. Industry expert Henrik Danford-Klein, director of network design strategy at Sears Logistics Services Inc. (847-286-1094), offers advice on avoiding the pitfalls of DSS.

A Supportive Process

Danford-Klein uses a DSS for supply chain optimization and routing to Sears stores. At a recent CLM annual meeting, he pinpointed several common mistakes associated with DSS. The first is that logistics managers often attempt to attack too large of an issue when implementing a DSS.

To remedy this, he recommends breaking DSS goals down into smaller, more definable, and more achievable challenges. For example, “Don’t say ‘we want to optimize the whole supply chain,’” he explains. Rather, take the process piece by piece—by analyzing inventory, for example, and then transportation and vendor costs.

A critical function of the DSS at Sears Logistics Services is facility utilization. The company uses its DSS, the Supply Chain Designer from Caps Logistics, to determine which stores to service from which distribution centers (DCs), where to cross-dock, and which modes of transportation to use. The software also determines the optimal capacity of each DC as well as their optimal inventory levels.

According to Caps Logistics, the Supply Chain Designer can also analyze production allocation, transportation and inventory tradeoffs, and resource utilization. Logistics managers can use the DSS to “red flag” costly procedures. The Supply Chain Designer, for example, is intended to pinpoint costly customers and shipments and underutilized resources.

Behind the Scenes

Because the capabilities and potential benefits of a DSS are so appealing, many logistics managers dive into DSS implementation headfirst. Too often, they are enticed by the software and do not realize the work that is involved. “Unfortunately, software vendors are forced to present DSS as ‘easy to use,’” says Danford-Klein. In a technological world that is largely Microsoft Windows-based, logistics managers want to point and click their way through every software program—and every logistics equation.

By its very nature, a DSS is not that simple (see sidebar). “The reality is, it takes a lot of work,” says Danford-Klein. It also takes a lot of money. Some

Common Mistakes to Avoid When Using a DSS

1. Not understanding how the model is built
2. Accepting recommendations without question
3. Ignoring soft data, such as customer service
4. Making change where change is not good
5. Not establishing senior-level buy-in
6. Failing to clearly define your goals
7. Failing to rely on experience

of these systems cost up to a million dollars, and consulting is usually a necessity. Danford-Klein suggests using a consultant to help build models and interpret DSS recommendations.

Experience is also a key to success. Not clearly understanding how the DSS works often causes logistics managers to accept the first recommendation that the DSS makes, with no questions asked. Danford-Klein warns logistics managers not to rely on the first result but rather to analyze the results by asking questions and posing new scenarios.

When a DSS makes a recommendation, it has optimized a model, not reality. Although its suggestion may actually be the best route, facility location, or customer assignment, you should still determine that for yourself. “It’s up to you to figure out what’s real and what’s not,” Danford-Klein notes. For example, a DSS may suggest making a change that promises to save your company \$10 million dollars. On the surface it would seem silly not to embrace that change. However, if you dig a little deeper, you would see that the recommendation might actually cost \$5 million to complete.

“Change is often very expensive,” Danford-Klein says. “It’s the 80/20 rule—it costs a lot to make a little change.” Therefore, making a move to save the company only \$5 million may actually cost less and have a higher payoff in the end.

Seek and Find

What steps should you take when searching for a DSS? First, you should establish buy-in from executive-level management, Danford-Klein says. Without it, you won’t be able to accomplish anything. By implementing a

DSS, “you’ll be able to suggest things that affect the whole company.” In addition, there are organizational and people-related issues associated with that change. The support of senior-level management will ensure that change is possible.

Next, you should determine exactly what you want to solve with a DSS, Danford-Klein says. Knowing what you want to accomplish is half the battle. Keep in mind that a DSS can cost nearly one million dollars—you don’t want to buy what you don’t need. In addition, flexibility is crucial to any DSS. You should be able to alter scenarios and make suggestions to achieve the best possible recommendation.

The most important factor, however, is knowledge. You need to be able to evaluate the experience of the people you’ll be working with to build the DSS model, Danford-Klein stresses. “All tools have their limitations.” Therefore, you should turn to a consultant or hire an in-house expert to build the models and interpret your DSS results.

Outsourcing the whole DSS analysis is an option, and many third-party providers offer DSS consultants. However, some organizations opt to hire a full-time person to support the DSS. Danford-Klein recommends hiring professionals with backgrounds in operations research or industrial engineering. Sears has done exactly that. In fact, it is such a large organization, and it places such an emphasis on DSS analysis, that it has four full-time employees dedicated to DSS.

Keep in mind that using DSS is a learning, reiteration process, says Danford-Klein. With DSS, you are constantly asking how different scenarios affect logistics costs and customer service.

LOGISTICS PRO OUTLINES TEN WAYS TO REDUCE YOUR SUPPLY CHAIN MANAGEMENT COSTS

Supply chain management costs are still on the rise, despite staunch efforts by logistics professionals to drive them down. The annual Davis Database, published by Herbert W. Davis and Company (201-944-5580), shows an increase in total logistics costs—up 2.21% as a percent of sales costs and 3.6% in cost per hundredweight (see Table I-4.1). The costs of value-added services, higher inventory levels, and gaps in logistics support caused by enterprise resource planning (ERP) solutions largely account for the increase.

Only 30% of the companies participating in the study claim they were able to reduce costs this past year, according to the Davis Database. These

Table I-4.1 Logistics Cost Change (1999 vs. 1998)

	<i>Percentage of Sales</i>	<i>\$/hundredweight</i>
Transportation	-0.71	+8.47
Warehousing	7.43	-3.57
Order entry/customer service	-8.57	+3.39
Administrative	-2.49	+7.51
Inventory	-1.35	-1.46
Total	2.21	3.6

Source: Davis Database.

Table I-4.2 Average Company Logistics Costs

	<i>Percentage of Sales</i>	<i>\$/hundredweight</i>
Transportation	3.24	22.38
Warehousing	1.84	18.39
Order entry/customer service	0.48	6.54
Administrative	0.38	4.06
Inventory carrying	1.52	25.58
Total	7.34	74.29

Source: Davis Database.

were firms that had significant sales increases, excellent inventory performance, and control over warehousing and transportation costs, says Bill Drumm, president of Herbert W. Davis.

In addition, the average company's total logistics costs average 7.35% of sales and \$74.29/CWT (see Table I-4.2), with transportation and warehousing being the greatest budget eaters.

Figures I-4.4 and I-4.5 provide cost breakouts as a percentage of sales and percentage of dollars per hundredweight, respectively.

10 Ways to Reduce Supply Chain Management Costs

In an effort to educate the logistics community about cost drivers and how to keep them down, Drumm outlines 10 ways to reduce overall supply chain management costs in a typical logistics operation.

1. Develop or enhance existing vendor managed inventory (VMI) and just-in-time (JIT) programs to increase inventory velocity and smooth ordering patterns. By developing supply chain partnerships and sharing demand and supply data with vendors and customers, you can smooth the flow of inventory. You will receive material as you need it instead of buying

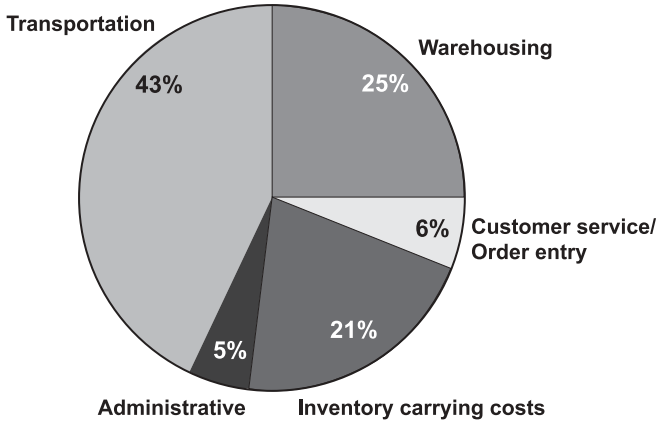


Figure I-4.4 Cost Breakdown as a Percentage of Sales

Source: Davis Database.

periodically in large, fixed lots. This reduces inventory carrying costs, space requirements, obsolescence, damage, spoilage, and shrinkage. When properly managed, these programs result in inventory reduction benefits for customers and suppliers.

2. Use electronic commerce to reduce transaction processing costs and cycle times. Transferring data between companies electronically, instead of in hard copy, decreases labor, time, and the potential for error and

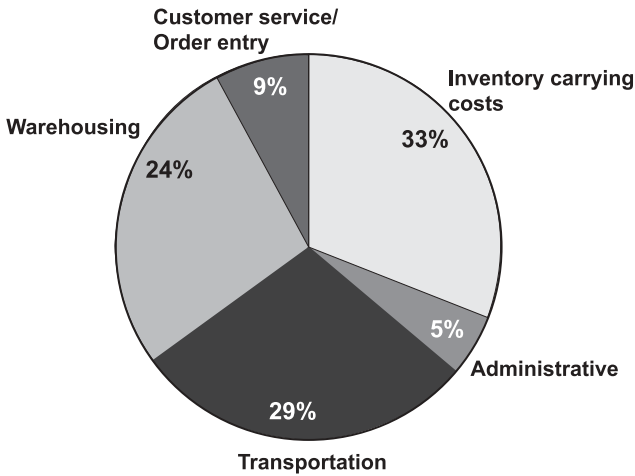


Figure I-4.5 Cost Breakdown by \$/CTW

Source: Davis Database.

speeds up the processing cycle. This results in reduced costs and improved service.

3. Centralize forecasting and inventory planning functions using forecasting and planning experts. In a multiplant/DC environment, demand forecasting, inventory planning, and production planning should be done centrally. The people doing the work should have a corporate perspective in balancing supply and demand across the supply chain and across the company.

4. Use optimizer software to create a production schedule that considers the optimal balance of profitability, customer service, total asset management, and capacity utilization. The model may propose alternatives for best service, lowest overall cost, lowest inventory, and best use of materials.

5. Continually review the cost of adding manufacturing capacity or outsourcing against the cost of building and holding inventory. Companies should continually review their success in meeting seasonal requirements with reasonable inventory levels. Techniques such as flexible manufacturing, core teams supplemented with temporary help, contract manufacturing, and outsourcing to meet peak period demand should be considered.

6. Condense your supply chain by carefully locating your manufacturing and distribution points to serve the market as efficiently as possible. Perform a formal network study based on historical shipping patterns to determine objectively the optimum number and placement of facilities.

7. Integrate production planning, inventory planning, customer service, and distribution and transportation functions to improve information availability, reduce inventory, and improve service. For these functions to work well together to service customers, they should be located together in a central logistics organization.

8. Identify and target nonprofitable customers and product lines to increase margins or eliminate that business. Customer and product profitability analysis should be performed regularly, and action should be taken to prune the line and possibly drop low-end customers. Total profit contribution over time should be examined. Unprofitable customers should be built up, charged sufficiently, or dropped. Unprofitable products should be dropped unless necessary to satisfy key customers who are profitable overall or to offer a full product line.

9. Evaluate the feasibility of outsourcing all or part of your supply chain operation and use functional experts from the outside when they can save you money.

10. Centralize supporting supply chain functions to gain economies of scale, downsize, and reduce transaction costs.

THIRTEEN ONLINE SERVICES MAKE LOGISTICS OPERATIONS FASTER, EASIER, AND CHEAPER

Access to shipment status, price quotations, and modal reservations is getting easier, cheaper, and faster for logistics and transportation managers thanks to new and improved Web sites from carriers. To help you navigate this rapidly expanding e-terrain, here are some of the top sites.

Carriers Make Web Improvements

Yellow Freight System has responded to customer demand for a more useful Web site, giving customers access to information that will help them to manage shipping activity better. Key changes include improved information groups for tracking, shipping, accessing bills of lading, or receiving proofs of delivery, as well as the ability to see zip-to-zip standards. Yellow will soon be introducing online rate quotes that include personal pricing based on a customer's individual shipping needs and specifications.

Emery Worldwide has also added new technology to its Web site (www.emeryworld.com) to simplify site navigation. The system, called eService Portals with SuperFAQs, gives customers access to general questions that require some consultation before a specific answer is given. Customers click on the FAQ button and are engaged in a short interactive session. The expert search engine gathers information from the Web visitor in order to deliver a tailored answer.

In addition, the portal will enable Emery customers to download and save documents, route e-mail inquiries to assigned specialists, and return to the portal to check on inquiries or review previous inquiries. Emery has also made its ImPower program available at its Web site. The program monitors shipments cleared by Emery's U.S.-based customs brokerage offices, providing detailed cargo reports and entry and billing information.

American Freightways Corp. (www.af.com) has also made significant additions to its interactive Web site. The new features are color-coded service maps and through rates between U.S. and Canadian points. The tools provide customers information about how long it will take for freight to ar-

rive at its destination, allowing more control over inventory management, procurement, and distribution.

Carrier and Shippers Benefit with E-System

The Hub Group, Inc., has launched an e-business system called the Vendor Interface (www.hubgroup.com) for managing the drayage portion of intermodal freight shipments. The Interface is designed to eliminate redundancy, improve operational efficiency, and enable order processing around the clock.

Shippers benefit by having access to increased information throughout the supply chain and can take advantage of the satellite-like communications and tracking. The carrier benefits because the new system enables it to process completed orders faster, resulting in more timely payments. The system enables Hub to identify appropriate carriers for each shipment based on cost, dates, location, and cargo. Shipments are offered to carriers, terms are set, and deliveries are authorized—all online.

Site Searches Rail Line

Emons Transportation Group, Inc., a rail freight transportation and distribution services company, has launched its new Web site, www.emonstransportation.com. The site allows customers to evaluate the advantages of locating manufacturing or distribution facilities on one of Emons' railroads. Customers can also use Emons' transload or intermodal services for companies not located on the rail line. In addition, the site includes links to industrial development agencies, distribution and warehouse facilities, and vendors.

Maritime Shipping Made Easier

GoCargo.com is a new Web site that aims to improve the efficiency of international marine shipping. The site can be described as an international exchange that allows importers and exporters to avoid shopping around by phone and fax for the best deal to move their goods. The shippers simply enter the parameters of their payload, the destination, any time constraints, and then allow the carriers to compete for their business.

“Say a shipping company proposes \$1,200 per container and it will take

15 days, and they say they will use rail service for part of the shipping process,” explains Eyal Goldwenger, chief executive of GoCargo Inc. (New York) explains. “Another provider might say that his price is \$900 per container, but it will take 18 days. The customer may decide that he or she wants the cheaper price even though it will take three more days. We allow the customer to put their own weight on the different parameters. Thanks to the Internet, customers can find out at the last minute if there is room for their goods on a ship,” says Goldwenger.

Another maritime site is ShipAhead.com, a joint venture of Cognicase Inc. and ShipAhead Inc. This e-business-enabled Internet portal brings together cargo carriers, shippers, seaports, and others in the maritime industry. Shippers, shipping lines, ports, and cargo transporters can find and post information about selling and buying cargo as well as about chartering vessels, ports, businesses, and schedules. The service is also useful for locating suppliers around the world.

Orient Overseas Container Line Ltd. (OOCL) of Pleasanton, Calif., has launched an online rate inquiry service, which allows customers to obtain rate quotations by completing an electronic form at www.oocl.com. Shippers are asked to provide cargo description, ports of origin and destination, shipping requirements, and contact details. In addition, shippers can retrieve tariff rates on the OOCL site, which are provided by E-Transport Inc. (www.e-transport.com) of Pittsburgh.

Making Cargo Reservations

Tafp, Inc., in Queens, N.Y., has introduced a Web-based cargo reservation system called Cargo4less.com. The service is targeted at exporters looking for discounted freight rates on airport-to-airport international shipments.

Through a Web-based form, users indicate a specific dollar amount that they are willing to pay to have their freight transported. Users must give a description of the cargo, including size and weight (Tafp will accept freight weighing at least 100 kilos), and must specify when it is ready to ship. No hazardous, perishable, or restricted cargo is accepted. Users are notified within 24 hours if their offer is accepted.

Shippers can also make reservations and obtain price quotes from a new Internet freight shipping service called ShipHere.com. It allows companies to purchase freight services without the need to set up or have an existing account with a carrier. ShipHere.com will automatically select from a port-

folio of national, regional, and local freight and parcel carriers to offer the best rates and modes of transportation available.

Users simply fill out a brief form that captures information about their company, products, origin points, and destinations. Once the “submit quote” button is clicked, a price is typically returned in less than 15 seconds. For customers who make frequent shipments, ShipHere.com can memorize shipment information to save time and minimize data entry.

Using United Airlines Cargo’s Web-based service (www.ualcargo.com), which replaces its dial-up cargo, can also save time. From the site, registered users can obtain shipment-tracking information, access flight status information, and create and modify cargo reservations online.

Customizable Web Pages

Two new customizable Web pages have been released for the transportation industry: myABF from ABF Freight System, Inc., in Fort Smith, Ark., and my.roadway.com from Roadway Express in Akron, Ohio. MyABF allows customers to manage a variety of transportation tools and shipment information and create links to other Internet sites. Users can trace shipments via carrier pro number, bill of lading number, purchase order number, or other customer reference number. The site can also create detailed reports, obtain customer-specific pricing quotations, view and retrieve critical documents, and learn the status of loss and damage claims.

My.roadway.com enables customers to access real-time shipment information and customize their data output. The service also provides information on standards and pricing data as well as the ability to inquire and track responses relating to freight bill invoicing or rating issues. Users can also obtain rate quotes, status reports, proof of delivery, and cargo claims status reports.

Up and Coming Web Sites

Cargo data will soon be obtainable through DHL Airways, Inc., which will offer customers online fulfillment services, thus becoming the first international carrier with the capability to quote customers the true cost of delivery for international shipments, the company claims. Using a landed cost engine, DHL (www.dhl.com) will be able to calculate the tariffs, duties, and other additive charges associated with international shipments over the Internet.

Finally, United Shipping & Technology (US&T; www.u-s-t.com) is rolling out a beta version of its tracking system for same-day shipping customers. The system will be tied to a global positioning system to allow vehicle tracking.

EIGHT TECHNIQUES TO CUT FREIGHT RATES AND GET CARRIER REFUNDS

Recent price increases from parcel carriers such as Federal Express, RPS, and Airborne leave logistics managers questioning if there is any way to save money on freight bills. The good news is that you still can, and if you are creative, you can save upwards of 20%. Here's how.

Eight Tips for Saving Money

The following techniques will save you more than 20% on your next transportation bill, according to Mark Taylor, president and CEO of Taylor Systems Engineering Corp. (Plymouth, Mich.; 734-420-7447). Start now and

1. *Hire a professional to negotiate your rates.* “These folks have usually worked for the carriers in a past life, so they are familiar with their pricing strategies,” says Taylor. Professional negotiators typically charge you based on what they can save you—usually half of the savings.

2. *Claim your guaranteed service failures.* Carriers such as UPS, RPS, Federal Express, and Airborne have a money-back guarantee that their packages will arrive on time. Most shippers do not track packages to check guarantees or collect refunds due. By regularly auditing your freight bills, you can routinely save 5% off your shipping charges. To do this, log onto the carriers' Web sites or use an online tracking service such as www.shippingrefunds.com.

3. *Research association discounts.* Many times, shippers can get discounts of 10% to 20% as a benefit of belonging to a trade association. Taylor cautions, however, that the carriers will not volunteer which associations they offer discounts for, so do your homework—check with the associations of which you are a member.

4. *Do not use the carrier's insurance.* Using an alternative private insurance company can save you as much as 65% on your premium.

5. *Avoid using only one carrier.* The UPS strike two years ago is a good reason why. Don't fall for carriers offering free shipping systems. Shop around. FedEx and Airborne are aggressively looking to attract small- and medium-sized customers and are offering significant discounts on overnight and air services.

6. *Renegotiate with the carrier.* If you opt to negotiate rates yourself, Taylor recommends that you first consider the volume that you ship on a regular basis—the larger the volume, the greater the discount you receive.

Also, realize that there is a war out there for market share among the carriers and that they are looking for ways to be more competitive, he continues. "It is possible for you to negotiate anywhere from 10% to 20% discounts," says Taylor. He suggests using those savings to help justify investments in technology that will help your logistics department run more efficiently.

Compare Rates on Your Own

The computerized shipping systems on the market today offer an array of features meant to help you save money on your freight bill, such as those in the following recommended solutions:

Resource, Inc. (800-818-0492) offers Partner, Partner Express, and Windows Express. These feature track time and day of delivery, shipping confirmation receipt, encrypted carrier costs, and rate comparisons. Partner Express, which is a shipping-only package, includes domestic and international rates for UPS, USPS, and Federal Express. A 386 CPU or higher, DOS 5.0 or higher, and at least 40MB of available hard drive space are required to operate Partner and Partner Express. Windows Express requires a Pentium 166 or higher, Windows 95 C or Windows 98, 32M RAM, and 400MB of available hard drive space.

Freight Plus (909-678-4522) offers the Freight Plus Shipping Manifest System for Windows 95/98 and NT. The package calculates all UPS, RPS, USPS, and Federal Express shipping services: ground, air, international, hundredweight, ground saver, and insurance from inside your accounting system. Freight Plus can be customized to your company's specific needs.

F.C. Rock & Associates (www.fcrock.com) offers the E-2000 shipping system for carrier rate shopping and carrier rate changes and updates. The system runs on the IBM 36X and AS/400 as well as on other mainframe computers.

Kewill E Commerce (877-TRACERX) offers the ClipperShip multicarrier shipping system. This system shops for rates, tracks, and generates management reports for charge-back purposes.

E-Business Shipping Rate Concerns

Parcel carriers' price increases are now threatening the Internet logistics community. E-merchants under pressure for improved business performance need to cover costs of shipping merchandise.

Considering the youthful history of e-business, there is no industry-standard formula for calculating shipping costs. Merchants wind up absorbing the shipping charges as part of the retail price, charging a flat fee for shipping to all destinations, adding a handling charge to cover shipping costs, e-mailing the shipping charges to the consumer who is then likely to cancel the order, or linking to the carrier's Web site for downloading one rate at a time, based on the consumer's choice of shipping method.

Why is it so hard to provide comparative rates online at the time of purchase? The answer lies in the complexity of rate charts of each carrier, which may contain hundreds of entries, and they are changed on a regular basis. In addition, software vendors have been challenged by delivering a solution that would integrate with any merchant's order form and shopping cart program; calculate shipping costs from various distribution points; compare pricing displays to consumers, including carriers, service levels, delivery times, and shipping costs; and display point to point charges.

There are now partial solutions that automate rate tables for a single carrier or allow limited comparison shopping. There are also enterprise solutions that bundle rate comparisons with complete warehouse and shipping systems.

One thing is certain: Competitive forces are coming to bear on shipping costs, and solutions are essential to winning customers and earning their loyalty, says Neal Anstadt, president and CEO of GoShip (Laguna Niguel, Calif.; 949-360-5858), a software designer and marketer of shipping systems.

Anstadt further believes that shipping costs will be a major factor in competition for online customers once merchants gain control of information and truly understand their costs. He says that they will be able to make intelligent decisions about when to mark down charges on commodity items and determine where competition is most intense, and about when to mark up charges on big-ticket items where handling costs are higher and shipping is a small percentage of the total.

7. *Use computerized shipping systems (CSSs).* CSSs, for example, let you compare carrier rates. These are a much better option than the free systems that carriers offer, which do not allow you to make rate comparisons, says Taylor. There are several CSSs on the market today (see sidebars).

8. *Know the resources available to you.* According to Taylor, shipping managers are hit hard by rate increases because they do not know what resources are available to ensure they do not fall victim to carriers. "They have no way

of benchmarking the rates they should be getting,” he says. “Most think they are getting a good deal, but unfortunately many are not.”

Catching the Carrier in the Act

Even if you adhere to these guidelines, you may not see any rate decrease or refunds. For instance, if you use a carrier’s guaranteed delivery service and deserve a refund because of untimely delivery, you may be in for a fight. Taylor says that you still have to pay for the service upfront and then wait for the rebate, which can take a long time. “Carriers make these promises for refunds, but don’t want you to hold them to a clock,” says Taylor. “The only way you will get your money back is if you catch them.”

LOGISTICS MANAGERS TURN TO E-MARKETPLACES TO CUT SHIPPING COSTS

Tired of the time-consuming and painstaking practice of negotiating rates with your carriers? Well, good news is here. The process is getting easier and faster for logistics managers who turn to online transportation exchanges and e-marketplaces (see sidebar). Shippers gain access to a variety of service providers and can literally arrange delivery contracts within 24 hours. “E-marketplaces will bring shippers and carriers together in an otherwise fragmented industry and enable them to collaborate on transportation planning and logistics execution,” says Kr. Jun-Sheng Li, chairman, president, and CEO of Transplace.com.

The closing gap is evidenced by the fact that shippers like to access information from multiple carriers at one location. Fifty-eight percent of respondents to a recent industry study said that a marketplace is the most valuable online resource, compared to 14% for a carrier’s proprietary site. Eight percent prefer no site at all; 6% were unsure; and 4% prefer other types of sites. “Shippers are not different from customers in any segment of the economy: They value choice,” says John Urban, president and CEO of Tradiant, an e-commerce solution provider. “An online marketplace is the most desirable option because it enables customers to make more informed decisions.”

Fast Turnaround Time

In addition to making more informed decisions about whom they want to handle their freight, shippers are using online marketplaces to speed up the

Exchanges to Check Out

Tradiant.com represents over 25 carriers. Shippers communicate their shipping requirements through an online request for proposal (RFP). The carriers respond with pricing information and the features and services important to the shippers.

Transplace.com is a one-stop supermarket for transportation solutions, including truckload, intermodal, package/parcel, LTL, refrigerated, air, cartage, and home delivery. The exchange supports seasonal/peak requirements as well as spot capacity.

The National Transportation Exchange (NTE; www.nte.net) e-commerce marketplaces bring shippers and their trading partners together for transportation optimization and greater supply chain visibility of products.

Transportation.com, set to launch in the second quarter of 2000, will feature transportation management, asset management, and consultancy services for shippers, carriers, and private fleet operators.

QuoteShip.com (212-931-6138) connects shippers and transportation providers. It enables shippers to manage spot quotes on 10 or more shipments from various carriers. At the close of the bid deadline, the shipper views a private bid screen showing the results. After the shipper books the shipment, QuoteShip notifies the consignee about the provider selected, the airbill numbers, and expected flights. The shipper prints and keeps a record of the spot price. The whole process takes about two minutes.

CargoFinder.com is a central information marketplace where both offers and inquiries of freight capacity are being exchanged. Commission-free transactions and cost-saving opportunities are potential benefits to shippers.

Eurotrans.com is a working tool meant to help professional European freight haulers find freight to haul, find someone to haul it, or even find the adequate vehicle for hauling it. Eurotrans also offers to its members the possibility to create their own private exchange, working only with a selected list of partners.

Bid Freight.com is a centralized, real-time information service that communicates shipment information among shippers, carriers, and consignees. It provides automated methods for shipment tendering, bidding, negotiating, scheduling, delivery notifying, and settling.

Cargo4less.com is a service in which users offer specific dollar amounts for cargo reservations. Users fill out a form submitting the cargo description, weight, size, and date as well as when it will be ready to ship. Then they fill in the price that they are willing to pay for the shipment. Shippers will be notified within 24 hours if the offer has been accepted. Initially, this service is limited to airport-to-airport service; however, the company anticipates that door-to-door service will be offered very shortly. There is a minimum of 220

pounds on all shipments, and no hazardous, perishable, or restricted cargo will be accepted.

Celarix.com provides shippers with a comprehensive, integrated e-business solution for domestic and international logistics. With Web-hosted applications for logistics process management, intelligence, and transportation e-procurement through the Celarix Marketplace, shippers can communicate and collaborate with key partners.

Eraterequest.com enables shippers to place their desired bids on the site for the carriers to quote on, or request the carriers' best shipment rates. The service is free.

Freightgate.com connects shippers, third-party logistics providers, and carriers in one environment. Shippers submit conditional buying offers, from which carriers view an aggregated list of offers by trade lane and have the option for acceptance or denial.

Freight-on-line.com is supported by minimal membership dues from shippers. This independent on-line freight quotation system provides the best shipping prices for ocean shipping.

GoCargo.com is a real-time solution for the container shipping industry to auction off shipping requests and for service providers to access those requests and place their bids. Membership is free.

OpenShip.com is a domestic shipping exchange. By facilitating competitive bidding and open information flow, OpenShip provides shippers with significant savings and access to scarce carrier resources during peak shipping periods. Shipments are awarded to the most competitive, qualified carriers.

contract process. Rather than making several telephone calls to do bid comparisons and set up a delivery contract, shippers merely compare rates online and can decide in seconds with whom they want to do business. The survey points out that shippers want quicker carrier responses for quotes and contracts. They seek an average of only three to four quotes per spot transaction and two to five carriers for service contracts. Slow response time is the most frequently cited reason why shippers do not get more quotes or contract offers via fax and phone.

A Struggle to Differentiate

Deregulation in the transportation community gave carriers the opportunity to differentiate themselves from competitors through value-added services. This has been heightened with electronic commerce, but only a handful of

carriers are improving sales force productivity by using e-commerce to respond to new business opportunities and to reach a larger market more efficiently.

Carrier efforts to communicate unique service features and brand have had limited success with shippers, despite the competitive environment created by deregulation. Sixty-four percent say that a carrier's brand is either not important or only somewhat important, compared to 36% who say that it is a very important part of their selection criteria.

"The survey found there are significant opportunities for shippers, forwarders, and carriers to increase profitability, streamline business processes, and enhance their competitive positioning by taking full advantage of the arrival of e-commerce," says Urban. "However, the findings suggest the transportation industry is operating the same way it has traditionally, with protracted contract negotiations and a reliance on low-tech solutions."

Steering Clear of Technology

The survey detected the shipping community's slow adoption of Internet marketplaces. Nearly 60% of the shippers and forwarders surveyed still arrange freight transportation services with carriers during a single, hectic contracting season that typically lasts four to six weeks. Almost half said that the process is less than satisfactory because it is time-consuming. Urban says, "Competition and technology are creating a golden age for opportunity for the global transportation industry, but many are adapting slowly. Only a fraction of shippers use technology to spread out service contracting across the year to rationalize the transportation procurement process." This, however, is expected to change as industry consultants predict that by 2002, supply chain services are expected to be 50% of a \$300 billion e-commerce market.

OUTSOURCING LOGISTICS IS OFTEN THE BEST OPTION FOR SPIN-OFFS

Outsourcing, usually anathema to logistics managers, is often the lowest-cost route to go, especially in a newly spun-off company. One company that has recently undergone such a change is BCcomponents, a spin-off of Philips Electronics. The passive manufacturer did this successfully by making the decision to outsource its logistics functions.

When BCcomponents spun off from Philips Electronics 18 months ago,

the manufacturer had to figure out how to deliver products efficiently to customers without getting weighted down with a costly bricks-and-mortar logistics and warehousing operation. After months of research, the Netherlands-based company decided to farm out U.S. logistics to UPS Logistics Group (UPS LG; Atlanta, Ga.; 770-206-4100).

“Our core competency is manufacturing parts, not moving inventory,” says Bob Gourdeau, BCcomponents’ vice president of sales for the Americas. “We knew outsourcing was going to be a challenge, but we think in the long term, this is the way to go.”

Laying the Groundwork

Before UPS LG could take over the logistics functions, BCcomponents had to streamline some internal processes. For example, plans were being made to change where parts from global factories entered the United States and cleared customs. Also, the frequency with which parts could be shipped to customers had to be increased.

In addition, the company products had been routed through Miami, then put on a truck and driven to an El Paso, Texas-based warehouse owned by Philips. That practice had two serious flaws, Gourdeau says. First, the drive between south Florida and west Texas took several days and contributed to a two-week delivery cycle. The company’s delivery times conflicted with the just-in-time delivery model for which customers were clamoring, Gourdeau says. And because the products were in transit for a certain length of time, BCcomponents had to maintain higher levels of inventory in order to meet demand pulls from vendor managed inventory programs. The second flaw in the company’s practices was that because BCcomponents was no longer in the Philips fold, the company had to find a way to stand on its own warehousing feet.

The New Arrangement

Under the UPS LG arrangement, logistics provider Bax Global Inc. delivers products from the company’s non-U.S. factories directly to Dallas. Customs are cleared in the air, and UPS LG receives the goods and stores and distributes them from its Dallas warehouse. From there, the goods are forwarded to BCcomponents’s customers in the Americas via a customer-selected carrier. Products from the company’s U.S. plant in Columbia, S.C., are still shipped directly to customers.

Foreseeing the Benefits

UPS LG estimates that it will manage the warehousing, packing, labeling, and delivery of more than 100,000 orders from BCcomponents per year. “The operation will go from a manual inventory system to our warehouse management system, which uses radio frequency scanner technology to monitor the location and movement of goods at any point in the delivery process,” says John Sutthoff, UPS LG’s chief operating officer. Some benefits that BCcomponents foresees are reducing lead times, improving customer service levels, cross-docking delivery, enhanced warehousing techniques, and lowering on-the-shelf inventory levels through increased visibility.

Gourdeau believes that the new setup will cut delivery cycle time from about two weeks to 72 hours, track exact location of devices in a shipping pattern, and use bar coding to get an accurate picture of inventory levels at the UPS warehouse.

Well Worth the Effort

Going through this extensive overhaul did not come without headaches, Gourdeau acknowledges. Although the company did notify customers of the changeover and prepackaged product as much as was possible before the transition, the manufacturer did miss some of its customers’ shipping dates. There were also some hurdles associated with integrating BCcomponents’ back-end systems with UPS LG’s warehouse management platform. “Is there ever a good time to make a switch like this?” asks Gourdeau. “Probably not. But we are willing to bite the bullet on these short-term issues to put in a better solution for the future.”

EXCLUSIVE SURVEY: INVENTORY CONTROL IS KEY TO CUTTING LOGISTICS COSTS

Logistics managers report in an exclusive *Managing Logistics* survey that better inventory control is one of the best ways they found in the past year to reduce costs. The survey highlights a variety of methods that managers use and the outstanding savings that they have incurred.

Review Inventory Data

It may sound obvious, but managers reveal that regularly benchmarking and analyzing inventory data helps to identify where cuts can be made and pro-

ductivity improved. “Our biggest gain in reducing inventory costs was by taking an aggressive approach through quarterly reviews,” says the director of logistics/distribution for a toy manufacturer. “We forecasted a strong schedule with our factories to increase inventory turns.”

“We rely on a cross-functional team of purchasing, production planning, logistics, and sales to periodically review obsolete inventories,” says a logistics manager for an automotive lighting company in Ohio. “This was a \$300,000 reduction from \$6.5 million worth of material inventory.”

Some logistics pros find that inventory analysis helps them place more informed orders with suppliers and keep the supply chain clutter free. “We aggressively pursued a program to reduce printed material inventory,” says a director of logistics for a compact disc manufacturer in North Carolina. “We analyzed reorder points and historical data on sales trends and reset safety stock levels, and we encouraged better on-time delivery performance from key suppliers to create a more dependable supply stream. Overall, we took over \$1 million out of inventory without compromising the customer service performance level, and closer monitoring will ensure future smaller buys of printed materials.”

Vendor-Managed Programs

Forging closer relationships with suppliers to control inventory costs also came up as a clear winner with managers. They maintain that improved communication between the logistics department and suppliers is essential in keeping customers happy. “We developed vendor relationships to store and ship products for our company from their facility, reducing inventory and associated costs while maintaining equal levels of customer service,” says a manager.

Supplier-managed inventory programs are also keeping managers on track with their just-in-time production strategies. “We implemented supplier-managed inventory, whereby suppliers deliver materials based on a fixed schedule no more than 24 hours in advance of a production schedule,” explains a supply chain manager in Minnesota. “Materials are to the exact quantities, which eliminates storage and rehandling. Materials move directly to production areas when they arrive. This has eliminated \$25 million of inventory, increased turns from 10.9 to 33.2 in 18 months, and reduced warehouse space by 50%, resulting in the closing of an 110,000-square-foot warehouse.”

“We reduced inventory carrying costs by implementing an inbound raw material hub, using a third party to manage it,” says a supply chain manager

for a large photographic products manufacturer. “Material is now managed by suppliers and consigned until we use it, resulting in multimillion dollar annual savings.”

Plan and Forecast

Warehouse management systems, MRP, DRP, and inventory management programs continue to be the mainstay of technology on which managers rely to control inventory costs. The results have been significant for some managers.

“We have tremendously improved our supply chain management by reducing inventory,” explains a plant manager for a small company in Ohio. “We now use forecasting analysis to identify bottlenecks and constraints and rely on cross docking at our outside warehouse locations to reduce storage costs. We have reduced our inventory by over \$500,000, thus increasing working capital.”

“We better understand how to use our distribution replenishment system to plan product orders,” says the senior vice president of corporate logistics for a retail home furnisher in New York. “We are now able to reach 97% customer service level with the same or less inventory. And, we reduced on-hand inventory by 16% without any determination of fill rates.”

In the realm of the cyberworld, logistics managers are finding success with Internet-based software to reduce the amount of inventory in their systems. “We implemented a new Internet-based order system that reduces cycle time and improved overall ordering efficiencies, which has lowered the amount of inventory in our system,” says the director of supply chain planning for a beer manufacturer.

Revamp Transportation Schedule

Although not many managers reported that a shift in delivery schedules had an impact on their inventory levels or costs, the logistics manager for a small supplier of automotive replacement glass obtained savings. “We have reduced inventory costs by increasing the frequency of deliveries. This was a \$500,000 savings in one quarter with less than \$100,000 increase in freight costs, and inventory was scaled down to allow quicker turns.”

Reviewing the Numbers

Each of the methods just mentioned for slashing inventory costs was identified by managers in all types of industries and in all sizes of companies. It is

Table I-4.3 Percentage of Logistics Managers Identifying Inventory Strategies Crucial to Controlling Logistics Costs by Company Size

	<i>Total Employees</i>	<i>Up to 500 Employees</i>	<i>Over 500 Employees</i>
Worked with suppliers on holding inventory	41.4	41.0	38.9
Reduced inventory costs	27.8	29.5	27.8
Reduced inventory carrying costs	26.2	22.9	30.6

Source: *Managing Logistics* survey.

interesting to note, however, that companies with over 500 employees have focused more on reducing inventory carrying costs over the past year than have their smaller counterparts, whereas companies with fewer than 500 employees look more at working with suppliers to hold inventory and in reducing inventory costs overall (see Table I-4.3).

When one compares inventory cost reduction practices among industries, the industrial manufacturing sector has made the most strides in the last 12 months in working with suppliers to facilitate vendor-managed inventory programs and in reducing overall inventory costs (see Table I-4.4). The consumer manufacturing market pulls ahead in reducing inventory-carrying costs, whereas the logistics/transportation sector does not take the lead in any one area.

We deduce from the data that the industrial manufacturing market has done a better job of handling inventory. This category comprises the automotive and high-tech markets, which historically have led the way in streamlining their supply chains and eliminating excess inventory and its associated costs from the network.

As one respondent so clearly states: “For the high-tech and automotive industries, the focus is always on inventory carrying costs. Service providers in these areas must continually analyze the inventory process to achieve the necessary reductions.”

Table I-4.4 Percentage of Logistics Managers Identifying Inventory Strategies Crucial to Controlling Logistics Costs by Industry

	<i>Consumer Manufacturing</i>	<i>Industrial Manufacturing</i>	<i>Logistics/ Transportation</i>
Worked with suppliers on holding inventory	40.6	43.0	42.3
Reduced inventory costs	23.4	36.6	23.1
Reduced inventory carrying costs	26.6	23.7	23.1

Source: *Managing Logistics* survey.

HOW 3M CENTRALIZED CUSTOMER SERVICE TO REDUCE LOGISTICS COSTS

Improving customer satisfaction is a critical process in realizing logistics and corporate objectives. To do this, people from logistics, sales and marketing, and finance must work together to fulfill customer expectations. 3M undertook such an endeavor by reengineering its Customer Satisfaction Improvement Process (CSIP); as a result, the company has cut costs significantly and has improved customer satisfaction.

Such paybacks result from changes such as the following: (a) reengineered front-end order entry/demand generation in striving to be “one voice” to the customer, cutting across all business units; (b) increased responsibilities of customer service personnel who have more respected jobs as team leaders in managing customer relationships; (c) information technology-based processes to enable improved trading partner communications; and (d) improved methods to capture customer satisfaction feedback to recognize rapid changes in customer and competitive activities, even on a multinational basis.

CSIP at 3M

3M develops customer relationships as part of its long-term business strategy, explained Dennis S. Fabozzi, director of Logistics Customer Service and Customer Order Fulfillment Process Leader at 3M (St. Paul, Minn.; 651-736-4094), at a CLM meeting. The company realized that if it could earn or maintain a customer relationship for seven years, the customers would not leave. Conversely, when a customer does leave 3M, the firm observes a direct decrease in contribution to profits of 18%. Knowing this, the company has made customer service a top priority.

“3M’s customer service mission is to manage each customer contact such that either a legitimate sales opportunity is realized or customer loyalty is improved,” said Fabozzi. 3M uses key result areas (KRAs) to monitor the results of customer interchange. KRAs include customer satisfaction, sales growth, productivity improvement, transaction speed, and customer retention and loyalty.

The customer service strategy for 3M revolves around two key areas: first, supply chain management processes and customer service management; second, customer segmentation and procurement practices. The customer should not suffer because 3M is a multinational, multidivisional,

multiproduct firm. Therefore, 3M uses many business groups to tailor service for distinct market segments with the goal that 3M will be one voice to the customer who buys from these multiple 3M business units.

The Customer Service Representative Role

Customer relationship management processes were instituted at 3M so that customer service representatives (CSRs) are market-focused instead of product-focused. 3M recognized that customer relationship management processes must be developed to fit customers' needs and goals and not be focused only on 3M processes.

Performance expectations and compensation tiers for 3M CSRs and managers include responsibilities for growing account business. CSRs enable order/replenishment satisfaction but also become accountable to customers as the one voice. Policies and ground rules are in place so that sales personnel do not overrule the authority of CSRs. Much of CSR performance is measured on how well CSRs meet customer expectations.

Managing Specific Accounts

The key difference in the role of the CSR has been the transition from satisfying transactions from any number of customers to managing specific customer accounts. CSRs must be fully knowledgeable of specific customer needs, of the range of 3M's products and service offerings, and of the tools required to match the needs and products. Also, CSRs go on-site at key customers to address needs to make improvements. CSRs must have excellent communication skills and problem-solving agility.

Adapting the Model

To be effective in your organization, the CSIP process must be adapted to the business culture of how your firm interacts with customers in determining orders and replenishments. Following are some key questions in assessing the culture:

- Is the firm a cost-driven firm or a firm that values logistics and supply chain relationships as a means to competitive advantage?
- Is the firm customer-driven or customer-focused?

- Is the firm committed to listening to the customer?
- Is the firm programmed to speak to customers in one voice?
- How is the firm structured in relation to logistics and supply chain initiatives?
- How are logistics and customer service functions organized across product lines and business units?
- How committed is the firm to its employees and customer service relationships?
- Are the firm's logistics and customer service operations aligned with the firm's mission, vision, and targeted key result areas?

Analyzing the Customer Service Function

After you have determined the culture of your firm, the next step is to conduct a detailed analysis of your company's customer service function and the customer service orientation of the firm's other functional activities. Here are some typical questions asked during this phase of CSIP:

- Are cross-functional teams used to service customers and trading partners?
- What roles are CSRs performing in relation to changing customer mixes and requirements?
- How prevalent is the use of outsourcing in the firm, and what are the degrees of communications and control in relation to the firm's customers?
- What key metrics are used to measure customer satisfaction, and how do these metrics relate to CSR performance?
- Are CSRs insulated from customer feedback?
- Is the firm striving to implement CSIP methods at the attainment of "perfect orders" and "perfect shipments"?
- What methods are used to communicate with customers?
- How does the firm value CSRs?
- What are CSRs responsibilities, and how is performance evaluated and rewarded, and at what levels of compensation relative to job responsibilities?
- Who champions the process as CSIP is implemented?

HOW CATERPILLAR REVAMPED LOGISTICS TO CUT COSTS AND IMPROVE CUSTOMER SERVICE

If you're looking for a grand strategy on how to rebuild a supply chain plan from ground zero, Caterpillar's North American track operation is a great place to start. With company facilities that are widely dispersed and lacking close coordination and cohesion, Caterpillar's logistics manager faced

- Component inventory levels that were much higher than acceptable
- Material flow from Caterpillar plants and suppliers that were not well managed
- Manufacturing lot sizes and buffers that were not tied to assembly levels
- Lead times for component parts that were not coordinated with assembly schedules

"The multiple assembly locations plus the high inventories resulted in excessive logistics costs without a smooth, sequenced flow," according to Andrew D. Nicoll, CFPIM, CIRM, C.P.M., and procurement manager for Caterpillar, Inc. (Peoria, Ill.). To solve these problems, an early decision was made to consolidate the total assembly process at one facility in Peoria for all North American customers of tractors, excavators, replacement parts, and OEM products. While the consolidation was taking place, a detailed review of the logistics and inventory management practices was also underway.

A Sound Logistics Blueprint

"One of the previous shortcomings was forecasting," says Nicoll. "Without a long-term forecast of demand, it was difficult to plan resources for assembly, develop scheduling plans, or establish inventory levels and manufacturing orders for components," he explained at an American Production and Inventory Control Society (APICS) Annual International Conference.

A group was assigned to do demand planning for truck groups by reviewing past history, using data from machine users and dealers to determine replacement parts and evaluate needs for "customized" truck groups for OEM customers. These forecasting techniques used fixed-lot size work orders for manufactured components based on forecasted use for the next six months. This technique allows component-manufacturing processes

to anticipate needed resources and minimize large fluctuations in process quantities.

Inventory Bank for Parts

A “sequencer” or inventory bank was established for parts that had ongoing usage. Inventory levels for each part are based on past observations of peaks in use over lead time required to replace them. If use varies significantly from one monthly period to the next, the inventory level in the sequencer is allowed to fluctuate with the short-term changes in demand. Then, fixed-lot size orders replenish materials at a constant rate.

“This technique is also beneficial in minimizing the inventory levels stored at the supplier’s group assembly lines,” Nicoll maintained. The storage of most components for assembly is consolidated at the supplier location to “save space and extra material handling.” An addition to the supplier’s main building was constructed specifically for component material receiving and storage. The inventory transactions are recorded at the supplier and at Caterpillar to reflect available parts and satisfy group demand.

Developing a Flow for JIT

“With a consolidated assembly operation, good requirements forecasts, and weekly schedules for group build, the logistics flow was established to deliver components just in time,” Nicoll noted. The finished group volume averages 150 pieces per day, which requires about 15 truckloads of the tractor plants’ needs and replacement parts. Supplying that volume of finished groups likewise requires over 10 truckloads each day of the major components, plus several truckloads per week for smaller parts such as nuts and bolts. Links and shoes are now delivered several times each day based on the build schedule sequence. Pins and bushings are delivered weekly.

Resolving Consolidation Problems

“As with any new process, there were many problems with the movement of the assembly functions, the startup at the new supplier facility, and different people involved in the operations at Caterpillar,” said Nicoll. Among them were the following:

- *The storage location at new assembly supplier was sized on previous assumptions.* “It was size based on assumptions for component delivery and storage

similar to those for previous operations.” In the past, much of the overflow material was stored in various Caterpillar locations, but this was not considered at the new facility. Likewise, the major component delivery schedules were based on past experiences.

At start-up, the new supplier had too many loads of links and track shoes from Caterpillar. “Gradually, the logistics team established a JIT delivery process based on assembly schedules and sequences that did limit the bulky and large usage component parts to less than one day.” Then the flow of material from the receiving dock through storage and to assembly lines was rearranged to avoid building congestion in aisles and to reduce total material handling time.

- *There was too much backup inventory at old group suppliers.* When the new supplier operation opened, the old suppliers began shipping material to the new location. However, the shipment of surplus material quickly filled the available space and had to be slowed until a plan could be established that would send the parts into the new facility based on demand.

“The previous suppliers wanted to vacate their storage space as soon as possible,” Nicoll acknowledged, but “this delay caused some concern about the supplier’s ability to manage the assembly process.” Eventually all excess inventory was absorbed. Inventory levels at the new supplier are now maintained at 30% of the volume held at the previous suppliers.

- *Scheduling began with the techniques used at the previous suppliers.* “This caused difficulties in combining schedules from three previous operations into one facility and subsequent shipment to five major customer facilities in the United States, and to a consolidation point for shipment overseas.” Nicoll says that “gradually working with the customer locations and the link, track shoe, and pin and bushing components suppliers developed into a new scheduling routine that overcame capacity and time constraints.”

The demand-forecasting routines were also changed to add OEM customer forecasts. “Their volume is a relatively small percent of the total, but they impact assembly schedules because many short-dated orders are received, especially for ‘customized’ groups with very low and sporadic usage. By combining all requirements for similar groups, the new assembly facility reduces the number of setups for these small volume orders.”

Significant Inventory Reductions Achieved

The inventory of steel to manufacture track shoes was reduced \$6 million due to consistent ordering and assembly processes. Further, the component inventory at the assembly supplier was slashed by more than 30%.

As a result of consistent on-time delivery and quick response to short-dated orders, the inventory levels in the replacement parts operations have been reduced by more than \$22 million. Meanwhile, service to dealers and customers has been maintained worldwide above 95%, even for old, non-current models. In addition, deliveries to the tractor and excavator plans have been 100% on time since early on in the start-up.

SPRINT PCS IDENTIFIES THREE WAYS TO REDUCE REVERSE LOGISTICS COSTS

As more logistics managers realize that supply chain management extends beyond order fulfillment to handling product returns, the need for reverse logistics grows. Sprint PCS realized this soon after start-up in 1996. One of the largest start-up companies in U.S. history, it handled \$400 million in returns in a 20-month period—8% of that was due to manufacturing defects. PCS has grown at 300% annual rates. With such staggering growth come the increased odds of returns. In one year, 1998, PCS saw 25% of its handsets returned.

Why so much? According to Eric Salisbury of PCS, some clients find that they do not get the coverage they need from the handset. In addition, PCS has a liberal returns policy, which promises a full refund in 30 days if the customer is not fully satisfied. Because customers do not sign a contract, they can return the product, cancel the service, and return the phone at any time. As a result, “We realized early on that we needed to develop a world-class and product reconditioning process to handle our high return rates.”

Six Ways PCS Achieved Reverse Logistics

According to Matthew Kunz at Sprint PCS, the company ultimately identified six ways to achieve reverse logistics:

1. *Understand both your own and your customers' business requirements.* Kunz says that the company wanted to provide timely financial credit to customers when they made a return, maintain revenue streams and customer satisfaction levels, and have the reconditioned product look and feel like new to the next customer. Customers, on the other hand, want a sound return policy and a quick resolution to their problems.

2. *Establish a reverse logistics supply chain network through existing sales channels.* Whether it is through locally owned and operated retail stores, local third parties, national third parties, third-party logistics provider (3PL) partners, or telesales, PCS makes sure that each of these sales channels knows how to process returned handsets quickly.

3. *Establish strategic alliances with logistics service providers.* UPS Worldwide Logistics processes returned parts and either gives a financial credit to the customer, replaces the part, or returns it to PCS's available stock.

4. *Clarify elements leading to reverse logistics success.* Two elements are critical: gatekeeping and compact cycle times. Gatekeepers stem the flow of returns by performing diagnostic testing. The product is resold at full or reduced price, depending on the damage. This screening process has saved PCS \$3.6 million.

5. *Identify and resolve issues between retailers and manufacturers.* Kunz says that PCS wanted to ensure that retailers and manufacturers developed shared initiatives to meet common goals and objectives. The groups worked together to understand the high number of returns and what could be done to resolve it.

6. *Establish performance measures and metrics for reverse logistics processes and monitor them.* "With our growth, we have to stay ahead of the curve," says Kunz. "By measuring our vendors and 3PLs, we can stay on top of them everyday."

Establish Partnerships

PCS outsources every part of its business that involves logistics, including reverse logistics. It partners with handset manufacturers and 3PLs to handle returns processing. In addition, PCS has required its manufacturers to partner with the 3PLs and required the 3PLs to partner with each other. For instance, one partner tests the returns within a centralized DC in Louisville. This eliminates the costs of shipping tested products back to the manufacturer and then sending them back to PCS to replenish inventory. "Our former procedures took up to 45 days," says Salisbury. "Now we can turn thousands of phones back into sellable stock within two days."

PCS makes weekly calls to each handset vendor to discuss how products are reconditioned and how to expedite the process, explains Kunz. "There has to be communication between partners to look out for PCS's best interest and to make sure our partners focus on the right areas."

Mirror Outbound Process

PCS is centralizing all outbound shipments into a DC in Louisville because its 3PL, UPS Worldwide Logistics, has its air hub there. This allows mid-night pickups to be delivered the next day. PCS realized that it could mirror the outbound concept to handle returns processing. Having all inbound product come into a centralized DC in Louisville reduces the time it takes to return the product to sellable inventory.

Reduce Inbound Product

Both Salisbury and Kunz admit that returns processing at PCS is constantly evolving, and although the objective is to perform the task successfully, the ultimate goal is to reduce inbound returns by 10%. “If we can slash costs by 10%, it will be \$500 million a year in savings,” says Salisbury. He continues, “Keeping sellable product in the field versus bringing it into the reverse logistics process creates a product our customers can be proud to use and we can be proud to have our name on.”

HOW INGERSOLL-RAND QUANTIFIED ITS LOGISTICS SPENDING AND SAVED MILLIONS

Keeping tabs on your logistics spending patterns can save millions. Just ask the logistics managers at Ingersoll-Rand. However, with \$8.3 billion in sales across 10 product groups, 40 divisions, 145 plants and distribution centers, and 47,000 employees, understanding its logistics costs and potential for improvement across the company was a significant challenge. Here’s how the company made a success of a formidable project.

Teaming Up

Ingersoll-Rand decided to supplement internal functional expertise with the acquisition of quantification methodology, best-practice knowledge, and international trade competency, explained JoAnn Johnson, director of logistics for Ingersoll-Rand (Huntersville, N.C.; 704-947-1464) at a recent annual conference of the CLM.

The 10-member project team, half from Ingersoll-Rand, half from

Vastera International Trade Consulting, was commissioned to identify opportunities for process improvements in logistics management. The team was required to quantify present logistics costs, estimate costs of tomorrow, and offer a list of recommendations with priority for action.

A Weekly Process

During the first week of the team's evaluation, members scheduled interviews with executives and prepared their questionnaires. Next, they conducted a total of 220 interviews at 41 sites, covering various parts of the value chain—sales, service, distribution, transportation, manufacturing, procurement, and finance. In addition, requests for quantitative data were sent to 42 consolidation business unit locations.

During weeks six to nine, the project team reassembled for an analysis, which consisted of understanding the core logistics processes, identifying customer needs, and quantifying the process costs and cycle times. The interview and quantitative data were distilled to characterize the Ingersoll-Rand logistics environment, to compare business unit logistics practices against best practices, and to find gaps.

The final weeks, 10 through 12, were spent resolving each of these gaps and prioritizing them based on their benefit. The team developed solutions for those at the top of the list and structured the summary of the findings and recommendations into a presentation.

The Findings

Johnson says that the findings were significant. Logistics costs were found to be slightly over \$550 million with 45% coming from transportation, 35% from people, and 20% from inventory finance charges. The costs are estimated to grow to \$650 million in 2001.

A total of \$170 million of opportunities was identified; \$20 million of that total was tactical, near-term (12 to 18 months) opportunities. These included establishing an international trade competency center and improving international transportation, company fleets, North American transportation, and supplier transportation. The longer-term opportunities were in the areas of integrated systems, scanning/bar coding, order entry, limiting model options, and worldwide inventory/distributor networks.

A Logistics Group Is Born

According to Johnson, executive response to the project and the findings was positive, and a small corporate logistics organization was formed. The group established an open dialogue with the logistics professionals across the business groups and began coordinating the effort to adopt best practices and align the network. Initiatives were developed and launched to capitalize on the tactical opportunities with the goal of \$25 million in annualized savings for 2000 in European and North American transportation and distribution.

These initiatives included

- Alignment of logistic processes with consistency of strategy, measurement, and contracts
- Leverage of company volumes in procuring transportation services
- Process improvements in demand flow methods, transportation service mapping, and e-business
- The establishment of an intranet site link to facilitate the spread of best practices and other logistics information policies

“Ingersoll-Rand has a corporate understanding that the definition of logistics is more than transportation and is key to the entire company value chain from supplier to customer,” says Johnson. “We understand total logistics costs and capitalize on process improvement to achieve a competitive advantage.”

FORD TAKES CONTROL OF INBOUND LOGISTICS TO CUT TRANSPORTATION COSTS

Often overlooked by logistics managers or left to suppliers to address, inbound logistics planning is a great way to reduce your supply chain costs. By taking the responsibility out of your suppliers' hands, you will realize a more reliable and cost-efficient network.

Consider the case of Ford Global Technologies, Inc. (FGTI; 313-323-7809), a wholly owned subsidiary of Ford Motor Company. Since concentrating efforts on inbound logistics, the company has saved tens of millions of dollars in transportation and inventory carrying costs.

Plant-Centric versus Origin-Based Networks

“We had to find a systematic approach to handling our complex inbound network,” explains Jerry Joyce, director of global logistics for FGTI. “We have 21 final assembly plants and 5,000 suppliers. Add to that limited dock space and limited time windows for deliveries. This high-volume, high-frequency inbound logistics network needed a solution. We wanted to keep up our pace without increasing freight costs.”

The best solution was moving from a destination- or plant-centric logistics network to an origin-based network. Joyce explains, “We used to be oblivious to the supplier’s location in relation to the manufacturing sites. Now we have optimized the pick-ups and built optimal trailer loads for the destination site.”

“While before we might have had five different trucks supporting five plants, we now have one truck that goes to all the plants,” says Mary Jo Koenigeauer, manager of global logistics technology at FGTI.

Getting Down to the Finest Details

FGTI is using an inbound logistics software solution to help synchronize the flow of product to the production site. The ultimate goal is to have no more than two hours of material at the production site, cutting down significantly on the amount of parts in storage.

The package that FGTI uses is SynQuest, Inc.’s (Duluth, Ga.; 800-844-3228) Inbound Planning Engine. Joyce says that the system enables FGTI to generate the lowest total delivered cost plan, based on the view of the complete inbound logistics process. It drills down to the individual material and determines inbound and reverse transportation routes and schedules, shipment frequency, inventory, manufacturing constraints, and equipment usage, allowing Ford to plan for every part.

For example, says Joyce, scheduling a weekly, full truckload delivery to a manufacturing plant—as opposed to a daily milk run—might make sense from a transportation-cost perspective, but it may totally ignore speed, quality, and inventory considerations.

“The goal at Ford is to develop logistics solutions that increase supply chain velocity and decrease total costs,” says Tim Harvey, president and chief operating officer at SynQuest.

A Collaborative Solution

Finding such a solution already on the market was not easy, agree Joyce and Koenigeauer, as no product addressed all of FGTI's issues. The company turned to SynQuest to develop a joint solution that FGTI could use and one that SynQuest could then make commercially available.

"Building the product with Ford allows us to bounce ideas off of a company and gives them the opportunity to practically custom-build a solution to fit their needs," says Chris Jones, executive vice president of marketing and corporate development for SynQuest.

In customizing the solution, Ford required that the solution allow for granularity. Jones explains, "Ford wants to see the product show up at the manufacturing site, which dock door it is at, what truck it is on, product sequence, and what physical constraints the part has."

"Ultimately, this collaboration benefits Ford in the delivery of automotive products and services to our customers," says Roger May, president and CEO of FGTI.

A Data-Driven Process

In order for FGTI to get the most from its inbound solution, the company had to do upfront work—practices that Jones says any organization should undertake if it wants to improve on its inbound logistics program.

For instance, Jones says, supply chain data is needed to configure the planning engine. FGTI had to supply information about its parts, including size, shapes, and weights. Joyce and Koenigeauer had to determine if there was an opportunity for supplier consolidation and if cross docking should be implemented. Finally, they had to evaluate suppliers and purchase prices.

"You have to get together with manufacturing and procurement to show them the opportunities that exist on the inbound side of logistics—that is, beyond traditional transportation. It may involve changing contracts with suppliers and how fulfillment should occur, but the savings are usually significant when you take a cross-functional approach," says Jones. Companies can save anywhere from 10% to 50% in overall logistics and inventory carrying costs.

He adds that most companies have not capitalized on inbound logistics—"but it is a place where companies can squeeze out costs without disrupting business."

The Implementation Plan

Since implementing two of the five modules last summer, FGTI has seen improvements and savings in logistics configuration management (LCM) and rotation and routing. Koenigeauer says that the LCM module allows FGTI to determine which mode it will use to make a delivery and then break down the requirements at the part level to optimize transportation and inventory costs. The rotation and routing module tells which days and windows times are best to ship, and it shows the number of conveyances on the road and the dock schedules.

FGTI will soon implement the additional three modules: mode selection, returnable containers assignment (which minimizes the cost of reverse logistics for returnable containers and pallets), and stowage (which shows how to fill the conveyance for maximal shipment efficiency).

Future Plans in the Works

Jones adds that FGTI is using the Inbound Planning Engine to consider how new carriers, new products, and other modes will impact its inbound logistics process.

“We are analyzing our network like never before,” says Koenigeauer. “We are able to participate in what-if scenarios to determine current and future business principles and build the organization around the changes that we make.”

“Our business is much more flexible, as we can now impose restrictions or turn off constraints, depending on what makes more sense for the business,” says Joyce.

Chapter I-5

Logistics Management and Strategy

HOW TO CREATE A LOGISTICS STRATEGY THAT GUARANTEES COMPETITIVE ADVANTAGE

There is a new weapon in the fight against the competition—the logistics manager. Not only has management discovered this, which is good, but your competition has discovered this as well, which is bad. Both, however, have put the logistics manager at dead center of the battle. It is now up to the logistics manager to find innovative ways of gaining and maintaining customers and keeping them loyal. It means that you must become much more proactive in your logistics strategy. These steps should help put this strategy into practice.

Putting Together a Winning Strategy

“Logistics managers tend to be placed in reactive modes when it comes to handling customers, but having a logistics strategy makes them more proactive,” says Ron Grossman, solutions director for Unisys Corp. (Windsor, Conn.; 860-298-1375). A proactive logistics strategy should include the following elements, with the overriding goal of getting product to the customer as quickly and accurately as possible:

- *Process system reengineering.* The objective is to examine all your internal logistics processes and determine if you could be doing things better.
- *Optimal inventory performance.* Determine optimal inventory levels based on historical data and forecasting. “You don’t want to have safety stock for just-in-case situations,” says Grossman.

- *Optimal storage schemes.* Does your warehouse have enough space? Does it have too much unused space? Is product stored for the most efficient picking sequences?
- *Cube space.* Stack product to the full height of the warehouse. Use narrower aisles and have equipment that will fit in those aisles. Make sure the picking sequence makes sense.
- *Integration of warehouse management system (WMS).* “The WMS can only tell you where product is stored—not if you should have the product in the first place,” says Grossman. “That is why it has to be integrated with other logistics systems, like the financial, shipping, and order fulfillment systems.”
- *Total cost of ownership.* This includes the cost of the product while it sits in inventory as well as the shipping costs. “I bet 90% of the businesses out there don’t know what their total net landed costs are,” says Grossman. “You must get a handle on these costs.”
- *Responsiveness to change.* Whether its labeling or shipping requirements, “if the customer wants something, you better figure out a way to do it, or the competition will,” Grossman says.
- *Supply chain optimization.* Can you avoid having product come into the warehouse altogether? Should you ship directly to the consumer? The goal here, says Grossman, is to save time and money.

Logistics Technology

The key to logistics strategy is technology. Electronic commerce has become one of the leading solutions, but Grossman warns that few companies are actually using it correctly. “You want to have more than just an Internet presence. Your site should do more than provide information; it should be interactive.”

Interactivity might come in the form of tracking and tracing capabilities, which Grossman says are of top importance to customers today. Also important is the ability to share information with customers—via electronic data interchange or on company intranets and extranets. According to Grossman, “accurate and timely information keeps things running smoothly and ensures that the customer will come back.”

THREE ROUTES TO ISO 9002 CERTIFICATION OF YOUR LOGISTICS OPERATION

What does ISO 9002 mean to warehousing and logistics? The answer is simple: plenty. ISO 9002 certification puts your company's name in lights. It lets the whole world know that your warehousing and logistics processes meet quality standards. As a result, customers will likely be drawn to you, your profits may improve, and you may gain more control over your operations. Because it has the potential to create such huge rewards for your company, ISO 9002 certification may seem a bit intimidating. In fact, certification can be simple—that is, if you follow some clearly defined steps.

ISO Defined

We've all heard of ISO 9000, but what exactly is ISO 9002? According to Peter Sanderson, president of TQMS International (514-630-0078), ISO 9002 is part of a larger group of standards that make up ISO 9000. ISO 9002, he says, is designed specifically for companies that perform a process. Warehousing and logistics are based on a number of processes and, therefore, are placed into this category. "A lot of warehouses have value-added processing such as shrink-wrapping and minor assembly operations," Sanderson says.

ISO 9001, on the other hand, is created for companies that design and manufacture products. Companies that want to maintain control over what is coming from and going to their offices should apply for ISO 9003 certification. Although ISO 9003 may sound like the best option for warehousing and logistics operations, it's not. According to Sanderson, "ISO 9003 isn't used often, and it's typically used by organizations such as law firms."

When considering ISO certification, it's important to remember that no one category is better than the other. Unfortunately, many companies perceive that ISO 9001 is more prestigious than is any other ISO 9000 certification. They are mistaken, according to Sanderson: "One isn't better than the other. It's the size of shoe that fits the company."

Specifically, ISO 9002 is a management system based on a set of management tools. To receive certification, these tools should be incorporated into your warehousing and logistics operations. The tools include conducting incoming and outgoing inspections and defining management authorities, such as who makes the decisions about financing, contracts, warehousing, and logistics processes.

Contract negotiation is another important tool to consider when applying for ISO 9002 certification. “Contract negotiation covers the basic criteria that are necessary before signing agreements,” Sanderson says. Contract negotiation includes issues such as insurance, theft measures, and service capabilities.

The management tools also address what to do if a process fails. When preparing for ISO 9002 certification, you should spell out exactly what you will do if a problem arises. In other words, what corrective action will you take? You should ask yourself what caused the problem and what you are going to do to solve it. According to Sanderson, however, you shouldn’t stop there. You need to determine how you will prevent the problem from re-occurring and how you will find a solution. Further, the newest step in the process is evaluating your solution to make sure it is successful.

Basically, ISO 9002 is a management plan that says “what would you do if . . . ?” For example, if one of your trucks overturned on a snow-covered highway, you need to know what to do. ISO 9002 certification basically says that you will have a contingency plan in place to get the shipment where it needs to be. “This is how ISO affects the bottom line,” Sanderson explains. “It ensures continuous improvement and reduces your costs due to non-conformance.”

What You Need to Do

There are basically three ways to become ISO 9002 certified, and the process typically takes five to eight months. Some logistics managers opt to take on the process themselves. However, when they do, “the process rarely gets completed on time,” Sanderson says. Their focus often shifts to other projects, and the ISO 9002 certification requirements fade into the background.

Despite the challenges, you may still decide to take the ISO 9002 certification process on yourself. If you do, the first thing you need to do is get educated. ISO certification courses are available. Once you have learned what you need to know about ISO certification, it is up to you to create a quality manual and develop and implement quality system procedures. Auditors enter the scene during the final phase and, hopefully, validate the quality procedures that you set up.

If ISO certification seems a burden, you can seek the help of an ISO consultant. Consultants supply required documentation and provide on-the-floor-training and management training. Because they have the necessary resources, consultants can start ISO-quality system procedures almost

immediately. Once the systems are in place, the consultants call in the auditors to ensure that you meet ISO certification standards.

According to Sanderson, there is yet a third ISO certification option—video conferencing. A blend of the first two methods, video conferencing takes advantage of the Internet and provides on-line training to logistics managers. TQMS helped 13 logistics companies gain ISO 9000 certification via video conferencing last year, and another 45 are working to do the same this year. Logistics managers can work their way through the procedures and collaborate with TQMS on the computer, Sanderson says. “They learn as they go.” If you think videoconferencing might be the most promising way to become ISO 9002 certified, visit www.tqms.com. There you can download the ISO certification procedures as well as an example of a quality manual.

The Bottom Line

Regardless of which way you choose to become ISO 9002 certified, you stand to reap a number of benefits. The biggest attribute of ISO certification is international recognition. Therefore, when “ISO 9002 certified” appears above your company’s door or on its letterhead, you have gained substantial marketing visibility.

Second, ISO 9002 certification enables you to gain more control over your warehousing and logistics operations. “By going through the process, you’ll see where you’ve been and where you want to be,” Sanderson notes. With this knowledge in hand, you are better able to streamline your processes, reduce the amount of paperwork in your operations, and make your warehousing and logistics systems more effective.

ISO 9002 certification can improve your company’s profit margin. “If you know what you want, and you start quality processes and train your employees, you should have tools for continuous improvement.” Furthermore, continuous improvement leads to increased profits. Remember that the goal of ISO 9002 certification is to ensure quality in warehousing and logistics. You are doing ISO not for an auditor, but for yourself.

EXCLUSIVE SURVEY: FOUR SUCCESSFUL LOGISTICS STRATEGIES FOR CHANGE

It looks as if all the industry seminars, conferences, and trade shows have paid off for logistics managers. Those responding to a *Managing Logistics* survey

show that they have learned about, and implemented, creative and innovative ways to bring about improvements in their logistics departments. The following sections reveal what they have done.

Implement Teams to Make a Change

Creating project teams was among respondents' top five most effective changes to improve logistics department operations (see Table I-5.1). Man-

Table I-5.1 Most Effective Logistics Changes (by number of employees)

	<i>All Employees</i>	<i>Up to 500 Employees</i>	<i>Over 500 Employees</i>
Implementing/changing logistics strategy	30.5	24.1	38.9
Use of technology/automating processes	18.7	21.7	18.1
Reducing transportation/freight costs	16.6	14.5	16.7
Personnel	8.6	9.6	5.6
Working with other departments/creating project teams	8.6	9.6	8.3
Warehouse/facility redesign	6.4	7.2	4.2
Working with suppliers	4.8	7.2	4.2
Outsourcing	3.7	3.6	2.8
Other	2.1	2.4	1.4

What Is the Most Effective Change Implemented to Improve Logistics Department Operations? (by Industry)

	<i>Industrial Manufacturing</i>	<i>Consumer Manufacturing</i>	<i>Logistics/ Transportation</i>	<i>Other</i>
Implementing/changing logistics strategy	32.3	32.3	10.0	30.0
Use of technology/automating processes	9.7	23.2	20.0	0.0
Reducing transportation/freight costs	17.7	14.1	30.0	30.0
Personnel	9.7	6.1	30.0	10.0
Working with other departments/creating project teams	8.1	9.1	0.0	20.0
Warehouse/facility redesign	6.5	7.1	0.0	0.0
Working with suppliers	6.5	5.1	0.0	0.0
Outsourcing	6.5	1.0	10.0	10.0
Other	3.2	2.0	0.0	0.0

Source: IOMA.

agers said that teams are particularly beneficial to identify savings opportunities in the distribution center (DC).

One manager relates how his team practices resulted in significant financial reductions. “We focused on throughput costs and inbound transportation,” says the distribution director for a retail company in Maryland that employs 10,000 employees. “We examined every process of receiving, shipping, and selecting to identify unnecessary processes. Our team members led the effort, developed new procedures, and implemented the results. Because it was their work, the team members embraced the change and made it successful. We also outsourced freight planning to a broker. In both areas, we reduced costs more than 20% and on some routes, 50%.”

Respondents also report that teams play an important role in strengthening interdepartmental relationships. “We have a new distribution strategy that segmented distributors and focused on managing the relationship differently,” explains the senior project manager for a Georgia-based beverage company. “We dedicated alliance managers to manage relationships and work on business process optimization, supply chain integration, and business building activities.”

High- and Low-Tech Solutions Pay Off

Almost 19% of the respondents implemented technology and automated processes, up slightly from 17% a year earlier. Everything from supply chain software to simpler solutions has shown significant savings for respondents.

Many said that achieving greater control over operations is the impetus for a new system. “We implemented an ERP [enterprise resource planning] system in January, which gave us more control over our inventories and opened our eyes to true costs—where they were and how to contain and improve them,” says the logistics manager consultant for a company in Maine.

The materials manager for an automotive molding firm in Indiana tells a similar story: “We implemented a new software system, MFG Pro. Now we can truly get a handle on controlling inventory, production needs, and customer requirements. Different scenarios can be played out in the system to keep the inventory at the desired level and still monitor our suppliers’ delivery performance.”

However, it’s not just the sophisticated technology that makes a difference. Something as simple as a barcode label can reduce costs and improve efficiency. “We implemented a program to print individual box labels and

carton labels overseas, reducing our label costs by 60%,” says the DC planning logistics manager for a footwear manufacturer in North Carolina. “Our consolidator is also responsible for notifying factories that the labels are ready, giving us advance notice of production delays, and ensuring vendor compliance on packaging and labeling. This enables merchandise to flow through the distribution center without delay and gives our buyers advance notice of production.”

Vendor Managed Inventory and Better Forecasting Cut Inventory Costs

Logistics professionals told us that by using the technologies just mentioned they have been better able to control their inventory programs, either by vendor managed inventory or through improved forecasting methods. “By pushing more vendors to stock off site, the amount of deliveries received daily at the DC has been cut about 50%,” says a manager of manufacturing services for a flexible packaging company in Pennsylvania. “Raw materials are received in approximately two loads per day. This frees time for other tasks, and delivery times are scheduled the same time each day, making operations standardized, predictable, and efficient.”

“We separated production planning and production scheduling functions,” says a vice president for logistics at an Ohio-based meat products company. “We added more responsibility for production planning to work closer with sales to improve forecast accuracy and frequency. This helps to reduce overstocks and aged inventory on slow moving/discontinued items and to improve customer service on faster-moving or new items.”

More Creative Transportation Practices

Another change cited as having the most effect on logistics departments consists of developing and implementing a creative transportation management program aimed at reducing freight costs. “We have turned our truckload freights into LTL freight,” explains the manager of transportation for a publishing company in Pennsylvania. “This eliminated our need to stage product in house until we build a solid load to a particular destination. We now use consolidators to commingle our freight with other companies’. This process has greatly improved turnaround time to customers and reduced our annual transportation costs.”

Another manager shares the advantages of leasing over purchasing

transportation equipment: "We leased an ISO tank to transport liquid caustic soda from our Honolulu facility to our neighbor island facilities," says the associate director for a chemical distribution firm. "The lease rate is low, and it allows us to spend our limited capital on other high-priority items."

Although the majority of respondents has realized advantages on a domestic front, creative transportation practices have also been internationally successful for some respondents. "We have centralized our international shipments to go through one port, giving us the effect and benefits of a 'hub' and allowing us better economies of scale and better customer service," says the import/export supervisor for a company in Washington.

Whether domestic or international, the goal of any transportation program is reduced costs. Changing the process structure is how one transportation supervisor did just that. "Transportation costs were reduced by three cents per case to customers by starting a one-day-a-week delivery system. We'd been on a delivery system rolling through every five days. Savings contribute to reduced mileage by delivering to each store 52 times a year instead of 73."

TEN WAYS LOGISTICS MANAGERS CAN IMPROVE SUPPLY CHAIN PRODUCTIVITY

The "State of Logistics Report" sponsored by Cass Information Systems and ProLogis is as dramatic as ever, inspiring logistics professionals continually to improve their operations for the good of the industry as a whole.

The report supports an important lesson: Logistics managers play a key role in improving business processes and productivity. The following 10 propositions, offered by Bob Delaney, vice president of Cass, suggest how the logistics profession can be improved.

1. *Improve the efficiency of inventory investment.* Delaney says that the logistics manager has primary responsibility for the investment, condition, and location of inventory. However, data indicate that the efficiency of inventory investment has declined in some recent years; for example, although the ratio of shipments to unfilled orders in manufacturing businesses that produce to order improved from 1.61 to 1.58, the ratio of shipments to inventory in manufacturing businesses that produce to stock increased from 1.35 to 1.38 in 1998. "We have not taken inventory out of the system," says Delaney. "We are merely shifting where inventory is held within the supply chain."

2. *Resolve logistics issues and concerns regarding ERP systems.* Although the ERP industry has made progress in supply chain planning system interfaces, such systems will not impact business logistics productivity for another two to four years, says Delaney. In an effort to take full advantage of the technology, he encourages logistics managers to

- Identify any key processes that need strong IT support
- Package these concepts in a way that is attractive to senior management
- Focus on mainline business operations, not back-office functions

3. *Continue to exploit the cost and service opportunities provided by third-party logistics services.* Typically, logistics managers are experiencing reductions of 10% in their logistics cost by using third-party providers. This might explain why the third-party logistics (3PL) industry continues to show signs of significant growth: gross revenues up 15% to nearly \$40 billion; transportation management up 21%; dedicated contract carriage up 20%; value-added/warehouse segments up 10%; and international 3PL services up 11%.

4. *Exploit opportunities of integrated package design.* Delaney believes that poor productivity is resulting because protective packaging is no longer considered a key responsibility for logistics managers. He points to Becton Dickinson & Co., however, as an excellent example of how packaging design can lead to cost reductions. The company's third-party provider, USF Logistics, retained the help of Computerized Packaging Consultants, Inc., to analyze six products and develop practical recommendations to optimize the costs of packaging, transfer freight, warehousing, handling, pallets, and delivery.

At least two options were presented for each product. Option A involved revisions to the internal arrangement of the products and a redesign of the packaging. Option B included increases or reductions in the product count per package. The potential cost reductions for the six items approached 30%, including reductions in packaging costs of 33%.

5. *Support programs that will reduce the driver shortage.* The driver shortage is expected to become even more acute than it is today. As carriers advertise significant signing bonuses to attract truck drivers, logistics managers can do their part to make the job more appealing as well, says Delaney. "The disposition among shippers is to accept rate increases that are applied to driver wages," he says. "The National Industrial Transportation League has even established a working group to investigate better practices to attract and maintain drivers."

Delaney says that logistics managers can look to their internal operations for ways to curtail excessive driver waiting times as well as loading and unloading times. “We cannot overstate the importance of an efficient trucking industry to our business logistics system. It is in everyone’s interest to reduce the driver shortage.”

6. *Demand that the focus of your transportation policy be on competition instead of protection.* “We regret to report that we are losing too much productivity because of political infighting between our rail and trucking industries,” says Delaney.

7. *Obtain the cost reductions that are available by safely operating longer, heavier highway vehicles.* The six-axle tractor-trailer combination, known as the Argosy Safety Concept Vehicle, has a 90,000-pound payload, and distribution load over the axles results in 13% less damage to pavements and bridges compared to the five-axle standard. “The Argosy is remarkably safe,” says Delaney. “It has a lower center of gravity, which provides more stability, and it is roll-over resistant.” The Argosy’s designers predicted a 15% improvement in safe vehicle performance last year; the actual improvements in safety are closer to the 30% range.

8. *Ensure that maritime reform delivers the economic benefits that are available.* It is widely assumed that shippers will have the advantage in the negotiation of confidential contracts.

9. *Continue to improve the capacity and service levels on the railroad network through increased capital investment and consolidated operations.* Capacity has become a serious issue for the railroad industry. Over the last 10 years, Class I rail freight density has increased by over 50%—more freight moving over fewer tracks. One of the actions necessary to reverse the capacity and service problems is to increase capital spending to upgrade and enhance track, signaling and communications, and freight car and locomotive fleets.

10. *Reform the Jones Act in order to support the requirements of our global economy.* According to the Bureau of Labor Statistics, the current penalty costs of the Jones Act exceed \$14 billion. The industries suffering the penalty costs are agriculture, forest product, petrol chemical, mining, and metals.

Delaney says, “The Jones Act is a costly, inequitable form of protection. It is no longer achieving its original intention and is harming our nation’s ability to compete in the global marketplace. We encourage Congress to enact a reform of the Jones Act to make the economy more productive and efficient.”

For a copy of the report, contact Cass Information Systems, a subsidiary of Cass Commercial Corp., at www.cassinfo.com.

EXCLUSIVE SURVEY: TWELVE TIPS FOR SOLVING COMMON LOGISTICS PROBLEMS

Good news for logistics managers: You're not alone. The problems that you face daily—inventory obsolescence, increasing costs, management of supplier relationships, and lack of communication along the supply chain—are common among your peers. But thanks to a new *Managing Logistics* survey, respondents share their advice for overcoming many of these, and other, obstacles to performing your job well. Here are 12 of the best tips culled from the hundreds we received.

1. *Plan labor better.* “We are planning to better balance the needs of warehouse operation inbound receipts and filling stockouts,” says the vice president of corporate logistics for a large home-furnishings company in New York. “The number and mix of inbound product is planned at maximum levels by the day of the week. This allows us to optimize/minimize labor requirements and plan our shifts accordingly.”

2. *Redesign the warehouse.* “We redesigned our warehouse with narrower aisles, a wire guidance system, and bar coding,” acknowledges the shipping supervisor for a forklift manufacturer in Indiana. “This has almost doubled our capacity, improved inventory accuracy. We are now able to move more inventory faster and more efficiently.”

3. *Work with other departments.* “Cross utilization of material handlers in different departments enables them to be deployed where the need is greatest,” explains the manager of distribution for a small firm in Illinois.

“Interdepartmental cooperation in dealing with transportation-related issues has improved our vendor situation,” explains the transportation manager for a company in Indiana. “Some vendors were shipping multiple shipments per day to our DC locations. We worked to get them to consolidate into one shipment per day per DC.”

4. *Benchmark logistics activities.* “The introduction of a continuous process improvement model has led to a 184% increase in productivity in the last 12 months and a 56% reduction in labor-related costs.”

5. *Renegotiate freight rates.* “We initiated a program to control more traffic by paying the freight instead of shipping collect to gain leverage with the carriers when negotiating for lower costs,” says the general manager of transportation for a chemical company in New Jersey.

“We combined our inbound and outbound freight with four trucking companies,” explains one shipping supervisor. “By combining our freight by area, weight and delivery time, we are now getting better freight rates, scheduled pickup and delivery times, and reduced truck traffic at the dock. This also gives us the security of dependable freight carriers.”

6. *Reduce throughput costs.* “We reduced throughput costs in and out of the DC,” shares the senior logistics manager for a large company in Washington. “By changing pick/pack operations, we increased our lines per hour by 30%, and the improved product handling sequence has reduced costs by \$200,000, while increasing productivity.”

7. *Reduce order processing and communication costs.* “We reduced the total cost per order by 50% compared to our previous fiscal year,” boasts the corporate manager of logistics for a printing company in Kansas. “The total cost was for material handling, receiving, inventory control, and shipping” (i.e., total labor divided by total orders = cost per order).

8. *Reduce inventory obsolescence, damage, and pilferage.* “We concentrated our efforts on reusable plastic packaging material,” says the logistics manager for a television-glass manufacturer in Pennsylvania. “Customer returns of the pack were never tracked, so obsolete packs wound up in storage. Consequently, we frequently purchased new packs only to have several truckloads returned from the customer or found at the warehouse. By implementing tracking processes and measurements, we reduced annual purchases by \$3 million, overall inventory by \$2 million, and warehousing costs by over \$100 million.”

“We now rely on reports that track material not used in more than 12 months,” explains the materials manager for a midsize company in California. “This has helped us identify \$500,000 in obsolete inventory.”

“We have reduced our inventory 20% by working more closely with sales in forecast accuracy, discontinuation of slow/nonmoving items, and reduction in aged inventory,” says the vice president of logistics for a meat product company in Ohio. “We now reforecast and establish inventory-level targets for each item every 30 days rather than 90 days, helping us to control production and inventory balances better and to reduce the level of aged inventory.”

9. *Have suppliers hold inventory.* “Through our integrated supplier programs, our suppliers hold inventory until the actual requirement time,” says the general manager of logistics for a large company in Georgia. “Now it’s as if we control the inventory without having to hold onto safety stock in our own warehouse.”

“Local suppliers hold inventory for us until delivery,” explains a traffic manager in Maryland. “Freeing up warehouse space and freight savings, as well as standardizing delivery, has saved us about \$300 per delivery.”

10. *Establish a foreign trade zone.* “By implementing our manufacturing site as a foreign trade zone, we have reduced costs by utilizing invested tariff and not paying duties on finished product placed into commerce,” says the director of logistics for a company in Oklahoma. “We have also been able to reduce inbound cycle time by bringing foreign goods through ports without delay from Customs processing.”

11. *Make use of sophisticated technology.* “We have yet to implement it, but when we do, our shipping management system will offer significant time savings,” predicts the transportation manager for an industrial pump manufacturer in New York. “We will reduce errors in calculating freight charges and in invoicing, and we will be able to improve customer service by capturing shipping data (tracking numbers, freight rates, carrier, and the like), which can be passed to the customer service organization to improve customer relations.”

12. *Improve communication with truck drivers.* “We do business with a third-party partner, who pays the total cost of a new radio/telephone system with all dispatchers, drivers, and large customers,” says a logistics manager in Utah. “This saves hundreds of dollars in downtime and duplicated services, and everyone from drivers to dispatchers to the customers loves it.”

EIGHT STEPS TO DETERMINE WHETHER YOU SHOULD MAKE OR BUY A WAREHOUSE MANAGEMENT SYSTEM

Many companies approach an operational problem in the warehouse with a “build versus buy” mentality. The usual argument is that the operation is unique and thus that no packaged solution will be able to meet its needs. Too often, however, internally developed solutions put firms on a path to doing this wrong, only faster.

Robert L. Olsen, project manager for Tompkins Associates (Raleigh, N.C.; 800-789-1257), says that building a system with internal resources is difficult to justify. His eight-step approach to purchasing, rather than building, a WMS has proven to mitigate risks and guarantee project justification.

Eight Steps Toward Purchasing a WMS

1. Start with a detailed examination of the operation with an eye toward true business requirements. The objective is to document what results are needed and examine every process step to determine the efficiency and intent. Group common processes and determine how they can be addressed consistently.

2. Evaluate the build versus buy decision. Several factors should be considered in this process. One is an analysis of available resources. Resource requirements include knowledge of radio frequency (RF) terminals, wedge scanners, electronic scales, bar codes, and automatic data collection (ADC) systems. Interfaces to other technologies in the warehouse, such as conveyors, carousels, and pick-to-light systems, can also be factors.

3. Consider lost opportunity. The development of a WMS from scratch requires a deep understanding of the operation's work flow. Lengthy delays in implementing the system result in lost opportunities for an improved operation.

4. Consider the risk factors of the project. Historically, a WMS project taken on solely with internal resources runs a high risk of failure. Using an existing solution increases the opportunity for success. The use of outside consulting resources in the planning and implementation phases of the project, coupled with a detailed analysis and facility preparation, greatly increases the success factor.

5. Consider the impact that the project will have on the overall facility. A significant benefit of a WMS is the discipline that it instills within the warehouse. The process dictates a specific work flow and accountability through real-time data capture and directed task management. The work directives pace employee activity. Optimum movement throughout the warehouse is controlled by issuing one unique task at a time.

6. Identify functionality. Functionality is the bottom-line factor that will direct the decision for a WMS solution. Once the core functionality has been identified, the needs of the organization can be compared to the capa-

bilities either of an existing solution or of the ability to produce a suitable software solution internally.

7. Consider cost factors. You must consider people who are already in the payroll, which is offset by the lost opportunity factors in the justification equation. Risk assessment of the internal group compared to the redundancy of staffing suggests that the package solution significantly mitigates the project risk.

8. Be aware of the issue of concept to delivery. Be aware of the possibility for the initial concept to diverge from the final product. Existing software allows future users to examine the solution thoroughly, to the point of documenting work flows prior to final commitment. The risk and hidden costs of internal solutions are difficult to justify by comparison.

Benchmarking Your Warehouse Management System

Olsen says that because management does not often uncover the results it expected from a WMS, it is important to measure the system by productivity standards. This is calculated as a ratio of revenue to operating cost. Revenue is the net cash flow—all cash received less returns and write-offs.

The second part of the equation is operational expense. It should include all daily operating expenses. The most obvious is direct labor (no overhead). People who work in the warehouse (including supervisory staff) should be included, as well as insurance and utilities associated with the operation. These are often considered fixed assets, but increases in productivity can result in the reduction of overtime and a reduction in utilities as well as insurance. Be sure also to include monthly expenses, such as maintenance, leased equipment, and transportation costs.

Benchmarking for Justification

Using the productivity ratio will ensure that management sees how the organization compares to industry leaders. This helps in the initial justification of a WMS project. As the project is initiated, the benefits can be measured rather quickly as they will be reflected in the ratio. The most immediate realizations will be lowered costs from a reduction in overtime and the reduction of reverse logistics transportation. Over time, adjustments in total labor, utilities, and insurance will contribute to an improved ratio.

Before setting out on the benchmarking project, make sure you

understand industry association guidelines to allow accurate comparison of industry numbers. Seek out a benchmark organization for comparison—either a sister company or an organization in another industry that shares common operational issues.

Finally, be aware that comparing last month's figures to this month's numbers may initially be of value, but if you have any significant seasonality in your business, averaging the numbers and comparisons to previous years will provide a more accurate measurement.

NINETEEN TRAINING TIPS THAT WILL REDUCE LOGISTICS STAFF TURNOVER

Logistics managers who invest time and money in training programs find that their employees opt to stay for at least 10 years. Nonetheless, we detected a catch-22 in many of today's logistics departments. Often, companies are reluctant to train operating personnel, thinking that if they do, the chances that these employees will leave for better jobs increase. Thus, they *do not* invest in their employees and then wind up with people who are not qualified to do their jobs.

To help logistics managers make the best decisions about formalized training programs, we present the highlights of an extensive study, *The Growth and Development of Logistics Personnel*, by researchers at Mississippi State University. This book describes competencies, job requirements, and training needs for 22 logistics job families, ranging from the warehouse floor to the executive suite:

- Logistics managers must create organizations that adapt quickly to change and can add to the organizational knowledge base.
- Personnel training should develop a common view of the logistics system and its role in the firm, share or expand job knowledge, and refresh or enhance job skills.
- Logistics managers should leverage relationships with multiple training sources to meet the complex and diverse training needs of the logistics organization.
- Firms offering employability and personal development attract a larger, better-qualified pool.
- Logistics managers should view training as an investment, not as a cost. The best organizations invest significant time, effort, and money in training.

- Logistics managers should assure that they and their operating employees are prepared for changes that technology and competitive pressures bring about.
- Top logistics managers must grasp strategic purchasing, inventory control, and customer service issues as these functions increase in importance and change in organizational structure.
- Logistics managers must seek to train all employees at all levels, including themselves, in communication and self-management skills.
- Logistics managers should commit to formal training systems and programs as key elements in creating organizational advantages. Organizations cannot afford to wait for employees to learn on the job and become competent.
- Logistics managers will need knowledge-based technical competence, cross-functional experience, collaborative interpersonal skills, and self-management skills to manage logistics organizations. Operating employees will require many skills currently associated with management as firms eliminate organizational levels and assign more interpersonal tasks to the warehouse floor, production lines, and the vehicle.
- Logisticians need structured, formal training because of the shortage of fully prepared workers and the potential failure of unstructured, informal training. Formal training shortens the time it takes an employee to become competent in a task.
- Employees should be given a sense of growth and development. “If employees don’t have a sense of growth and development, from you, they will seek it elsewhere,” state the authors. “Where we once had a sense of movement in organizations and the chance to climb the corporate ladder, we no longer have that, so folks are willing to look for another job that does. If you want them to stick around, pay them.”
- Employees deserve a little latitude. If you are like most of your logistics peers, you probably have more people working for you than you used to, and you probably do not have the time to keep looking over their shoulders. Give them the tools to do their jobs.
- The exchange of accurate information should be accelerated. If your employees do not know what is going on, they will not know whether they are making good decisions.
- Training professionals or training managers should become certified as trainers. The authors warn that you should not rely on videos to train personnel just because they are the easiest training method.

- Jobs and people should fit each other. Make sure people are trained for their real jobs.
- On-the-job training (OJT) is more important than on-the-job experience (OJE). OJT is a structured program and not what occurs in most organizations, state the authors. They add, “Most often, organizations fire you into a swimming pool and tell you to figure things out for yourself.”

The authors conclude that OJT brings people to competence four times faster than does OJE. Additionally, 33% of those who learned from OJE could solve problems in the operation, whereas 80% of those receiving OJT could solve the same problems.

SIX STEPS TO SOLIDIFY SUPPLIER PARTNERSHIPS

The reality is this: Supplier partnerships are, at best, short-lived; most end within three years. Yet according to *Managing Logistics* reader surveys, many (almost half) respondents continue to seek out and form new logistics partnerships. Essentially, they seek from the partnership what they cannot achieve alone and, as a result, need to place a major emphasis on maintaining partnerships with several key suppliers. The following sections present ways to solidify these partnerships and in the process increase customer service, reduce inventories, and minimize total operating costs.

Mutually Beneficial Relationships

Supplier relationship authority Tim Underhill, president, Underhill & Associates (Tulsa, Okla.; 918-494-8085), says, “If a partnership is not beneficial to your suppliers, and it’s not beneficial to you, it’s going to end.” The idea is to form a relationship that is mutually beneficial. Underhill says to “pick the ‘low-hanging fruit’ of a relationship, meaning consignment inventory or reducing the number of transactions. This can typically represent about 30% of the savings you can get from your suppliers.”

The real decision that logistics professionals must make is whether it is worth their time and effort to go after the other 70% of the total savings. “Those who have learned how to bring benefit to the supplier and themselves have had tremendous impact on their company’s bottom line,” says Underhill. “Alliances are based on your ability to be more profitable,” he continues. “You’re not going to enter an alliance because you want to have

this great relationship with a supplier; you want to do it for the bottom-line impact.”

Removing Causes of Failure

Underhill says that there are four primary places where alliances fail over and over again:

1. *Failure to put together a good commodity/service plan.* Do you understand the risk you are facing? Do you understand the return opportunities you are looking at? How is the supplier of that good or service going to drive down your total cost of operation?

2. *Failure to perform the proper evaluation.* “Know what you want to accomplish and then select a methodology to measure it,” says Underhill. “Evaluate your results and select the one that’s going to give you the best return on investment and meet your needs better than any other.”

3. *Poor change management.* Managing change is critical to the process, yet it is often overlooked. “The problem is the people who have knowledge and understand what’s to be done haven’t gotten the others to understand it,” he says.

4. *Lack of ongoing evaluation.* “If you can’t measure your suppliers on a total cost basis, it’s going to be tough to justify why you really have an alliance,” states Underhill. “If you can’t measure it, you don’t really have the proof that the supplier is the best for the overall organization.”

Developing Service Alliances

Opportunities for service alliances should not be overlooked in this era of partnering. Experts claim that much of what is true about alliances for materials may also be said about service alliances. In addition, selecting potential service providers may be more of an art than selecting material partners is.

Be aware that service alliances differ in that fewer potential partners may be available. This means that more relationships may have to be developed. Pros recommend the following seven steps for developing a service alliance:

1. *Identify suppliers that can benefit from the alliance.* In many instances, the greatest benefit to a supplier is that labor may be better used because the buyer can assist with forecasting demand. Another advantage to service alliances is that the supplier may train employees for procedures specific to the

logistics manager's needs. However, it is essential to find suppliers who will benefit from the alliance so that they will be motivated to ensure its success.

2. *Develop a total cost model.* The purpose of an alliance is to increase overall efficiencies, not simply reduce prices. However, service providers are often small organizations, so it may be necessary to assist the provider in developing a cost model. You can adapt the cost model used for materials for services.

3. *Clearly define the roles of both parties.* Both parties must be clear on which company and precisely who within the company is responsible for the various alliance activities.

4. *Develop evaluation measures.* The evaluation of a service alliance is subjective, so it is important that the supplier understand the evaluator's biases and how best to work with them. Also, it can be helpful to develop a checklist to assist the process. Joint collaboration of the development of the measures will ensure that both parties take advantage of the expertise and consider both perspectives.

5. *Establish formal communication systems between both parties.* Again, it is important that the communication procedures be agreed upon early in the alliance discussions.

6. *Continually evaluate service performance.* Unlike materials, services cannot be put on the shelf. Services are generally independent of each other and may require independent evaluations. Although related to measurements and formal communications, the recommendation is to communicate the measurements among the parties. Also, the more frequent the evaluation, the better. However, it must be balanced on number and complexity. Here again, a primary difference between services and materials is that the service provider is often being directly evaluated. Evaluating people is far different from evaluating a product.

7. *Develop problem-solving and dispute procedures.* No alliance is without some problems. If both parties know they have a vehicle by which their concerns may be heard, they will probably be more willing to express their viewpoints and suggestions.

WHERE OUTSOURCING IS CHANGING PURCHASING'S RESPONSIBILITIES

Outsourcing remains a viable option for many companies today, and purchasing professionals, more frequently, are at the center of these critical

make-or-buy decisions. In fact, Michael G. Patton, president and CEO of Corporate Strategic Services, Inc. (Columbus, Ohio; 614-760-9280), sees this outsourcing phenomenon as transforming traditional buyers and contract administrators into sourcing managers and administrators.

The What and Where of Value-Added

Of even more significance, purchasing professionals are being asked to identify core competencies within the company and to recommend where specific processes can be better managed and operated by external suppliers.

“By honing the core competencies of its suppliers, as well as looking inward at its own core values, purchasing methodologies have adopted outsourcing as a viable way to add value in the supply chain,” say Robert J. DeFranco, EMC Corporation (Hopkinton, Mass.; 508-435-1000) and Michael D. Clark, Purchasing and Materials Consulting, Inc. (Yarmouth, Maine; 207-846-4026).

“What may have begun as restructuring and cost cutting to simply save money has become a sophisticated process of value-added operations that blend more than one methodology,” they told a recent International Purchasing Conference of the National Association of Purchasing Management (NAPM).

A Caution Is Sounded

“Outsourcing essential services to external providers is all the rage these days, and can be an appropriate action to take,” agrees Eberhard E. Scheuing, CPM, APP, of St. John’s University (New York, N.Y.; 718-990-6770).

However, in his book *Value-Added Purchasing: Partnering for World-Class Performance* (Crisp Publications), he advises purchasing professionals, “It is wise to look before you leap.” Specifically, “If a decision is made to outsource, the fixed cost that supported prior in-house production of the service must be removed to reap the full benefits of this move.”

Furthermore, additional cost for service elements not contracted for with the external provider may enter the picture. “After all, the price of a product or service is not its total cost,” Scheuing reminds.

Other risks identified by Patton include “outsourcing contracts that are so complex that companies have to hire consultants to evaluate proposals, and long-term contracts with outside suppliers that are no longer competitive.” He does offer an 11-point program to plan and launch a successful outsourcing initiative (see sidebar).

11 Steps to a Successful Outsourcing Initiative

Success in outsourcing depends on having a clear vision, a defined corporate strategy, knowledge of what it currently takes to deliver the outsourced commodity, what service levels must be met, and what it costs to meet them. Once you have identified what is to be outsourced, take the following actions:

1. *Select your team.* If you are outsourcing a complex product or service, form a cross-functional team. The team leader would come from the purchasing function. The other members of the team would be individuals that represent the product/service being outsourced or those affected by the product/service being outsourced.
2. *Understand your cost structure.* Using tools such as expenditure analysis and process mapping, detail the costs involved in providing this product/service. Make a complete and detailed inventory of the various personnel, licenses, equipment, leases, facilities, and any other resources, assets, and contracts that are currently required to produce the item or perform the function being outsourced. Use metrics, benchmarks, and other tools to evaluate existing capabilities and costs of the function being outsourced. Include all conversion costs for the function being outsourced.
3. *Develop service-level agreements (SLAs).* Meet with the internal clients that had provided this function and develop SLAs that define the nature of the services as well as performance measurements, quality levels, and other relevant metrics or key performance indicators (KPIs) and any transfer pricing. Include baseline performance measures and the formula for measurement.
4. *Determine the length of the outsourcing contract.* It is in the interest of the purchaser to negotiate a shorter-term contract that provides ample flexibility. Whatever the length of the contract, you should provide a reasonable exit of convenience in case the relationship becomes unmanageable.
5. *Develop a statement of work.* This is the most critical portion of any outsourcing agreement. This document should specify exactly what, when, where, how, why, and by whom this function will be performed and the manner in which this performance will be measured.
6. *Identify potential suppliers.* Conduct preliminary due diligence on all prospective suppliers before determining if you are going to outsource. Determine how many companies can provide the function you are planning to outsource, where they are located, and the geographic area that they can support.

7. *Identify internal resources.* Identify all critical internal resources that will stay with your company after the function has been outsourced and who will help manage and administer the outsourced function.
8. *Develop a strategic plan.* Identify the long-term needs of your company for the function being outsourced and incorporate these projected needs into any outsourcing agreement.
9. *Determine which outsourcing strategy fits best.* It is important to review and consider which options will fit best for your current environment and meet your long-range goals.
10. *Develop a prequalification process.* Develop a prequalification form and have all potential suppliers complete it prior to determining your candidate list. This form should provide relevant information regarding the capabilities of any potential company to provide you with outsourcing services.
11. *Have your facility inspected.* Inspections of potential outsourcing providers should occur after your analysis of the prequalification forms has been completed. On-site inspections of their clients where the outsourcing company is providing functions should also occur, if allowed.

Source: Michael G. Patton.

New Skills Required

It is obvious when reviewing the details of this plan that purchasing professionals who are becoming involved with outsourcing will require a new, or an expanded, skill set.

Patton, also speaking at a NAPM annual meeting, recommends that purchasing professionals “inventory the skills you need to effectively develop, manage, implement, and sustain an outsourcing program.” The “typical” new skills he lists include the following:

- *Contract development.* One must have the ability to develop sound, competent, comprehensive contracts that fully protect the organization while being fair to the outsource provider.
- *Contract administration.* This is the most commonly overlooked and underestimated area. In outsourcing, the significance of contract administration takes on a whole new meaning. It will not be successful if the

purchaser assumes a passive posture. Therefore, all contracts should be administered in a consistent and professional manner.

- *Experience in cross-functional teams.* It is extremely beneficial for purchasing professionals to possess the ability to form, participate, and lead a group of diverse individuals who are not as familiar with many of the strategies and processes commonly used in contract development and negotiations.

- *Ability to manage relationships.* Purchasing leaders must suppress their egos and give credit to others rather than themselves for providing a service more effectively or efficiently than they had been able to do in the past.

- *Financial analysis.* You must perform a financial analysis of all costs associated with the product being outsourced to then determine the potential savings or additional or transferred costs.

- *Process flow analysis.* This will ensure that all processes that are included in the acquisition of products and services outsourced are accounted for and included in the development of the cost structure for outsourcing.

In concluding his remarks, Patton added, “Understanding where, when, and how to successfully outsource will be one of the most important business skills purchasing professionals will need for the future as you are challenged to do more with less.”

E-FULFILLMENT IS KEY TO THE LOGISTICS STRATEGIES OF ONLINE RETAILERS

What separates the e-retail winners from the losers is how well they fulfill their orders. One prominent e-retailer, opening two new fulfillment centers for a total of 1.9 million square feet of distribution and warehouse space, is dedicated to “owning the customer experience,” says its chief operating officer. “Our new initiatives will dramatically improve our turnaround and delivery time and give us maximum flexibility in meeting our customers’ shipping needs.” The facilities are modular and designed to accommodate future growth.

Many other retailers, however, are choosing to outsource, drop ship, and in some cases even purchase a firm with this expertise instead of trying to build it themselves. Whichever approach you take depends on your specific needs. The following sections should help reveal which is best for you.

Three Fulfillment Models

How well you meet customers' shipping requirements depends on the fulfillment model that you choose. For optimum control over online customers' shopping, brand identity, long-term cost, and the fastest Internet speed, it is best to bring e-fulfillment in-house. But beware of the drawbacks—a large, upfront capital investment, a steep learning curve, and the time to build and configure the fulfillment network.

Many Internet retailers who do not consider e-fulfillment to be their core competency look outside for e-fulfillment expertise. Following are three common ways in which Internet retailers can quickly begin fulfilling orders:

1. *Outsource to a fulfillment service provider (FSP).* This makes a lot of sense during the early stages of online selling because order volumes are typically low and unpredictable. For an average of \$.30 to \$1 per order, an Internet retailer can begin shipping orders through an FSP.

An increasing number of companies are positioning themselves as FSPs, having spun off from established distribution companies, or are 3PLs targeting business-to-consumer customers. Examples are 3PF.COM, Inc. (Portland, Oreg.), Connexions.net (Orlando, Fla.), Modus Media International, Inc. (Westwood, Mass.), PFSweb, Inc. (Plano, Texas), SubmitOrder.com, Inc. (Dublin, Ohio), GATX Logistics, Inc. (Jacksonville, Fla.), NFI Interactive Logistics (Vineland, N.J.), TNT Logistics North America (Mississauga, Ontario), and USF Logistics (Long Grove, Ill.).

Other FSPs are evolving from catalog or express delivery organizations looking to take advantage of their existing fulfillment infrastructure: ASD Systems, Inc. (Garland, Texas), Fingerhut Business Services, Inc. (Minnetonka, Minn.), J.C. Penney Company, Inc. (Plano, Texas), Keystone Internet Services, Inc. (Weehawken, N.J.), Federal Express Corp. (Memphis, Tenn.), and United Parcel Service (UPS; Atlanta, Ga.).

However, if retailers become successful and order volumes increase dramatically, economies of scale move toward the owning of their e-fulfillment infrastructure rather than outsourcing.

2. *Drop ship from suppliers.* A good way for Internet retailers to offer a variety of goods without holding inventory is to source everything from individual suppliers and have them drop ship orders directly to customers. This option offers the least amount of control but is scalable and quick.

3. *Acquire expertise.* If you want to maintain control over e-fulfillment but lack the logistics experience, try buying it from someone who does. Distributors and mail-order houses have networks in place and years of fulfillment experience.

Software Dedicated to Order Fulfillment

Another way to facilitate order fulfillment is to purchase dedicated software. However, finding the right solution is proving difficult for some logisticians.

“Companies today are realizing the importance of fulfillment, but with [software] vendors creating so much noise about their capabilities, companies are spending an inordinate amount of time simply trying to understand what’s real,” says David J. Simbari, president and CEO at Optum, Inc. (White Plains, N.Y.). In addition, many systems that currently exist do not have the functionality to meet online requirements. Thus, a new breed of software is being born.

Stand-alone order management systems (OMS) are attempting to fill the void left by existing solutions such as ERP systems. The new OMS offers are highly scalable and feature real-time multichannel order processing, inbound call center functionality, line-item independence, order personalization, cross-sell and up-sell capability, order status visibility, product sourcing optimization, and returns processing.

OMS vendors include CommercialWare, Inc. (Natick, Mass.), Galleon Distributed Technologies, Inc. (Bellevue, Wash.), InterWorld Corp. (New York, N.Y.), OpenOrders, Inc. (Newton, Mass.), OrderFusion (San Diego, Calif.), and Yantra Corp. (Acton, Mass.).

Working in conjunction with the OMS is the WMS, which must be highly scalable, flexible, and configurable, and must have intelligent decision-support capability. At a minimum, a WMS needs to execute the instructions sent to it by an OMS to prepare an order for shipment.

Given the low-order volumes currently moving through many e-fulfillment operations, most WMS applications will meet the basic warehousing requirements of Internet retailers. Make certain that solutions that offer advanced capability and functionality that extend beyond the warehouse include cross docking, labor management, value-added services, and reverse logistics.

A third software solution is the order fulfillment system (OFS) designed specifically for e-fulfillment. AMR Research, Inc., says that it should include supply chain executive management, real-time, available-to-promise,

and supply chain reoptimization functionality. “Only such a tightly integrated suite will provide Internet retailers the real-time inventory visibility, order control, and customer service levels they need to satisfy their increasingly demanding customers,” says Chris J. Newton, analyst at AMR (Boston; 617-542-6600).

A Change In Management Style

Satisfying online customer demand also requires management skills. AMR offers these suggestions for altering your style and your company’s online image.

- *Think of yourself as an online logistics company.* Success in Internet retailing is determined more by the ability to deliver on-time, complete orders than by marketing and merchandising skills. Even if order fulfillment is outsourced, you still need an understanding of the logistics of fulfillment.

- *Approach e-fulfillment as a process, not as a series of tactical operations.* Effective order fulfillment requires a comprehensive plan for business processes and information technology. The traditional business model of functional handoffs between autonomous business units will not work in Internet commerce.

- *Do not overlook employee training.* In the rush to get to market, there’s a strong temptation to skimp on training. Online customers expect high levels of customer service. Make sure your customer service reps and warehouse personnel have the proper skills and IT training to ensure a quality experience for your customers.

- *Remember that Internet retailing is not a vertical industry.* When selecting a WMS application for your fulfillment center, choose from vendors who specialize, through product functionality and domain knowledge, in your vertical industry.

- *Avoid making short-term system decisions.* Although a WMS application that meets 60% of your functional requirements will enable you to ship orders, it could cripple long-term success. Make sure that your WMS application can grow and adapt to changes in your business.

- *Reward suite vendors.* Pursuing a best-of-breed strategy runs counter to speed-to-market requirements. Selecting vendors offering several components, even if not a complete system, can reduce integration time and costs, gain a higher level of system interoperability, and encourage continued development toward a true OFS suite.

CEOs NOW LOOK TO LOGISTICS MANAGERS TO TURN CUSTOMER SERVICE AROUND

Where will America's fastest-growing companies be placing their attention over the next year? That was the question PricewaterhouseCoopers, Inc., asked CEOs in the product and service sectors. The two leading answers were customer service and cost control (see Table I-5.2) and that CEOs expect logistics managers to pull all the pieces together. "The responses indicate that people are getting back to basics with respect to business," says Lee Durham, middle market manager for assurance and business advisory services at PwC (New York; 212-259-4496). "Customer service is more important because of competition, which will accelerate as the economy begins to tighten. The same goes for costs," Durham continues. "Sales growth may be slowing, so it is now time to get costs under control."

To perform better, Durham believes that many executives are looking to logistics managers to turn things around. "Logistics managers should concentrate on all the processes that touch the customer, from delivery to billing."

Suppliers Are Closely Linked to Customers

This is the path that Computer Centerline (Greensberg, Pa.), a small computer equipment installer for the education sector, is following. Company CEO Rich Mazza reports that the operations manager is expected to forge stronger relationships with suppliers to ensure that customers receive their orders on time.

The problem is that there is not a single strategy in place for all orders.

Table I-5.2 Priorities of Trendsetter Companies over the Next 12 Months (%)

	<i>Product Companies</i>	<i>Service Companies</i>	<i>Total</i>
Customer service	82	79	81
Cost control	74	70	72
Innovation	49	57	53
Competition	44	42	43
Time to market	37	45	41
Shareholder value	22	30	26
Regulatory compliance	15	19	17
Globalization	10	10	10

Source: PricewaterhouseCoopers.

Each order is planned differently in how it will be fulfilled. “We might get one order from a school for five computers and another order of several hundred computers for an entire district,” explains Mazza. “How we fulfill that order depends on our vendors and their logistics operations. Unfortunately, we don’t get a lot of cooperation from our suppliers.”

Mazza says that suppliers are also not cooperative when it comes to satisfying particular customer requests. For instance, a customer may want certain software installed on the computer or may request a specific delivery date. “To ensure that we respond to those requests, we have to dangle that possible order in front of the vendors like a carrot to get them to comply,” says Mazza.

The constant struggle with suppliers is causing Computer Centerline to revamp its vendor strategy. Mazza explains, “We now work with three independent manufacturers, and none meet our customers’ needs. These vendors are tying our hands because we are only as good as they will let us be. So, we are considering having our machines built by just one company. We hope this will allow us to meet our customers’ standards and work toward developing partnerships with the schools so that we can figure out how to serve them better. We want the customers to feel they are a part of our business and dictate to us how to proceed.”

Better People Equals Cost Control

Just as people are at the core of Computer Centerline’s customer service strategy, so too are they at the heart of cost control (see sidebar). Mazza strongly believes that the number one way to control costs is better people. “They make our business go,” he says. “Hiring cheap help costs money, so we have made it a practice to pay more through bonuses and our employee-owned formula. Offering low wages can really hurt you.”

In addition to better wages, James A. Tompkins, president of consulting firm Tompkins Associates (Raleigh, N.C.; 919-876-3667), recommends offering gimmicks as a way to gain and maintain skilled workers. “Consider raffling off a car every six months for those who have perfect attendance,” he says. “You have to keep coming up with new schemes to make it a positive experience to come to work.” You might also consider reconfiguring shift schedules to three 12s or four 10s to better fit with individuals’ preferences.

In addition to the cost of keeping skilled labor around, CEOs are also concerned about the rising labor costs associated with customer demands for order consolidation, value-added services, and same-day delivery. “The

The Cost of Customer Service

Douglas M. Lambert, professor of marketing and logistics at the University of North Florida, draws a clear parallel between customer service and cost control in the second edition of *The Warehouse Management Handbook*, published by Tompkins Press. Each of the following elements of a customer transaction should be managed closely to meet demand and control cost.

1. *Stockout level.* Stockouts should be recorded by product and by customer to determine where problems exist. When stockouts do occur, arranging for suitable product substitution or expediting the shipment when the product is replenished can maintain customer goodwill.

2. *Order information.* The ability to provide the customer fast and accurate information about the status of inventory, orders, expected shipping and delivery dates, and back orders is essential.

3. *Elements of the order cycle.* It is important to monitor and manage each component of the order cycle—from order entry to delivery—to determine the cause of variations.

4. *Expedition of shipments.* Because expedited shipments are costly, determine which customers qualify. This should be based on how much individual customers contribute to the manufacturer's profitability.

5. *System accuracy.* Mistakes can be costly. Errors should be recorded as a percentage of the number of orders handled by the system.

6. *Order convenience.* This refers to the degree of difficulty a customer experiences when placing an order. An appropriate performance measurement is the number of errors as a percentage of number of orders.

7. *Product substitution.* Manufacturers should work closely with customers to inform them and gain their consent to make a substitute.

SKU proliferation, increased warehouse space, and amount of labor required to carry out these tasks add cost to the network," says Tompkins. "Some trendsetter firms may wind up installing automation to perform the activities as it is cheaper in the long run."

The Role of the Internet

Leading-edge firms also benefit from the Internet and from the role it plays in cost control and customer service. "In my view, all entrepreneurial businesses can benefit greatly from focusing on customer service and cost con-

trol,” says Steve Hamm, managing partner for PwC’s middle market advisory services. “Each factor is of importance on its own, and both combine synergistically in our Internet economy.”

Hamm believes that the Net offers customers speed, convenience, and access, and businesses can better adapt to customer needs through analysis of online ordering patterns. “Likewise, businesses can gain new control over costs by linking the Net to their back-end operations,” Hamm continues. “B2B [business-to-business] auctions and purchasing consortia are exploding in number and offer significant savings. In addition, e-networking with strategic partners and subcontractors can greatly improve operating efficiency.”

FOUR WAYS TO END A LOGISTICS OUTSOURCING RELATIONSHIP ON THE RIGHT FOOT

According to the Outsourcing Institute, 55% of all third-party partnerships fail within five years. Too often, this premise is ignored in the initial outsourcing contract, and what should be a business-like agreement between parties turns into an adversarial struggle and an operational disruption for those involved.

A recent book from the CLM (Oak Brook, Ill.; 630-574-0985), *Logistics Outsourcing: A Management Guide*, by Clifford F. Lynch, offers advice on why contracts need to be terminated and how to bow out of an outsourcing agreement gracefully (see sidebar).

Strategic Terminations

There are several strategic reasons for an outsourcing relationship to end. Even successful alliances sometimes terminate when the interests and focuses of the parties change. Here are some examples:

- *Mergers and acquisitions.* This can result in a combined firm having more distribution locations than it needs. One leading U.S. firm operated in 14 DCs for over 20 years and then found itself with over 200 facilities as a result of three acquisitions. Although most of the operations were outsourced, well over 150 contracts had to be terminated as the network size reduced. Because of the full disclosure with which the firm conducted its termination negotiations, there was little difficulty in ending the relationships.

10 Rules to a Beneficial Outsourcing Relationship

1. *Develop a strategy for outsourcing.* Outsourcing should always be carefully thought out and measured against an in-house solution. This will help identify relative strengths and weaknesses for each alternative. Include the provider in the process from the beginning.

2. *Establish a rigorous provider selection process.* Check industry sources, existing clients, and financial health. Carefully analyze management depth, strategic direction, information technology capability, labor relations, and personal chemistry and compatibility.

3. *Clearly define your expectations.* A number of outsourcing relationships have been unsuccessful because of unrealistic expectations. Providers are often asked to submit bids based on inadequate information about volume, size, and frequency of shipments. Companies, on the other hand, lack accurate or detailed knowledge of their own logistics activity. Such inaccuracies result in providers' developing costing for, and committing to, arrangements that do not reflect reality.

4. *Develop a good contract.* Provide incentives to improve operations and productivity with both parties sharing the benefits. Clearly spell out obligations, expectations, and remedies.

5. *Establish sound policies and procedures.* Give the service provider an operating manual. Ideally, the manual should be developed together and contain all policies, procedures, and other necessary information for the efficient operation of the outsourcing arrangement.

6. *Identify and avoid potential friction points.* Both parties are usually aware of friction points that may arise. Identify them in advance and develop a procedure for dealing with them.

7. *Communicate effectively with your logistics partner.* Failing to do this is a major cause of a failing relationship.

8. *Measure performance and communicate results.* When setting up a relationship, clearly identify, agree upon, and communicate standards of performance and measure performance regularly.

9. *Motivate and reward providers.* Compliments, recognition, awards, trophies, and dinners are all proven motivators. Do not take good performance for granted.

10. *Be a good partner.* Your provider's ability to serve you and your customers often can hinge on your own performance (or lack thereof).

Some of the providers even agreed to early terminations without penalties.

- *Change in corporate or logistics strategy.* This can result from realignments of product offerings, target markets, or ordering and shipping philosophy.
- *New providers.* If the operations are continued at all, they will be combined with those of other providers. In such cases, it would be helpful to have the old and new providers work together during the transition. Reward the provider for a smooth transition with bonuses.

Performance-Related Terminations

The most difficult relationship terminations are those that result from the actual or perceived failure of the provider to perform in a satisfactory manner. There are two basic methods of terminating a relationship for performance deficiencies: failing to renew an agreement on its expiration date and terminating early under the failure to perform provisions.

- *Contract expiration.* If at all practical, it is best to see an arrangement through to its normal expiration date, making it unnecessary to prove performance deficiencies and eliminate penalties and legal proceedings. However, the contract should prescribe how to carry out an early termination.
- *Early termination.* It is important that the relationship manager keep the provider well informed about problem areas and the consequences of not getting them resolved so that by the time a probationary period is declared, it will come as no surprise to the provider.

The contract should clearly state how the notice of dissatisfaction will be rendered and allow a reasonable time for the correction of deficiencies. If they are not corrected within the given timeframe, it will be necessary to give the provider a notice of termination.

There are six basic principles that should be remembered when terminating a relationship early:

1. *Do not act impulsively.* Before the first notice of unsatisfactory performance is rendered, a contingency plan should have been developed and communicated to the managers within the client firm.
2. *Include the new provider in the planning process.* If the operations being terminated are transferred to another provider, involve the new provider

early in the planning process. Include a timeframe for an orderly transition and determine how much volume could be transferred on shorter notice.

3. *Develop alternative distribution points.* If a total breakdown occurs before the new provider is ready to assume operations, optional shipping points should be available. Other DCs can handle additional volume over the short term, and contingency plans should be developed for doing so. Be sure that adequate labor, equipment, and inventories are available.

4. *Communicate internally.* Keep marketing, sales, and other managers informed of developments. They can help minimize customer issues. As a logistics manager, acknowledge to others that the outsourcing relationship went bad and that you are taking appropriate contingent and corrective action.

5. *Try not to become emotional.* The client managers should maintain equilibrium and handle the myriad of details in a professional manner.

6. *Break clean.* When it is over, it is over. Learn from the mistakes that were made and carry on to make the new relationship successful.

Emotional Terminations

Some logistics outsourcing relationships are terminated when there are no good business reasons for doing so. This will happen with changes in client logistics management. New managers may feel more comfortable with providers that they have dealt with in the past. In other instances, provider managers may change firms, and clients will want to follow them to their new affiliations.

In situations such as these, expect the worst. In some cases, the new provider has been sued, and there is a potential to get caught up in disputes between employees and employers. Lynch warns that the client should be cautious in entering transactions where personalities are the determining factor.

Terminations for Cost Reasons

In some instances, a provider who renders very satisfactory service simply becomes too expensive. When this happens, the client may turn the operation over to a new provider or bring it back in-house. Since there are no performance issues, these terminations almost always occur at the end of the contract term and are much less adversarial.

Such terminations should be carefully considered. Make sure that there

are valid comparisons between the acceptance of the existing provider's new increased rate structure and the cost of not accepting it. When the costs of relocations, training, and executive distractions are considered, the rate increase may be the low-cost alternative.

COUNCIL OF LOGISTICS MANAGEMENT PLACES INVENTORY CONTROL AT CENTER OF LOGISTICS PROFESSION

There is no more accurate barometer of the current state of the logistics profession and the logistics professional than the *The Ohio State University Survey of Career Patterns in Logistics*. Bernard (Bud) J. La Londe, professor emeritus at OSU (Lalonde.3osu.edu), developed the annual survey almost three decades ago. Career Patterns polls senior U.S. logistics and supply chain executives who are current members of the CLM, and it is not only a reliable and credible benchmark but also an accurate prognosticator of events still to come.

The State of Logistics

In this respect, *The Ohio State University Survey of Career Patterns in Logistics*, co-authored by La Londe and Terrance L. Pohlen of the University of North Florida (Tpohlenunf.edu), does not disappoint. Among the highlights, which were presented at a recent CLM Annual Conference are the following:

- *Inventory management remains a critical area of responsibility for logistics executives.* Almost four out of five (77.6%) respondents mention inventory control as an area of responsibility (see Figure I-5.1). This ranks right behind the more "traditional" responsibilities of traffic management (94.0%), warehousing (91.4%), and plant/warehouse location (87.9%). However, Pohlen notes the steady increase in international logistics and order processing/entry. "International is up significantly over the last five years, reflecting the globalization movement in the U.S.," he observes.

Another interesting development is the increase in order processing, which has also become a logistics function. "This reflects the continuing trend of the consolidation of a lot of previously independent functions, such as production planning, scheduling, and capacity planning, all under logistics," Pohlen reflects.

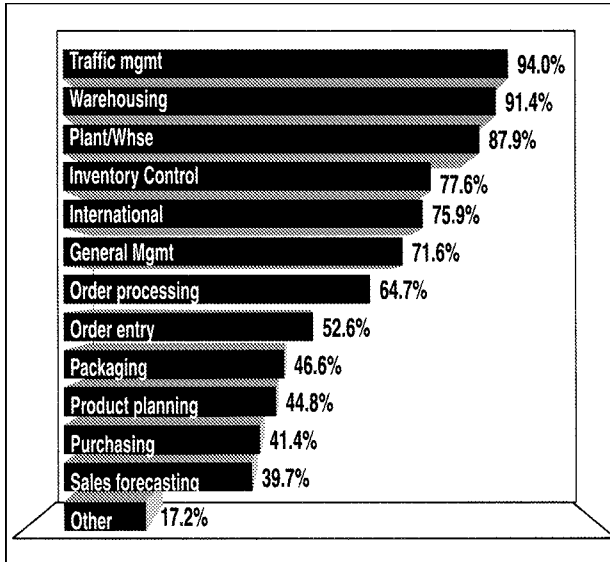


Figure I-5.1 Inventory Control Remains a Significant Responsibility for Logistics Management

Source: The Ohio State University 2000 Survey of Career Patterns in Logistics.

- *The population of women in logistics is growing.* Respondents to the survey were 89% male and 11% female. This closely parallels CLM membership, which is estimated at about 10% female. It also reveals the growing influence of women in logistics (see sidebar). Three years earlier, for example, the survey respondents were 95% male and 5% female.

- *Logistics is becoming more centralized.* The corporate structure of logistics still reflects a combination of both divisional and centralized activities. The combined format is used by 46% of the respondents. “Over the last several years, the combined organizational form has been the most widely used, while the centralized approach to logistics organization has grown in importance,” observes La Londe. The survey finds that 23% of the respondents report that logistics functions are centrally organized. The number of firms reporting logistics as part of each corporate division or as a separate logistics division has decreased.

- *Welcome to the supply chain management department.* When classified according to department, fewer respondents worked in logistics than in distribution three years ago. Now, 52.3% of the CLM respondents worked in logistics, 14.6% in distribution, and 12.1% in supply chain management (up

How Women in Logistics See Themselves, Their Jobs, and Their Profession

Representing an estimated 10% of the membership in the CLM and growing numbers in undergraduate and graduate logistics programs, it is a slam dunk that women will play an increasingly important role in logistics.

That's why Martha C. Cooper at OSU (cooper.7osu.edu) developed the *Career Patterns of Women in Logistics* survey four years ago. Despite its short history, the annual survey presents many insightful and valuable conclusions about female logistics executives.

Cooper polls women members of the CLM. She cautions her audience to "avoid generalizing the results of this survey," as it is a biased sample that may not represent the general population of women in logistics. In our opinion, Cooper's findings have great relevance in defining the role, responsibilities, and attitudes of women in logistics. The following come from the findings in the 2000 *Career Patterns of Women in Logistics*:

About Themselves

- Most respondents are 30 to 50 years old (79.8%); 7.6% are under 30, and 12.6% over 50. Two-thirds are married, and 23% have never been married.
- Half the respondents (51.8%) felt that it was "difficult" or "very difficult" to balance a career and family. Less than one-fifth (18.3%) felt it was "not difficult at all" or "not very difficult."
- The highest degree attained was an undergraduate degree, but few are in logistics. A large proportion of the respondents had graduate degrees, and the MBA was the most frequent graduate degree.

About the Work Environment

- By job title, the largest category is manager (40%), followed by director (23%), vice president (13%), and analyst (9%). Only 2% head their organization.
- Almost one in three (32.1%) have direct responsibility for logistics functions; 23.7% have advisory responsibility, and 44.2% have direct responsibility for some logistics functions and advisory for others.
- Female logistics executives spend an average of 51.2 hours on the job, three-quarters of which is in the office. Respondents also travel, spending an average 37 nights away from home and taking 1.5 international trips per year.

(continued)

- Female executives have a participative (52.1%) rather than a directive (15.5%) management style, but 32.5% felt it was more of a combination. They are much more likely (65.9%) to facilitate decision making rather than directly telling subordinates what to do. One-quarter felt they use a combination of both.

About the Profession

- Most respondents (75.5%) are satisfied with their current positions and feel that the opportunities for building a sound professional career in logistics are better (90.4%) today than every before.

- Respondents indicated that what they like best about logistics are that it utilizes different areas of expertise, that it is a fast-paced environment, and that it is challenging. They also felt that they can make a difference and interact with other functions, that there is customer contact, and that there is an opportunity to train and be taught.

- Respondents least liked the lack of understanding of logistics by top managers, the stress, the high concentration of males in the field, the need to keep up with the constant changes, and the long hours.

- Contributing most to respondents' success was both the analytical skills that are job-related as well as the "softer" management and personal skills. Dedication, hard work, and determination ranked first (see Figure I-5.4). Having a good education in logistics or operations was also a plus.

from just 5% in 1998). Although the current survey finds "stability" in the logistics department (52%), supply chain management reporting relationships (17.7%) enjoyed another large increase.

International Focus Becomes More Dominant

These emerging trends are also reflected in the "degree of authority" that the respondents have over each logistics activity (see Figure I-5.2). For example, the activity with the highest ranking of direct authority in the latest survey is international logistics (90%).

Only last year, international logistics (68% direct authority) lagged far behind general management (82%), traffic management (80%), warehousing (80%), plant/warehouse location (73%), and packaging (70%). Meanwhile, in the latest OSU survey inventory control moved to 78% direct authority, from last year's 64%, showing a renewed focus on inventory management.

Logistics executives, when asked about the amount of time they spend

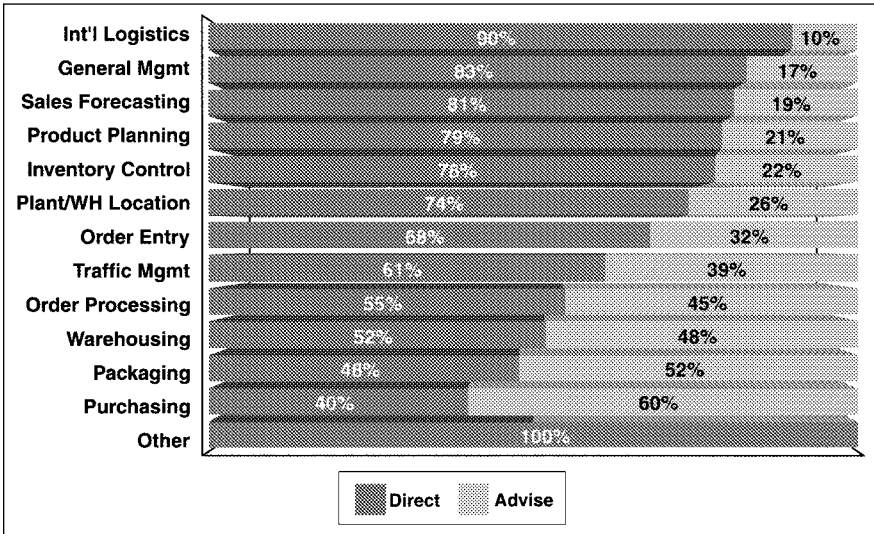


Figure I-5.2 How Logistics Executives View Their Areas of Responsibility

Source: The Ohio State University 2000 Survey of Career Patterns in Logistics.

of specific activities, reported that they devote the most to traffic management, general management, and warehousing (see Figure I-5.3). International logistics and inventory control each account for 7.8% of the logistics executive's time.

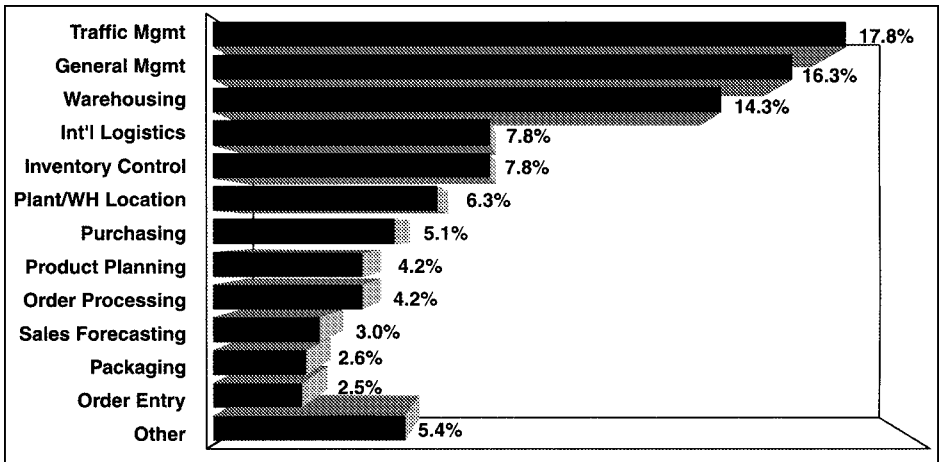


Figure I-5.3 How Logistics Executives Allocate Their Time among Responsibilities

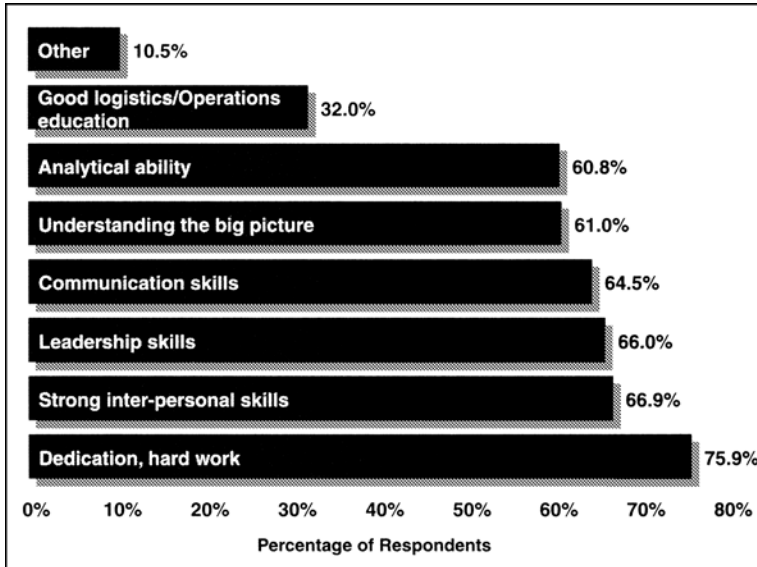


Figure I-5.4 What Attributes Contribute to Professional Success of Female Logistics Executives

Source: 2000 Career Patterns of Women in Logistics.

E-Commerce Is the Future

If the respondents could return to school for a period of 90 days, 21% reported that they would select a curriculum in information systems/technology; 16% selected e-commerce; and 15% mentioned global business processes. “This shifting response from earlier surveys shows the dominance of information technology and e-commerce as learning needs for contemporary logistics and supply chain executives,” La Londe concludes.

This emphasis was reinforced by a question on the future of logistics and factors that will influence its growth and development. E-Commerce/e-business (34%) outpaced the field, with supply chain management integration (26%) and international (10%) cited as the most influential factors.

Complete copies of *The Ohio State University Survey of Career Patterns in Logistics* can be downloaded from the CLM Web site (www.clm1.org), or from La Londe’s Web site (fisher.osu.edu/scmrg).

SEQUENT COMPUTER SYSTEMS REVEALS NINE SECRETS OF ITS LOGISTICS STRATEGY

The team approach to developing a business strategy is often taught in MBA programs but rarely used in the real world. One logistics manager, however, has been uniquely successful in realizing its theoretical potential. Since coming on board with its strategic emphasis, Martha H. McMahon, worldwide logistics manager at Sequent Computer Systems, Inc. (Beaverton, Ore.; 503-578-7580), declares that the team approach has been responsible for toppling logistics costs by one third while improving inventory velocity and reducing inventory overall.

Keys to Sequent's Success

1. *Strong logistics teams.* The team has a manager who reports to McMahon. Among the team members are the corporate distribution manager, customer service logistics manager, and representatives from the import staff, export staff, and traffic staff.

McMahon also serves on the team. "We frequently bring in consultant members from other Sequent organizations, such as accounts payable, computer applications, warehouse staff, packaging commodity manager, and international subsidiary logistics staff," she explains.

2. *Keeping few suppliers.* Sequent's shipping is primarily by air, without ocean or rail transport. There is a little LTL. "We have a narrow supplier base with our logistics providers," she noted at a recent Proven Performance Metrics in Logistics conference (Institute for International Research, New York). "We try to increase business with existing providers to keep the number of providers limited."

3. *Creating commodity teams.* The commodity team is responsible for the logistics supplier and evaluation process. The formal process begins with the request for quote. "We try to keep this down to less than five potential suppliers quoting," she explains. Commodity team members conduct the evaluation. The process includes supplier presentations and site visits. Where appropriate, the team is extended to include members from Sequent's international subsidiaries.

4. *One provider, one service.* Sequent prefers this arrangement. This includes one courier, a single international airfreight forwarder, one heavyweight air carrier, and an LTL provider. Also, Sequent prefers single

providers for small-package domestic and international air, 3PL for warehousing support service, and van lines.

A small supplier base also improves the quality of supplier management, she maintains. "We have the benefit of receiving special consideration from our suppliers, which fall into a variety of categories," she confides. As an example, she mentioned the UPS strike. "There was no impact to our pickup and delivery time." Nor was there inventory buildup on their shelves.

"One benefit of a limited supplier is that it really minimizes supplier management cost and enables us to better control inventory," McMahon insists. "We focus our energy with the supplier who has a major impact, instead of spreading ourselves over a large supplier base." Further, with some of the suppliers, Sequent serves as a beta site to prove out a new technology. For instance, she tells of utilizing a new tracking system that "wasn't quite on board yet," for the supplier's other customers.

5. *Favoring long-term contracts.* "Our formal, written, multiyear contracts are typically for a period of three years," McMahon notes. This has protected Sequent from annual price increases. However, she notes, "We also benchmark in the second year of the contract, so we know that our rates are still competitive within the marketplace." The team's goal is to be in the first quartile of the competitive pricing that they benchmark.

6. *Meeting with all suppliers.* "In our formal logistics supplier management process, we have regularly scheduled meetings with our providers," says McMahon. "We produce an annual calendar each year that specifies when all meetings will be conducted." This includes all quarterly reviews and the semiannual executive performance reviews. "Here, our executives will meet with the appropriate supplier executives to discuss the state of our mutual business relationship," she explains. Further, a supplier report card is prepared for this meeting.

7. *Importance of performance metrics.* "We have quarterly goals that are established for each metric. They are in writing and agreed to by the suppliers and ourselves," McMahon explains. "The team notes the results of each performance measure each quarter and rates each as 'exceeded,' 'met,' or 'did not meet expectations.'" Typically, the report will have between 15 and 25 monitored expectations. The logistics commodity team tracks the trends and documents all aspects of the relationship.

Following are some unique aspects of some of the individual performance metrics.

- *On-time delivery metrics.* “We tailor on-time delivery metrics to that provider since each is different and provides a different type of service,” she maintains. In addition, the only failures allowed for on-time delivery are airport closures related to weather. “We generally don’t allow for weather or mechanical failures.”

Her biggest problem is achieving 100% on-time delivery across the board. “Some segments of it, in small-packaging LTL, for instance, achieve it,” she notes. “However, our major challenge is to bring that level of activity up to above 99% on a consistent basis so we can focus our time on other things relating to what happened to that shipment.”

- *Quality metrics.* “We use written closed-loop corrective action, and our report cards monitor the number of corrective action forms that are issued and the response time of the supplier,” McMahan explains. “Our challenge now is to get the long-term corrective actions into place.”

- *Customer service metrics.* “Here we have a much more subjective team assessment of supplier performance,” she offers. They look at the response time from the supplier’s staff, such as pickup and delivery timing. There is also a “very soft” metric, and that is whether the supplier is flexible in meeting Sequent’s needs. “Sometimes we’re a really challenging customer,” she acknowledges. “But we discuss this with our supplier and work with them to make sure they are able to meet our demands.”

- *Cost performance metrics.* “We spend a great deal of time looking at the cost drivers,” says McMahan. “We attend seminars with our suppliers and work with them on a cost driver analysis.” They try to identify the elements of cost that can be jointly worked on to decrease the total cost to the corporation. “We even have a specific cost reduction initiative in place where we’re looking at everything from actual rates to the things we may be doing that suppliers point out to us that are not cost-effective,” she details.

8. *Logistics supplier feedback.* How are we doing as a customer? That is an important question Sequent asks of its suppliers. “We ask our suppliers to assess performance,” McMahan offers. “However, this is a challenge for them. Typically, they’re conservative and nervous expressing what they really think.”

McMahan and the logistics team try to be supportive of the feedback process. “We encourage them, and we frame the approach as, ‘What are we doing that makes sense? What drives you crazy? How can we fix it together?’” After a slow start, she acknowledges that “we’re now starting to get meaningful feedback from suppliers.”

9. *Logistics team goals.* “A quarterly performance metric we do on our team is to ask ourselves, ‘How are we doing as a team managing the logistics needs of the corporation?’ And for our logistics commodity team we have annual program goals.” For this year the goals are the following:

- On-time delivery: 97%
- Quality: Less than five claims per quarter for the entire supplier base
- Cost: 98% of logistics expenditures with preferred suppliers
- Quarterly performance reviews

HOW SPRINT CALLED ON LOGISTICS MANAGERS TO SUPPORT NEW PRODUCT LAUNCHES

Logistics managers are now playing an increasingly important role in how new products are launched. Sprint PCS, for example, recently engaged its logistics experts in several intense product launches over the past five years, particularly in the area of telephone calling cards.

According to Gary Mendez, manager of prepaid card logistics for Sprint in Kansas City, this step has helped put the company and the product in a strong marketing position. For those looking for some tips on how to get involved, Mendez addressed these issues at a recent Logicon Conference.

Understanding the Customers

It is important to recognize who your customer is and how your product is being sold to the final consumer. At Sprint, for example, the consumer is the card user, whereas Sprint’s actual customer is the entity who purchases the card for resale to that consumer. Typically these are drug and grocery stores. “We can best meet consumer wants by exceeding customer needs,” says Mendez. “This involves making sure that the product is available for the consumer at all times.”

He adds that it is also important to recognize customers’ pressures. For instance, Sprint’s retail customers face large drivers in their business equation, such as pressures from competitors like Wal-Mart. “Pressure from these mass merchants forces our customers to go to market with a format that offers lower prices to the consumer. Fortunately, there are tools out there now that are allowing our customers to compete in new ways, such as efficient

consumer response [ECR].” Mendez believes that ECR is allowing grocers access to accurate and timely information that supports their logistics decisions. “ECR reverses the approach to product flow. Conventional methods push product through the system, but ECR is demand driven. Product flow is driven by consumer demand, needs, and purchasing patterns. Card suppliers can now know exact consumer demand based on point-of-sale data.”

Bump Up Your Marketing Skills

Mendez says that it is critical for logistics managers to create demand by directly targeting consumers. “Create brand awareness and educate consumers and retailers. Encourage product use and have a product that consumers want to use repeatedly.” Tactics include media support, point of sale material, understanding product attributes, and micromarketing. “We used to offer free sample calling cards on cereal boxes to build consumer awareness.”

Mendez says that micromarketing puts you in a position to know exactly how your product is used right down to retailer and region of use. “It helps establish corrective actions to be taken. For instance, we may find that low-end product denominations (\$5 and \$10 cards) are going out the door faster in a certain region and that higher-end denominations (\$100 cards) are not selling at all.”

You also want to make certain that the supply chain presents an opportunity to develop a competitive advantage. Leveraging the principles of ECR to maximize delivery efficiency, a sound inventory processing system, and retail sales coverage are proven tactics to gaining competitive advantage. “An automated inventory management system gives point of sale information that allows us to track demand. That helps set up inventory levels with each retail customer.”

RITE AID OUTSOURCES REVERSE LOGISTICS TO FOCUS ON CORE BUSINESS

Processing returned goods is a time-consuming (and non-value-added) activity for logistics managers. That is why many are looking to turn the function over to a third party. Take the case of Rite Aid Corp., which has been handling all returned, damaged, and discontinued merchandise for its 3,800 stores nationwide. As the organization grew through a series of acquisitions, the reverse logistics process became inconsistent and decentralized, explains

Kevin Sheehan, president and CEO of Processors Unlimited (Dallas; 972-980-7825), a logistics subsidiary of USFreightways Corp. “As the company continued to expand, it made sense to look in the market for an outside company to coordinate returns processing,” says Sheehan.

Rite Aid selected Processors Unlimited for the job, says Amy Johnson, director of public relations at Rite Aid. “Processors Unlimited services some of the largest drugstore chains in the industry today; they know our product, the vendors, and obviously know reverse logistics.”

Under the agreement, Processors Unlimited will work with Rite Aid suppliers to dispose of and account for damaged, defective, outdated, discontinued, and recalled merchandise, previously shipped to Rite Aid stores.

A Low-Cost Solution for Rite Aid

By centralizing returns processing, a single strategy could be applied to all Rite Aid locations, explains Sheehan. If an item is recalled, it is pulled from the store shelves and placed in storage within the store. Items returned or damaged are also placed in storage until a delivery is made to the store. When the delivery truck is unloaded, the returned goods are then loaded onto that same truck and taken back to the Rite Aid DC. The items are cross-docked, and a truckload shipment is sent to one of three Processors Unlimited facilities for processing.

Each item is scanned for data collection. Based on that information, items are sorted into disposition categories—they are either disposed of, given to charity, shipped to the original manufacturer, or held for the manufacturer to review. Some items are returned to stock.

Processors Unlimited also creates and sends a Rite Aid invoice to the manufacturer, who then pays Rite Aid for the returned product. Processors Unlimited also creates store credits, indicating the profits and loss for each Rite Aid store. Rite Aid’s only cost is transporting the items to Processors Unlimited for handling, but Sheehan says that the manufacturer should reimburse the company for that cost.

Creating Better Supplier Relations

One of the main thrusts behind any reverse logistics program is the relationship it forges with suppliers. “It was important for Rite Aid to create a fair and equitable relationship with its suppliers,” says Sheehan. “They want fair and reasonable policies for supplier reimbursement.”

Johnson explains that Rite Aid suppliers will work directly with Processors Unlimited to determine how they want their merchandise handled once it leaves a Rite Aid store. “Fortunately, most our suppliers are already familiar with reverse logistics, so they already know how they want their goods processed,” Sheehan says. “Managing supplier relationships is the critical factor in any reverse logistics program.”

HOW A MANAGER AT CASE CONTROLS STRATEGIC ALLIANCE WITH THIRD-PARTY LOGISTICS PROVIDERS

Outsourcing international logistics activities can be a daunting experience for logisticians. Giving up control of functions previously under your domain can be challenging enough on the domestic front, but when it is on a global basis, the challenge becomes even greater.

However, the cost savings associated with outsourcing will outweigh your trepidation. As a way to gain a level of comfort, try forging strategic alliances with the outsource providers. This is the strategy that Case Corp. of Racine, Wisconsin, chose, and according to Larry Trumbore, director of logistics and supply chain operations, the company has been able to resolve issues of poor cycle time, unreliable delivery, and too much finished goods inventory.

Trumbore, who shared his views with attendees at a recent Logicon Conference, says that outsourcing enabled the construction and agricultural equipment producer to concentrate on its core competency—manufacturing—rather than on non-value-added services such as transportation.

Tips for Successful Outsourcing

Trumbore says that he learned several lessons about what will and will not work in executing an international outsourcing project. He offers up this advice to other logistics managers:

1. *Work with consultants.* Case worked with consultants who helped put together a vision of what its supply chain should look like. That ultimately made it easier to identify the activities to outsource.

2. *Determine what to outsource.* Trumbore says that the consultant identified 11 projects that could be outsourced. Integrated logistics was one of

those. “We wanted to integrate all the functions of logistics throughout the world and carry them out with only one or two providers,” says Trumbore.

“It’s tough to do your job if you don’t have the tools to do your job,” says Trumbore. “So, give it to the 3PL.” Case, for instance, used to own its own fleet of trailers but turned the whole activity over to Schneider National, Inc. (Green Bay, Wis.; www.schneider.com), and “never looked back,” says Trumbore. “As a logistics manager, your job now is to manage the activity, not to perform it.”

3. *Select the carriers.* Case selected Fritz Companies, Inc. (San Francisco; 415-904-8360) to act as the lead integrator for the international logistics operations. Schneider National was selected to handle North American and European ground transportation, and GATX Corp. (Chicago; 312-621-6200) was chosen to oversee North American warehousing activities and value-added service offerings.

The selection process took about six months for Case. Not only was the company looking for pricing structures and services offered, but it was also concentrating on letting the logistics providers know what services interested it. According to Trumbore, “Some fainted when we told them what we wanted, while others were confident they could do it. This made it very easy to narrow down our list from 26 providers to the three we chose.” Trumbore warns, however, that although Case selected Fritz as the lead integrator, the concept of one global integrator can be a far stretch. He says that it is important to realize that one logistics provider cannot always do everything for your company.

4. *Form a strategic alliance.* Trumbore says that once the providers were chosen, the key was getting the third parties together to form a logistics alliance that would offer Case a competitive marketplace advantage. “The third parties know what logistics is, but didn’t really know how it could make money for us or what areas to focus on.”

5. *Define objectives and synergies.* Case clearly defined its corporate goals to each of the 3PLs. “You have to be clear on your scope and not change the direction as you continue through the outsourcing process,” says Trumbore. “You basically want to say, ‘Here’s the state of the business currently, and here’s where we want to go in the future.’”

Realize that 3PLs have different objectives than you, says Trumbore. Their interests lie in market share, profit, and how to gain a good reputation. “Explain to them that you are interested in leveraging their assets because they are better at certain functions than you are,” says Trumbore.

6. *Remain open-minded about contracts.* There are different approaches to contracting with outsource providers. You may wind up with a different contract for each of your providers. Trumbore says that you must understand the baseline of where the logistics costs and services are starting from in order to determine how to compensate the provider. “We didn’t know how good we were and did not want to give money away or not pay enough to the provider.”

7. *Know where your business is heading.* One goal of the contract is to address your future business needs, not just those in the present. Case has recently undergone a series of acquisitions and plant closings, which it did not know would happen when it put together its provider contracts. “It would have been nice to see in the future, but we couldn’t,” says Trumbore. “If possible, try to build your outsourcing program about what your company plans are for the future.”

8. *Trust your providers.* “Some trust is necessary, but too much is dangerous,” says Trumbore. “Can the provider really offer up what it says it can deliver, such as real-time visibility to the part level?” He says that some providers will provide such details in the contract, while others simply write up a one-page profile of their services. “Experience says the devil is in the details, and you’ve got to get down to the nitty-gritty.”

9. *Transition portions of the business to the 3PL.* Case developed a five-year, three-phase plan, which broke the project into measurable pieces. In the first year, the providers would just take over the outsourced functions, and Case would measure how fast they did the job, how well they did it, and if it was seamless to the customers. In the second phase, the providers began expanding their understanding of what the other was doing and did a better job of interacting with one another. In the final phase, which will last the next three years, a true strategic alliance is being formed to meet customer expectations. Trumbore points out that you cannot outsource everything at once and that you might have to manage a dual process until you get everything transitioned. Try following a tightly coordinated timeline to facilitate the transition.

10. *Establish a single point of contact.* “Anything a 3PL needs has to come through me,” says Trumbore. “This keeps them focused.”

11. *Become a better manager.* Outsourcing changes your responsibilities as a logistics manager. “You are now behind the scenes as a coach, giving your team the signals and guiding them. You are no longer an active player on the field.”

Chapter I-6

Software and Technology

NEW STUDY REVEALS HOW TO SELECT THE BEST WAREHOUSE MANAGEMENT SYSTEM FOR YOUR NEEDS

There is a warehouse management system (WMS) in your future—especially if you manage a small to midsize facility that has traditionally shunned such systems. Currently available and emerging WMS technology supports better, more accurate inventory data. It also promotes the creation of an end-to-end transaction process. Nevertheless, the planning and implementation process of a WMS solution is still complex and must be carried out with care. Although there are no silver bullets to ease this process, there are several critical junctures that require special attention.

Clearly define what you want to accomplish. “Define the needs and establish the budget,” advises Richard Houyoux, president of Access Data Systems Inc. (Blue Bell, Penn.; 610-270-9800). “This is instrumental in getting to a successful conclusion.” As evidence, he tells of a successful WMS installation at Wieland Electric’s 41,000 square foot facility. The warehouse area consumes only 14,000 square feet of floor space, with the rest housing office and manufacturing areas. And the budget for the system was set at \$90,000.

“The first thing the team did was to create an initial set of goals and objectives,” he offers. “A small team began by listing all of the activities they felt they wanted to get out of the system.” In receiving, for instance, they wanted the system to create bar code labels and integrate it with the receiving process, to assign shelf space, and to update inventory information automatically. They outlined similar wants for putaway and picking, shipping, and manufacturing. To facilitate the process, they used a checklist developed by Houyoux, which, in turn, is provided to various system vendors (see sidebar).

WMS Features Required Checklist

Feature: RF handhelds	Yes	Probably	Possibly	No
Receiving <ol style="list-style-type: none"> 1. Anticipated receiving, RF reconciliation 2. Unanticipated receiving, new SKUs 3. License plate creation and tracking 4. Units of measure conversion 5. Serial number tracking 				
Putaway <ol style="list-style-type: none"> 6. Quality Control hold status management 7. Zone preference hierarchy 8. Match to existing location, otherwise random 9. Directed putaway with operator override 10. Optimum putaway routing 11. Unlimited putaway stacking 12. Receive to cart, putaway from cart 				
Order Processing <ol style="list-style-type: none"> 13. Real-time, automatic host interface 14. Sales orders from host 15. Work orders from host 16. Purchase orders from host 17. Changes to orders at any time before invoicing or receiving 18. Ability of supervisor to review all orders status easily 19. Ability of supervisor to change order priority 20. Ability of supervisor to establish picking waves 21. Paper-free picking, handheld directed 22. Ability of more than one handheld to pick the same order 23. Ability to easily change optimum pick route 24. Ability of operator to override pick sequence 25. Automatically report missing inventory to the host 26. Automatic scheduling of cycle counting for missing inventory 27. Ability of operator to complete the pick stack earlier than directed 28. Forward pick automatic replenishment 29. Work order picks, relieving inventory 				

(continued)

Feature: RF handhelds	Yes	Probably	Possibly	No
<p>Checking/Packing/Shipping</p> <p>30. Automatic packing slip creation</p> <p>31. RF handheld order checking</p> <p>32. Carrier system interface for automatic shipping</p> <p>33. RF shipping entry for nonstandard carriers</p> <p>34. Relieve inventory after picking, shipping or invoicing (site selection)</p>				
<p>Physical Inventory</p> <p>35. RF handheld physical inventory utilities</p> <p>36. Manage cycle counting on both product and location basis</p> <p>37. On-screen and printed report for supervisory review of physical inventory or cycle counting results</p> <p>38. Cycle count recount notification by location</p> <p>39. Supervisor's selected approval, then inventory adjustment processing with automatic host notification.</p> <p>40. Ability to continue to operate the warehouse during physical inventory or cycle counting</p>				
<p>Administrative</p> <p>41. Easy display of warehouse data, with grids and sorting options</p> <p>42. Automated setup of warehouse data (not location by location)</p> <p>43. Security access</p> <p>44. Information query, especially for product number and order number</p> <p>45. "Drill down" on product number and order number</p> <p>46. Long SKU number support</p> <p>47. Bar code number/SKU number cross reference</p> <p>48. Integrated, user available report writer</p> <p>49. Integrated, user available label design and printing</p> <p>50. Archive and audit trail capture, search and review features</p> <p>51. Employee productivity measurement and reports</p>				

Source: Access Data Systems Inc.

Understand what senior management wants. Meanwhile, Ben B. Gunter Jr., vice president of Sedlak Management Consultants, Inc. (Cleveland, Ohio; bgunter@jasedlak.com), adds another dimension to the “needs and budget” phase. He advises WMS teams to focus on the needs of management. “Implementing a warehouse management system is still a business decision first,” he advises.

A recent study titled *Warehouse Systems and the Supply Chain* (Warehousing Education and Research Council, or WERC; Oak Brook, Ill.) also finds that one of the “threads” of successful WMS implementation is executive input and sponsorship. “When a chief executive is the sponsor of the project, the chances of being successful almost doubled,” the report notes.

“Too often the teams believe they are merely buying a computer, software, RF [radio frequency] terminals, or handheld scanner,” he told a Distribution/Computer Seminar East (C. S. Report, Inc.; Uwchland, Pa.). When the project team starts moving in this direction, “it’s time to remind them it’s not a technology project, but a business one,” Gunter maintains.

Remember that preimplementation determinations are also a critical juncture of the WMS project. Well before the technology is in place and ready to be rolled out, the team should face the training issue. The trainees must be identified (e.g., on-the-floor operations staff, supervisors, managers and clerical staffs, maintenance staff, and information staff). Also, early on the team must make decisions about whether the training will be conducted by the in-house training department, software vendors, a project consultant, or a third party.

Test, test, test. The rush to skip testing and avoid following a methodical conversion plan is understandable, but this misconception accounts for more delays and failures than anything else, according to the WERC study. “The earlier you start testing, the sooner you get a true picture of what’s going on with your module,” maintains Gunter. He recommends a seven-step testing process:

At the vendor’s site, perform

1. Perform unit/module testing.
2. Integrated systems testing.

At the warehouse or plant site, perform

3. Connectivity testing
4. Low-volume systems testing

5. High-volume functional area testing (“You need to know what your load will be now and in the future, so have the numbers in the spec and have the vendor use them to conduct the tests”)
6. High-volume integration testing
7. User acceptance testing

Demand on-time delivery of all functionality. “When it’s time to go live, if all you’ve requested is not ready, the vendor will start playing the ‘you pick what is important’ game,” Gunter warns. “Don’t be drawn into the vendor’s trap of having to choose which functionality will be delivered late. This is the time to hang tough,” he urges.

APICS SHOWCASES NEW LOGISTICS MANAGEMENT SOFTWARE SOLUTIONS

Logistics planning and management software solutions are gaining star attraction. The latest evidence is from a recent American Production and Inventory Control Society (APICS) International Conference and Exposition, where it seemed that almost all suppliers put on display their latest inventory management and supply chain management technology. We visited and viewed many of the new and updated versions of the displayed software focusing on inventory planning, warehouse management, supply chain solutions, and the enterprise. The following are synopses of the features from those solutions that we found promising and believe have potential for widespread application by industry management practitioners.

E/Step Software’s Finished Goods Series (FGS) release 5.00. The latest in a suite of forecasting and inventory planning solutions, FGS 5.00 for Windows is compatible with the DOS product at the database and command file or macro levels. The software is Web- and Java-enabled, so users do not have to convert their databases or commands because the software is compatible with previous releases. The software presents the user with a custom wizard for each phase of inventory management and analysis. Also, the FGS Form Administration kit allows all of the forms in the program to be customized by the system administrator.

For information: E/Step Software Inc., P.O. Box 409, Tieton, WA 98947; 509-678-5900; fax, 678-5902; www.EstepSoftware.com.

Glovia International’s Glovia 4.0. Unique in this release is its Seiban capability. Glovia’s Seiban Workbench helps to establish higher levels of cus-

customer satisfaction through more accurate tracking of inventory, customer orders, and the supply chain. The application employs a selective netting capability allowing manufacturers to have exact control over the allocation of supply. They can isolate certain inventories from the general population of parts or open stock and assign them for designated use. The product enables visibility on the level of the customer order line throughout the entire manufacturing process. Seiban Workbench gives instant access to all customer-related information and supports impact analysis, what-if simulations, and maintenance of Seiban assignments and management.

For information: Glovia International LLC, 1940 E. Mariposa Avenue, El Segundo, CA 90245; 310-563-7000; fax, 310-563-7300; www.glovia.com.

American Software's Visual Flow Manufacturing. Visual Flow Manufacturing for the Windows NT platform provides an easy-to-use graphical management view to streamline the design, production planning, and execution of demand-driven manufacturing operations. A new product feature includes kanban management. It provides replenishment signals and a graphical layout of material paths designated for each point of raw material or component replenishment, while keeping the lowest possible inventory points.

For information: American Software, 470 East Paces Ferry Road, Atlanta, GA 30305; 404-261-4381; fax, 404-264-5206; www.amsoftware.com/flow.

Distinction Software's Constrained Distribution Planning module. The new software enables manufacturers and distributors to improve inventory and distribution planning across the supply chain. Constrained Distribution Planning is the latest module in Distinction's SCOPE suite of supply chain planning applications. It is a tactical tool for distribution managers that enables them to plan the replenishment of their distribution centers (DCs) and vendor managed inventory (VMI) locations and takes into account various manufacturing and distribution constraints relating to product availability, shipment calendar, and carrier capacities. Constrained Distribution Planning produces a time-phased plan of replenishment to fulfill each location's customer demand requirements.

Also on display was the Blend and Pack Scheduling module, which is designed for batch process manufacturers who need to synchronize the production and packaging of multiple finished products to reduce finished goods inventory and achieve greater plant yields.

For information: Distinction Software Inc., 1117 Perimeter Center

West, Suite E105, Atlanta, GA 30338; 770-390-9339; fax, 770-390-9757; www.distinction.com.

Acacia Technologies' Warehouse BOSS 6.0. The complete WMS covers all aspects of receiving, locating, putaway, order management, picking, packing, and shipping. The new release includes enhanced RF receiving capabilities, which streamline the receiving process to reduce time and personnel requirements. The release also includes resource reporting and activity tracking, which provide the capability to define tasks, track tasks being performed, track the amount of time spent performing the tasks, and track the quantity of work that is completed. A third enhancement is the proactive replenishment planning feature, which provides the ability to generate, modify, and commit replenishment plans outside of pick planning. The product also supports activity-based locating, bar code and directed RF, automatic replenishment, lot tracking, wave picking, and cross docking.

For information: Acacia Technologies, a division of Computer Associates International, Inc., 2400 Cabot Drive, Lisle, IL 60532; 630-505-6000; fax, 630-505-6410; www.acaciatech.com.

MK Group's MK Warehouse Optimizer. This software package was created specifically to automate single- and multisite distribution enterprises. Designed to work under any host business computing system, MK Warehouse Optimizer controls and monitors all aspects of warehousing based on rules established by system users. The inventory-locating components determine optimum locations for items in receiving, replenishment, transfer, and picking situations. Its putaway confirmation feature provides continuous checking of inventory status and location. The order pool management controls order picking and shipping priorities. The user controls the content and size of each pick plan and manages shipments to meet schedule and staffing levels. The new software, which is a client/server-based program on Windows NT, supports electronic data interchange (EDI), directed RF, and bar code reading.

For information: The MK Group, Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788; 800-407-8686; www.mkgroup.com.

EXE Technologies' Succeed Warehouse Optimizer. The new solution enables warehouse managers to plan, execute, and assess strategic layouts based on cost-of-labor, cost-of-space, and usage characteristics. Success Warehouse Optimizer is designed to maximize throughput and space efficiency while allowing the user to model and compare the cost associated with various warehouse configurations. It also uses the principles of cost-based analysis to eval-

uate the impact of changes to product forecasts, new storage solutions, and associated labor adjustments. The software will generate continual tactical reslotting strategies. It comes with design wizards allowing managers to configure the system to meet their specific warehouse requirements.

For information: EXE Technologies, Inc., 12740 Hillcrest Road, Dallas, TX 75230; 972-233-3761; fax, 972-788-4208; www.exe.com.

SAP's Advanced Planner and Optimizer (APO). A key component of the SAP Supply Chain Optimization, Planning, and Execution initiative, SAP APO enables companies to respond quickly to changing market dynamics and synchronize planning across the supply chain. It helps to reduce inventory and costs by balancing supply and demand in real time. Among its features is the supply chain cockpit, an instrument panel for modeling, navigating, and controlling the supply chain. SAP APO also features supply network planning and deployment, which model the supply network—sourcing, purchasing, manufacturing, and distribution—so that users can synchronize activities and plan material flow throughout the supply chain.

An additional release is the SAP Logistics Execution System, which provides enhanced warehouse management and transportation management functionality. Among its new component is the WMS planning, monitoring, and decision support feature. It provides warehouse supervisors an overview of the expected workload and work capabilities at the earliest point in time, allowing for staff scheduling and assignment of temporary staff.

For information: SAP America, Inc., 701 Lee Road, Suite 200, Wayne, PA 19087; 610-725-4500; fax, 610-725-4555.

webPLAN's onPLAN. The webPLAN configurable suite of collaborative supply chain planning products for midsize manufacturers now includes onPLAN, a product that instantly filters through manufacturing resource planning (MRP) and enterprise resource planning (ERP) data to provide performance analysis information. It delivers a business report card based on industry standard key performance indicators (KPIs). User-defined events immediately trigger cautionary alerts so that manufacturers can proactively deal with critical issues, such as excess inventory. Embedded on-line analytical processing (OLAP) technology allows managers to view performance metrics in both numeric and graphical formats and to drill down and “slice and dice” the underlying data.

The webPLAN suite has been extended to meet the challenges faced by the aerospace industry. WebPLAN Aerospace represents the first deliverable in the company's strategic plan to focus on key vertical markets. Future vertical industry releases will be focused on electronics and industrial sectors.

For information: webPLAN Corp., 600 Terry Fox Drive, Kanata, Ontario, Canada K2L 4B6; 613-592-5780; fax, 613-592-0584; www.webplan.com.

*auxilium's Info*Engine version 2.5.* The supplier of enterprise application integration (EAI) software to optimize interoperability between ERP and critical supply chain partners unveiled its latest version of Info*Engine. Release 2.5 provides global user access and seamless integration throughout the manufacturing supply chain. The newest version of the software offers thin client management, which allows all users to perform document management functions from the desktop using a standard Web browser. Also, a new logic engine, which is a Java-based module that reduces programming skills and time required to develop complex enterprise application solutions, enables rapid deployment and adaptation throughout the supply chain. Auxilium also announced its SAP Early Adoption Program for those who want to utilize Info*Engine's ease-of-access to link other business processes and users to their existing SAP environments.

For information: auxilium inc., 2060 Centre Pointe Boulevard, Mendota Heights, MN 55120; 612-405-8200; fax, 612-452-0524; www.InfoEngine.com.

IndX Software's IndX HQ. The new Internet-based enterprise information solution extracts real-time information from any source and presents it in ways that are meaningful to the users. Complete with animation, reports, charts, and alerts, the software visually indicates changing status and behavior in all enterprise and supply chain activities. Users can quickly and intuitively search, locate, and aggregate enterprise information, monitor KPIs, and define personal alerts.

For information: IndX Software Corporation, 30011 Ivy Glenn, Suite 200, Laguna Niguel, CA 92677; 949-249-5360; fax, 949-249-5362; www.indxhq.com.

CONSIDERING NEW SUPPLY CHAIN SOFTWARE? A LIST OF THE LEADERS

As logistics managers continually find that ERP solutions are too heavily centered around manufacturing and thus do not provide them the functionality they need to handle warehousing, distribution, and transportation activities, they are increasingly turning toward supply chain management and

planning software that allows them to manage within their facilities and beyond. Major players in the software market (in order of revenue, according to AMR Research, Inc., Boston; 617-542-6600) are

- *i2 Technologies*, 909 E. Las Colinas Blvd., 16th Floor, Irving, TX 75039; 800-800-3288 or 214-860-6000; www.i2.com
- *Manugistics, Inc.*, 2115 East Jefferson Street, Rockville, MD 20852-4999; 301-984-5000; www.manugistics.com
- *Industri-Matematik International Corp.*, Kungsgatan 12-14, Box 7733, SE-103 95 Stockholm, Sweden; +46 8 676 50 00; www.industrimatematik.com
- *McHugh Software International*, 20700 Swenson Drive, Waukesha, WI 53186; 414-317-2000; www.mchugh.com
- *EXE Technologies, Inc.*, 8787 Stemmons Freeway, Dallas, TX 75247; 877-EXE-TECH (toll free); 214-775-6000; www.exe.com
- *Numetrix Ltd.*, 655 Bay Street, Suite 1200, Toronto, Ontario M5G 2K4; 416-979-7700; www.numetrix.com
- *Manhattan Associates, Inc.*, 2300 Windy Ridge Parkway, 7th Floor, Atlanta, GA 30339; 770-955-7070; www.manhattanassociates.com
- *Optum Inc.*, Westchester Financial Center, 11 Martine Avenue, Suite 1175, White Plains, NY 10606; 914-933-3400; www.optum.com
- *Baan Corp.*, Baron van Nagellstraat 89, 3771 LK Barneveld, Netherlands; +31 342 42 8888; www.baan.com
- *Chesapeake Decision Sciences*, 200 South Street, New Providence, NJ 07974; 908-464-8300; www.chesapeake.com
- *SynQuest*, 3500 Parkway Lane, Suite 555, Norcross, GA 30092; 800-844-3228; 770-447-8667; www.synquest.com
- *SAP AG*, Mannheim, Germany; www.sap.com
- *Peoplesoft Inc.*, 4460 Hacienda Drive, Pleasanton, CA 94588-8618; 800-380-7638 or 925-225-3000; www.peoplesoft.com
- *Oracle Corp.*, 500 Oracle Parkway, Redwood Shores, CA 94065; 800-ORACLE1; www.oracle.com
- *QAD Inc.*, 6450 Via Real, Carpinteria, CA 93013; 800-218-3434 or 805-684-6614; www.qad.com
- *American Software, Inc.*, 470 East Paces Ferry Road, Atlanta, GA 30305; 404-264-5296; www.amsoftware.com

P-CARD AND E-COMM SOLUTIONS DOMINATE NAPM SHOW

The exhibition hall at a recent National Association of Purchasing Management (NAPM) International Purchasing Conference was packed with ideas, innovations, and imaginative solutions for the purchasing professional. Again, e-commerce technology and the purchase card (P-card) ruled the show. In fact, there were some announcements about the integration of the P-card with a particular electronic procurement system:

- Visa U.S.A. was demonstrating its P-card pairing with software developed by Ariba Technologies to realize significant time and cost savings during the procurement process. During its pilot program, Visa explained that the purchase of computer hardware, which once took three business days to complete, was decreased to a mere 32 seconds, while administrative costs were reduced from 50% to 90% of traditional paper-based purchasing methods. On the payment end, the P-card enabled Visa to eliminate five steps from the process. Visa is now expanding the program to all its employees.

- MasterCard International announced its enterprise deployment of ELEKOM Procurement, from the 250-employee pilot to its 2,300 end users. Thousands of transactions have been successfully completed between MasterCard and its suppliers over the past eight months. The employees selected goods and services from a local catalog, electronically placed orders, and paid for the products using a MasterCard Corporate P-card.

Additionally, MasterCard said that the results of a recent survey found that 64% of companies “would find value in having one card that combines the functions of a purchasing, fleet, and T&E card.” First Chicago NBD will begin issuing a MasterCard one-card solution this month for purchase, travel, and fleet needs.

- American Express revealed at a press conference that the company has completed a training initiative involving its middle-market sales force. The 250-plus dedicated account managers and salespeople will be focusing their efforts on “aggressively expanding sales of the American Express Corporate Purchasing Card to midsized companies,” according to S. Thayer Stewart, vice president of marketing. A successful pilot program led to this action. Meanwhile, without commenting on the MasterCard and Visa actions relative to their involvement with electronic procurement systems,

Stewart told us that American Express will be announcing a “much tighter integration agreement in a couple of months.”

Energy Purchasing Specialists Steal the Show

We think that the National Energy Team, a PECO Energy Company (Philadelphia), was the hit of the show. We saw no booth or exhibit that had as much traffic as this modest one. The interest in PECO’s service reflects the growing concern that purchasing professionals have about the deregulation going on in the utility industry and about their emerging role and responsibility for negotiating future rates and service.

“We have full-service energy consulting and procurement capabilities, which we’re offering to purchasing professionals in both regulated and unregulated markets,” Sandra J. Barber, energy supply manager, explained during an interview.

According to Barber, the National Energy Team provides procurement services for “nationally recognized clients’ facilities located throughout the United States.” In addition, it provides a full range of energy consulting and procurement services specifically targeted to corporations with multiple locations. “We have been able to reduce energy costs by up to 20% in many cases,” Barber claims. No wonder so many purchasers were lined up seeking more information.

For more information about PECO’s National Energy Team, contact Cheryl Camuso at 215-841-6474 or ccamuso@peco-energy.com.

New Solutions That Purchasing Professionals Are Considering

With the emphasis on e-comm and electronic procurement, we took the opportunity to explore what the various vendors were promoting and making available to the profession. The following is our annual review (in alphabetical order) of what we believe to be the newest and best of what we saw at the NAPM show.

AGENTics introduces SupplyChannel. An enterprise-wide solution for on-line procurement management, this system is installed on the buyer’s side. Orders for approved goods from approved suppliers are placed via intranet by users from their desktops. SupplyChannel is based on AGENTics’s Distributed-Catalog technology, which enables users simultaneously to navigate disparate on-line catalogs residing at different supplier sites, as though they were one, unified catalog. Unique to this technology, suppliers do not

need to provide any special or dedicated interface. All product information also resides at supplier sites, where it is kept up to date, correctly reflecting inventory status, price, and availability.

For information: AGENTics, 83 Cambridge Avenue, Burlington, MA 01803; 781-221-0101; fax, 781-221-7878; info@agentics.com; www.agentics.com.

American Tech debuts PurchasingNet-SQL. Designed for mid- to large-sized purchasing environments, Version 1.5 of the enterprise purchasing and requisitioning system is deployable with a browser or Windows interface. The software enables designated people to generate requisitions from a corporate catalog or in free-form mode or to place orders directly with suppliers via their browsers. Through prebuilt database queries, end users can determine status of requisitions, approval status, and purchase order (PO) status. PurchasingNet-SQL also maintains an audit trail for all transactions. License fees start at \$50,000.

For information: American Tech, Inc., Colonial Commons, 670 N. Beers Street, Holmdel, NJ 07733; 732-946-8844; fax, 732-946-3102; www.purchasingnet.com.

Ariba Technologies announces Operating Resource Management System (ORMS) Release 4.0 and 5.0. Building on the previous three releases for the acquisition and management of operating resources, Ariba ORMS Release 4.0 includes several industry-first capabilities. The downloadable client application allows mobile or remote users to use Ariba ORMS over dial-up or ISDN modems. The high-volume approver interface enables others to view status and approve high volumes of requests rapidly. Further, Ariba has enhanced the scalability of Release 4.0 to allow global corporations to support even larger enterprise-wide deployments. Version 5.0, due in September, will deliver a new T&E management system. It is intended to streamline the manual, paper-intensive process of submitting, approving, and paying for expense reports.

For information: Ariba Technologies, Inc., 1314 Chesapeake Terrace, Sunnyvale, CA 94089; 408-543-3800; fax, 408-543-3900; www.ariba.com.

Bellwether Software releases Purchasing Management Extra (PMX). The automated procurement and materials management system's modular design allows individual tailoring to meet specific needs. Nine fully integrated modules automate the complete procurement process in a paperless mode. The Purchasing module, which includes supplier management, PO generation, history retention, and management reports, can be used as a stand-alone unit or in combination with the other modules. The new release of PMX now includes a warehouse management module.

For information: Bellwether Software Corporation, 9900 Shelbyville Road, Suite 6B, Louisville, KY 40223; 502-426-5463; fax, 502-423-8963; www.bellwethercorp.com.

Celerity Solutions unveils Advanced Supply Chain Planner. This advanced planning product is based on a patented planning algorithm. Supply Chain Planner is a real-time, event-driven planning tool that instantly responds to each change in supply, demand, and planning rules. Each change generates a message to a planning server that reevaluates the supply plan. Planned orders are updated automatically. The software develops a supply plan based on a model of the supply chain. It is offered as a stand-alone product or as part of Celerity's Continuum suite of supply chain management products.

For information: Celerity Solutions, Inc., 200 Baker Avenue, Suite 300, Concord, MA 01742; 978-287-5888; fax, 978-287-4222; www.celeritysolutions.com.

CONNECT launches MarketStream. The new software is a multiseller/multibuyer electronic commerce application designed to support the needs of distributors and purchasing groups in vertical markets whose sales channel is the Internet. It includes support for integrated cross-supplier catalog search, product-specific attributes, tiered or customized pricing, buyer profiling and personalization, back-end systems integration, and robust reporting capabilities. MarketStream's comprehensive scope of functionality reduces the technical effort required to build a customized application to support a major vertical market.

For information: CONNECT, Inc., 515 Ellis Street, Mountain View, CA 94043; 650-254-4000; fax, 650-254-4800; www.connectinc.com.

Dun & Bradstreet presents D&B Supplier MarketPlace. The new software package allows purchasing professionals to locate new suppliers easily, including minority-, women-, 8A-, and veteran-owned businesses from among the company's database of more than 10 million suppliers. Updated quarterly, this package lets purchasers customize a sourcing search from their desktops. Suppliers can be targeted by type and size of business, location, socioeconomic status, years in business, ownership type, legal status, and so on. It can also prescreen suppliers, create lists of prospects, and produce counts. The D&B Supplier MarketPlace starter kit costs \$699 and includes an annual subscription with quarterly updates, software upgrades, and \$100 worth of supplier data.

For information: Dun & Bradstreet, Supplier Evaluation and Management Services, 3 Sylvan Way, Parsippany, NJ 07054; 973-605-6992; fax, 973-605-6990; www.dnb.com.

Elcom Systems updates PECOS Procurement Manager. The Intranet-based automated procurement software (PECOS.pm, version 2.0) empowers desktop users with the self-service ability to place orders from their PC and track the status of their orders through receipt and financial settlement without manual intervention. Version 2.0 incorporates several new and enhanced features. The navigation features of the browser-based user interface have been improved. Also, capabilities such as catalog access controls, multiple line-item account splitting, on-screen savings calculations have been added.

For information: Elcom Systems, Inc., 400 Blue Hill Drive, Westwood, MA 02090; 781-407-5000; fax, 781-407-5063; www.elcom.com.

i2 Technologies displays RHYTHM Global Procurement Manager (GPM). The new software helps to manage effectively the complexity and diversity of the evolving procurement organization by automating routine work flows such as generation and management of POs. It also automates system-wide processes such as bid management and closes integration of procurement information with advanced planning engines at both the buyer and supplier side. RHYTHM GPM generates allocations for individual suppliers based on flex limits.

For information: i2 Technologies, Inc., 909 E. Las Colinas Boulevard, 16th Floor, Irving, TX 75039; 214-860-6000; fax, 214-860-6060; info@i2.com; www.i2.com.

Intelisys Electronic Commerce offers IEC-SupplyNet. The new product enables small and mid-sized suppliers to do business over the Internet. It uses third-party commerce service providers to develop and maintain electronic catalogs for smaller suppliers. IEC-SupplyNet, based on the Open Buying on the Internet (OBI) standard, combines with Transact (Open Market, Inc., Burlington, Mass.) Internet commerce software to allow suppliers to do business electronically with any OBI-based procurement system. Also, the company announced its end-to-end electronic procurement solution for large buying organizations and all their suppliers. The product family includes IEC-Enterprise, an intranet-based MRO procurement application; IEC-Link, a modular toolkit for suppliers to integrate with their buyer's intranet; and IEC-SupplyNet.

For information: Intelisys Electronic Commerce, LLC, 55 Water Street, Room 602, New York, NY 10041; 212-638-1173; fax, 212-638-8478; www.iecsolutions.com.

RightWorks initiates ProcureWorks. This is the first of a suite of operational activity management solutions. ProcureWorks Version 1.0 is an advanced

procurement management system that provides the information, process, and controls required to achieve the principles of RIGHTBuying of a broad range of corporate supplies, services, and equipment. The software is a solution for sourcing and consolidating suppliers, improving contract quality, minimizing maverick buying, improving quality, and reducing inventory carrying costs. ProcureWorks is a highly scalable product with extendable architecture.

For information: RightWorks Corporation, 31 North Second Street, Suite 400, San Jose, CA 95113; 408-882-0350; fax, 408-280-7002; www.rightworks.com.

TRADE'ex offers TRADE'ex Procurement. A member of the TRADE'ex e-Market Suite, this is an enterprise-wide operational purchasing application that leverages Internet technologies to streamline the corporate purchasing process for mid- to large-sized companies. TRADE'ex Procurement establishes an electronic market trading community among a company's internal users via the intranet and among their suppliers through the Internet. The system is managed by a governor at the buying organization that empowers all participants in the e-Market with varying levels of access and permissions to maintain centralized control.

For information: TRADE'ex Electronic Commerce Systems, Inc., 501 E. Kennedy Boulevard, Suite 750, Tampa, FL 33602; 813-222-2050; fax, 813-222-5658; www.tradeex.com.

Waltrip exhibits WEB Buyer Release 1.5. The new product is an automated Web application that delivers centralized management of a distributed procurement process. Introduced with Release 1.5 is the requisition module, which allows users to submit requisitions for the appropriate electronic approval at the department level, then automatically forwards approved requisitions in a standard format to the purchasing department.

For information: Waltrip and Associates, Inc., 1750 Howe Avenue, Suite 260, Sacramento, CA 95825; 916-925-2058; fax, 916-925-0781; swaltrip@ededi.com.

EXCLUSIVE SURVEY: NEW "ELECTRONIC" WAYS TO IMPROVE SUPPLIER PERFORMANCE

Not only is electronic data interchange (EDI) technology being considered, but many purchasing professionals are now actively doing it. According to a *Supplier Selection and Management Report Cost Control Survey*, more than one

in five (21.6%) of purchasing professionals working in companies with fewer than 500 employees are installing EDI technology. Furthermore, fewer than one in four (23.1%) of respondents in organizations with more than 500 employees are doing the same.

Purchasing professionals participating in the survey, answering an open-ended question cited EDI most often as the procurement/information technology that they are carrying out. Following behind, but at a distance, is the Internet (10.5%) as the information technology of choice for procurement departments.

Scattered among the remaining majority of responses is a potpourri of unique, innovative, and interesting electronic solutions that provide you with much food for thought. Many of the respondents share their solution and experiences, which we pass along for your consideration.

Installing ERP with EDI release to provide timely information to suppliers. A sales/purchasing manager at a midsized producer of recreational products notes, "We are implementing an ERP/requirements planning system and coordinating it with EDI release." She also allows that "most suppliers are ready to go EDI and look forward to it. Further, all parties benefit through more accurate and timely information."

Running the full gamut, from EDI to the Internet. A purchasing manager at a large maker of snack foods has EDI in place already and notes that most supplies like it. He also allows that on-line catalogs will be implemented in about two years, and Internet/intranet/extranet technology/applications are currently under review. "We hope to implement this in two to three years," he tells us. "One of the drivers is that our major suppliers have these solutions in place now, or will have in the near future."

Slashing lead times with an Internet-based MRP link. "The procurement information technology solution we will begin to implement is an Internet-based material requirement planning data link," a procurement manager at a midsized producer of navigation safety and emergency equipment details. "This will directly transfer all of our MRP system information to our suppliers to support our manufacturing requirements."

He adds, "The advantage to this practice will be a seamless transfer of information that is instantaneous." He believes that the real-time data will give the suppliers the time they require to deliver parts on time. "From our standpoint, it will eliminate the time spent generating purchase orders and free our purchasing professionals to work on value-added tasks," he assures. "Yearly contracts and certifications will be set up to manage the flow of information."

Using the Internet for kanban replenishment. "We have recently started to

use the Internet for communicating kanban replenishment orders to key suppliers,” maintains a business unit manager at a small manufacturer of pumps. “So far, it is saving us time and is proving to be effective,” she relates.

Expanding use of the Internet for sourcing purposes. A purchasing manager at a small utility is starting to use the Internet for “solicitation distribution.” They’ve recently begun to pilot a “few electronic invoicing arrangements.” To date, she reports, “suppliers are very enthusiastic.”

Building a home-grown system to avoid problems of EDI. A manufacturing engineer at a large manufacturer of fuel systems for the aerospace industry explains, “We’re in the process of developing our own electronic commerce system. We are avoiding the boundaries of EDI and basing our system on Web tools,” he reports. “Our suppliers just need MSOffice tools and an Internet connection. Data is designed to be highly portable.”

Constructing new data file of suppliers. “We are building a whole new data file on suppliers that identifies cost drivers and details on supplier operations,” says a manager of coordinated purchases at a major builder of recreational vehicles and engines for water sports. “Some of the suppliers are cooperating and sharing confidential information. Of course, others are reluctant to participate.”

Using a cost-based supplier rating system to do double duty. “We have a cost-based supplier rating system that doubles as a best value determiner on bid price,” relates the director of technology and quality assurance at a large producer of avionics equipment. The software interfaces with the legacy system to evaluate costs of quality and delivery. It also compares these to the suppliers’ material costs. “Our suppliers are very much involved in this since it determines their future business with us,” he reports.

Implementing a supplier performance measurement dashboard for all strategic partners. “We’re currently pursuing EDI and procurement cards and are in the early stages of researching electronic commerce/Internet-based procurement,” a purchasing and material logistics manager at a midsized producer of compact discs reports. “Suppliers are cooperating as continuous improvement is the backbone of our strategic partnership program.”

Distributors’ participating in EDI implementation. “We are currently implementing EDI,” declares a purchasing manager at a small assembler of telecommunications test/monitoring systems. “While all of the electronics distributors are eagerly participating, we’re having problems getting the smaller manufacturing companies on board. We’re trying to educate them and present advantages for them to consider,” she explains. “Some will grow with us, and the others will eventually be left behind.”

Keeping suppliers in the loop on long-term materials requirements. The general manager of cost control at a large maker of automotive air compressors relates how his company has developed a repetitive supplier scheduling system that keeps the supplier base informed of their long-term materials requirements. "It has been effective, and the suppliers are quite happy with our new system," he says.

Using new technology to eliminate mailed copies of supplier quotes. "We've installed a system that faxes detailed quotations directly into an electronic file that is readily available for review," says a director of purchasing at a large manufacturer of gears and gear drives. "The system eliminates paper filing and makes information readily and easily available to all in our organization. However, at first some of the suppliers were reluctant to eliminate mailed copies of quotes," he explains.

THOMSON'S INTERNET INITIATIVES TO LEVERAGE PURCHASING IS TOPS

In a large, decentralized company with many divisions, it is often difficult to let everyone know about new contract opportunities. The Thomson Corporation, a multibillion dollar, diversified international corporation with over 200 companies worldwide and 40,000 employees, is solving this problem by putting them all on an extranet.

A team of just eight individuals put in place the value process to leverage purchasing opportunities within Thomson's various business units. Through the team's initiatives, over 100 agreements have been negotiated to date, and almost \$300 million in expenditures have been captured under Thomson-wide agreements.

Furthermore, \$60 million in incremental savings have been realized since the program's inception in 1995. More impressive, is that the Thomson Optimized Purchasing Services (TOPS) program delivers 35 times its cost in savings. However, Karen M. Fedele, CPM and director of global contracts (karen.fedele@tfn.com), declares, "We have just scratched the surface, as there still exists \$1.6 billion in leverage spending out there."

Changing the Decentralization Culture

Thomson has grown primarily through acquisition, which in turn has fostered a high degree of decentralization throughout the organizations. "Due to the

decentralization, the companies don't typically work or talk with each other," Fedele states, explaining a situation that is familiar to many readers. "They didn't work together to form single agreements with common suppliers. Where we did have contracts, they were often multiple contracts with a single supplier."

"We were spending a lot of money but not getting a lot in return," says Fedele, who copresented with Ray Mazzoleni, CPM and contracts manager (ray.mazzoleni@tfn.com), at a recent NAPM Electronic Commerce Conference. "At Thomson, the internal customer, the company, and the supplier weren't being managed, so we were losing a lot of leverage."

Beginning the Leverage Process

Several years ago, Thomson's top management recognized this situation and formed a team. The mission: "Work with Thomson business units to select the suppliers to maximize quality and service levels while minimizing cost."

As Fedele explains, "We are committed to the cost of ownership, so we don't sacrifice service and/or quality for cost. Our approach is to work with and cooperate with the businesses, get their buy-in, and to team with them to identify leveraging opportunities."

TOPS Team Focuses Only on the Strategic

"Our biggest problem at the outset was to have the companies understand and utilize the agreements effectively," Fedele maintains. "We're a strategic group, and not transactional. We don't take any requisitions and don't place any. What we do is give the individual companies the tools to make their own purchasing decisions."

The principal activities of the TOPS initiative are to

1. *Identify contract opportunities.* The criteria includes volume/savings potential, key/strategic suppliers, geographical coverage, ability to provide benefit to the majority of Thomson companies, and the supplier's understanding of Thomson. The sources for these are internal customer suggestions and constant reviews of existing agreements to determine whether they satisfy the established criteria.

2. *Negotiate and manage agreements.*

3. *Market agreements secured by TOPS and other Thomson businesses.* This is done through the TOPS intranet site and the TOPS Information Exchange newsletter.

4. *Determine reporting requirements.*
5. *Monitor savings, company participation, and customer satisfaction.*
6. *Benchmark success.* “Here, we evaluate and recommend processes, such as best practices, technology, and administrative cost savings,” Fedele explains. “Also, for the contracts we are continuously reviewing the discounting/pricing and terms and conditions for improvement.”

Extranet as a Key Technology/Communications Tool

“Before we made a decision, we went out to talk with our customers and asked them how they wanted to get information,” Fedele noted. “Without exception, it was ‘give it to me on a browser-based system that’s password protected.’”

The approach taken was to create an extranet. “It’s a Web-based solution that resides within our firewall but relies on portions of the Internet to allow people to access the data,” she describes. The site is accessible by Netscape Navigator or Microsoft Internet Explorer and is password protected with two levels of security.

Since the companies within Thomson are not located on one network, this arrangement enables them to overcome the lack of a common communications platform, whether it be e-mail or browser, she explains.

Content Selection Is Critical

The Web site includes contract summary information and contract abstracts. It’s a one-page view of whom the agreement is with, what it provides, and when it is valid, and it includes bullet summary points of what the agreement is about.

The site also contains pricing information, which is provided by the suppliers, and contract bulletins, which include product announcements and other information relative to the market and business. Also, every publication that TOPS sends out is included at the site.

“We also actively promote the discussion forum,” she offers. “We’re breaking cultural barriers here as we promote Thomson people talking to each other and to share information, experience and expertise.”

They’ve just added a purchasing contacts directory. “It’s a Who’s Who in our company of who handles what,” she notes. “It’s another way of matching the customer to the supplier and to foster more one-on-one rela-

tionships. In this way, the supplier can go to just one source rather than many.”

Closer Ties, Better Management

“The Web enables us to provide consistent information to all parties” she explains. “Our information is provided to both our supplier organizations and to the Thomson companies, as well.”

Also, with the Web, the supplier/customer information is better managed. For instance, all Thomson employees can look at the data and verify the supplier information. “Importantly, we’ve been able to develop a purchasing community within Thomson,” concludes Fedele.

INTERNET PURCHASING POISED TO DRIVE BUYING STRATEGIES

Why the “sudden” interest in Internet purchasing? “It’s the desire to move the balance of power in the buying relationship to the purchasing professional’s side of the table,” declares Bruce D. Temkin, CPIM and senior analyst at Forrester Research, Inc. (Cambridge, Mass.; btemkin@forrester.com). That is the impetus driving the pilot projects by a handful of pioneering purchasing professionals. It is also the reason why scores of others are making serious inquiries about this new technology.

E-Purchasing Builds Momentum

Responding to a *Supplier Selection and Management Report* survey, the global supply manager for MRO at a large producer of rubber products shares, “We are now studying e-commerce beyond faxing and P-cards. We’re looking into ordering on the Internet from our key suppliers.”

In addition, the interest is not confined only to larger organizations. For instance, a business unit manager at a midsized manufacturer of pumps explains, “We already have started to use the Internet for communicating kanban replenishment orders to key suppliers. It saves us time and is very effective, even in the early stage of implementation,” she adds.

Meanwhile, Merck & Company (Rahway, N.J.) will move its supplies procurement activity to the Internet this quarter. The company plans to deploy the ORMS from Ariba Technologies (Sunnyvale, Calif.) for the online

General Electric's Quest for Electronic Online Indirect and MRO Purchases

GE is developing a process called Integrated Indirect Supply (IIS) to apply sophisticated electronic commerce techniques (Trading Process Network, TPN Register Company, Rockville, Md.; 888-287-9876) to the purchase of indirect and MRO materials, according to William G. Cafiero of GE Information Services (Dallas; bill.cafiero@geis.ge.com) and Randolph M. Rowe of GE Corporate Initiatives Group (Fairfield, Conn.; randy.rowe@corporate.ge.com). The initiative will incorporate a company-wide intranet, an extranet for supplier communication, integrated use of purchasing cards (with line item detail), and complete "back-office" EDI transaction usage.

GE's six sigma sourcing process. "In the new indirect sourcing process, we have developed a process for managing the supply chain," Cafiero and Rowe said at a recent NAPM Annual International Purchasing Conference. To start, they are empowering end users to access the TPN to order products or services from online supplier catalogs.

If an item cannot be found in the catalog, an off-catalog requisition process can be used. Also, products or services can be submitted out for bid via the TPN Post module.

Based on the user profile and defined business rules, the system controls the process flow, routing, and approval requirements. The system also is integrated with a standard e-mail system to permit easy notification of activity. Once approved, all orders are processed via EDI to suppliers.

"By implementing this program, we see two areas of benefit," they offer. First are hard benefits in terms of price leverage and usage/leakage control. Soft benefits include quality improvements and lower costs of each transaction.

procurement of nonproduction or indirect supplies. In addition, General Electric is developing a process to "apply a sophisticated electronic technique to purchase indirect and MRO materials" (see sidebar).

Benefits for Purchasing Professionals

Keynoting a recent NAPM Electronic Commerce conference, Tempkin lists the following benefits:

- *Lower costs.* "The companies we surveyed expect that by tracking total demand they will be able to find and terminate noncompetitive suppli-

ers, negotiate volume discounts, and eliminate many of the costly human touches between buyers and sellers,” Tempkin itemizes. For instance, he cited an example in which a software company spends \$142 in total costs to place an order today. They believe that it will be reduced to just \$7 per order when they convert to using the Internet.

- *Increased control.* “Access to purchasing history will put the buyers in the driver’s seat,” Temkin maintains. “Purchasing departments can monitor end-trends, while CFOs analyze how budget dollars are spent.” Purchasing professionals can apply complex business rules, down to employee ID levels, to manage by exception.

- *Better services.* Buyers also can use purchase data to force better terms and responsiveness from existing suppliers. Tempkin contends, “Smart suppliers will have detailed supply and demand information in their databases to analyze prior behavior to offer targeted services, JIT [just-in-time] delivery, and customized prices to satisfy the purchasing professional’s needs.”

Obstacles Impede Total Acceptance

“While companies have great expectations, purchasing professionals still see some obstacles to widespread usage,” Temkin notes. The largest, by far, is overcoming resistance to internal culture change. “Internet purchasing does place a broad impact throughout the organization,” he mentions. “While companies are starting Internet purchasing initiatives, many of them are not typically prepared for the changes that are required.” Additionally, he charges, “Suppliers are not ready to support all of the purchasing initiatives of their customers. Even the ones with Internet commerce capability are not necessarily ready to commit to every different procurement initiative,” he declares.

Meaning for Purchasing Managers

“The Internet is about buyer power,” Temkin repeats for emphasis. “We believe that the Internet economy will favor the savvy purchasing departments.”

Forrester research finds that 30% of purchasing managers have taken the most forward-looking approach to buying consumables. “In these vanguard organizations, the purchasing managers view their roles as strategic, not tactical,” he offers. “Think about that shift and what it could mean to your organization, moving from 70% transactional to 90% strategic.”

First is the purchasing process. In the Internet procurement world, very little paper, if any, is created.

Second is supplier management. Although this has always been part of purchasing, there are some additional requirements and initiatives—for instance, from analyzing the performance of the supplier's online activity to how to handle the management of catalog content. This is critically important to the initiative, Temkin asserts. He insists that purchasing managers clearly determine who owns the catalog, who maintains it, how it is maintained, and where it resides.

The third area is the end user. This is definitely a new role because Internet procurement means expanding the number of people who can now have purchasing authority. "You will need to become an evangelist to get widespread adoption of this new Internet online purchasing process across the company," he declares. "It's up to you to make sure the features of the software solution you choose, processes you have, and the support you offer is as easy as it can be, and as straightforward as it can be to satisfy the users' needs on an ongoing basis." Otherwise, they will "gravitate to the easiest way to do it, even meaning rogue buying," he warns.

SIX WAYS LOGISTICS MANAGERS CAN FULFILL INTERNET ORDERS QUICKLY AND ACCURATELY

Efficient Internet order fulfillment is essential for getting a competitive advantage, boosting sales revenue, and gaining and maintaining customers. To help advance your own processes, we offer the following guidelines for carrying out a successful fulfillment strategy, based on the results from two recent industry surveys: *B2C Internet Practices* from Deloitte and Touche (www.deloittetouche.com) and an ongoing e-business study from Hackett Benchmarking & Research, the research arm of AnswerThink (Hudson, Ohio; 330-656-3110; www.answerthink.com).

Six Ways to Fix Fulfillment Failures

1. Dedicated Facilities

Picking eaches versus full cartons or case packs is a challenge for many firms that are used to shipping full truckloads. This could be the reason why the industry averages a 3.55-day turnaround from order to shipment for Web-based order fulfillment. In short, this is a good reason to consider dedicated

Table I-6.1 How Orders Are Fulfilled

Other	0.07
Picking at separate e-business DC	0.11
Outsource fulfillment	0.22
Picking from store DCs	0.46
Picking from store shelves	0.3

Table I-6.2 Outsourced Web Activities (%)

	<i>Total Sample</i>	<i>Retailers</i>	<i>Consumer Goods</i>
Returns handling	9	9	8
International order fulfillment	10	9	12
Domestic order fulfillment	18	19	16

e-fulfillment DCs. They can be designed as a pick-and-pack, product-zoned layout for selecting and shipping smaller-sized orders. Currently, 11% of companies pick and pack Web orders from separate e-business facilities, while most firms continue to use traditional facilities or retail stores for filling orders (see Table I-6.1).

Outsourcing Web fulfillment has become an alternative for some (18%) both for domestic and international order fulfillment (see Table I-6.2). However, third-party DCs are a more popular alternative for supplier and manufacturer organizations than for retailers.

2. Software Integration

No matter what type of DC you choose, the facility must have its systems integrated with others in the fulfillment process. "Poor systems integration stifles the flow of information in any enterprise, and fulfillment suffers the most because it's the point of integration for almost everything that happens," says Richard T. Roth, managing director for Hackett. "It's this failure to integrate that is keeping products from customers who have expectations now heightened by the speed of the Internet."

Of the companies surveyed by Hackett, 40% have yet to integrate their supply chain systems with their e-business systems, limiting functional effectiveness and hampering information exchange between managers.

3. Information Sharing

Systems integration leads to information sharing. The amount and depth of information that representatives can access determines the level of service that they can give. Most companies provide their call center representatives

with data about inventory, order/shipment tracking, the individual customer, and customer purchase history. Nonetheless, this same information is not readily shared with e-mail representatives, and this oversight is bound to result in competitive weaknesses.

Those that have achieved integration (18%) see a tight relationship between the finance, distribution, transportation, customer relationship management, marketing, and inventory management departments. They are thus experiencing more accurate forecasting and inventory planning.

4. Streamlined Order Processing

Information sharing also streamlines order processing. Even though this improves customer satisfaction, only half of the firms have integrated Web orders into order processing and fulfillment systems. The rest manually enter orders into distribution/fulfillment, order processing/fulfillment, or merchandising systems (see Table I-6.3).

5. Shipping Strategies

Part of streamlining orders is delivering them in the most efficient manner. The majority of companies in the Hackett study say that they recognize that their distribution strategies must change as e-business heightens customer expectations. However, 73% have not changed their traditional shipping methods, and most require more than three days to complete product fulfillment.

“Successful companies will facilitate the shipping of individual orders, track those shipments, and ensure accurate and timely delivery,” says Bill Blumberg, national director of consumer business for Deloitte and Touche.

Table I-6.3 Web Integration Activities (%)

	<i>Total Sample</i>	<i><\$25M</i>	<i>\$25M–\$100M</i>	<i>\$101M–\$500M</i>	<i>\$501M–\$1B</i>	<i>>\$1B</i>
Manually entered into distribution/fulfillment system	19	33	19	8	17	6
Manually entered into processing/fulfillment system	41	44	44	42	42	31
Manually entered into merchandising system	5	4	—	4	17	—
Web site integrated into processing/fulfillment systems	36	15	25	62	33	50

6. Full-Time Leadership

Of course, none of the above can occur without strong leadership and a belief in the project. Not convinced that the Internet will affect their business, many firms have organized their e-business efforts halfheartedly. Half (48%) of respondents to the Deloitte survey have an e-business leader, but few (13%) are full-time. The mean amount of time that e-business leaders devote to e-business is 21%—only one day a week.

Generally, these leaders hold other positions: 32% are from senior management, and 23% hold vice president titles. Smaller companies (less than \$25 million) usually task senior management with e-business. As companies grow in revenue, e-business leaders fall into the realm of directors and managers. Among companies with revenues of \$101 million to \$500 million, 41% of e-business leaders are directors (24%) or managers (17%). Among firms over \$1 billion, e-business responsibility belongs to senior management (24%), vice presidents (19%), directors (33%), and managers (14%).

In addition, one quarter of respondents have one or fewer full-time e-business staff members; only 7% have five or more. Among larger companies, 35% field teams of five or more, and firms below \$1 billion dedicate one or no full-time resources.

OUTSOURCING E-LOGISTICS ALLOWS YOUR DOT-COM TO FOCUS ON THE CUSTOMER

With customers looking for reassurance that delayed e-commerce fulfillment is a thing of the past, many e-logistics providers are striving to fill an unmet demand for effective back-end outsourcing services.

“There is an exploding opportunity in both the B2C [business-to-consumer] and B2B [business-to-business] e-commerce logistics spaces,” says Ting Piper, senior analyst with International Data Corp (IDC; Framingham, Mass.; 508-872-8200). “On the B2C side, you have players ramping up to provide one-stop-shop solutions, as well as niche players addressing individual logistics components, including shipping, order processing, fulfillment, and returns management. Meanwhile, on the B2B side, logistics is heating up as well. Here, the prospect of reducing costs and enhancing utilization in a collaborative, information-based environment is creating an e-logistics opportunity that is about to explode.”

Succeeding in e-commerce requires mastering both the front and the back end of selling products online. But because the back-end process is a

E-Logistics Services Emerge

USFreightways Corp. (Chicago, Ill.; 773-824-1000) decided to seize the opportunity by launching a business unit dedicated to online retailers that manage warehousing, distribution, and delivery of merchandise to consumers.

PFSweb, Inc. (Plano, Texas; 888-330-5504), offers e-logistics services to e-tailers such as American Eagle Outfitters, Hewlett-Packard, and Daisytek International.

Electron Economy, Escalate, Inc. (Redwood Shores, Calif.; 650-769-9300), Ingram-Micro (Santa Ana, Calif.; 714-382-2692), and Fingerhut Business Services, Inc. (Minnetonka, Minn.; 612-932-3529), sell themselves as one-stop-shop solutions for companies that want their orders managed from the second the consumer hits the “buy now” button to the time product is delivered to the consumer’s front door.

more complex operation, involving inventory management, system integration, order fulfillment, billing and business reporting, mastering it poses the bigger challenge to most dot-com firms. Supporting this is recent industry research that states that back-end logistics functions are now a huge barrier to gaining and keeping online customers.

Help is now on the way, however. A growing market of e-business third-party providers can manage the entire back-end process for you, freeing you up to concentrate on customer relationships (see sidebar).

Outsourcing with the Customer in Mind

“Many dot-coms will very soon realize that building a cyber business involves much more than spending millions of dollars on marketing and advertising,” says Piper. “In a world of at-home delivery, the logistics industry is what makes e-commerce possible.”

In the case of Egghead.com, a provider of computer and related products, e-logistics solution provider Electron Economy (Cupertino, Calif.; 408-873-3270) will audit the entire transportation management network.

Prior to working with Electron Economy, Egghead.com used a manual process to match invoices to shipments in order to ensure that service-level agreements were being met and to determine real freight costs.

“We can now audit freight and transportation costs and measure delivery service effectiveness to ensure that we are using the most effective and

efficient distribution network possible,” says Norman Hullinger, senior vice president of sales and operations for Egghead.com.

San Francisco-based Basement.com is an online shopping mall whose vendors continually lower the prices of their goods and services. This complicates e-commerce management, so the company decided to seek an outsource provider that could monitor operations and continually achieve optimal efficiency, explains Steven Lee, CEO of Basement.com. “We now get a real-time window into the supply chain, enabling proactive customer and vendor communications.”

HardCloud, an online retailer of sports and adventure products in Palo Alto, California, decided that a third-party logistics (3PL) provider could better manage the e-commerce operations challenge of setting new online retail standards for customer service and fulfillment.

“Our audience demands a high-impact, energy-driven experience when visiting our site and has little patience for nonintuitive site navigation,” says Robert Balmaseda, vice president of production and community at HardCloud. “We relied on our outsource provider to mask the logistical complexity under the surface so that we can focus on getting our site up and running quickly while maximizing service.”

Finally, Los Angeles-based style365.com, an integrated site with a directory of stylish names, products, and services, must filter through volumes of online information to offer consumers the time-pressed data for which they are looking. At the same time, upscale goods often have special requirements associated with warehousing, fulfillment, shipping, and delivery. The retailer chose to outsource its operations infrastructure, allowing the company to focus on “building strong relationships with customers,” says Kathy Prost, chief merchandising officer.

“To compete and win in the Internet economy, online retailers need a robust logistics infrastructure in order to deliver an easy and enjoyable purchase experience for their customers,” adds Vincent Gulisano, executive vice president of Electron Economy.

What You Can Outsource

The potential to strengthen customer relationships is the primary reason that the current e-logistics outsourcing market is growing. Research from Northeastern University (Boston; 617-373-4813) and Benchmarking Partners (Cambridge, Mass.; 617-679-7687) shows that the use of 3PLs for electronic commerce is expected to increase significantly in the next few years.

Table I-6.4 Logistics Managers' Ratings of 3PL Providers' Role in E-Commerce Strategies (%)

	<i>Now</i>	<i>Next Year</i>
Very important	15	54
Important	35	26
Minimally important	32	11
Unimportant	18	9

Source: Northeastern University and Benchmarking Partners.

Logistics managers were asked if their company was currently involved in e-commerce and how important 3PL providers would be in supporting their e-commerce strategies. Although 50% said that 3PLs are currently important or very important in supporting those strategies, that percentage will increase to 80% next year (see Table I-6.4). At the same time, the percentage of users who classified 3PLs as minimally important or unimportant in supporting EC strategies has been expected to decline from 50% to 20%.

Similar research from IDC shows that retailers are interested in outsourcing several logistics areas, including order management, fulfillment, and delivery activities. IDC found that 81% of respondents manage orders in-house. However, dot-coms are more willing to outsource order management—33% said that they currently do so. However, return management and fulfillment are likely to take off at a faster speed than are order management and delivery services.

Customizing Outsourced Logistics

No matter what you want to outsource, third-party providers can customize their solutions to fit your specific logistics requirements. “We listened to our customers and created a service offering from which they can easily pick and choose,” says Michael Terrell, senior vice president of the new IM-Logistics division at Ingram-Micro, an e-logistics outsource provider in Santa Ana, California (714-382-2692). “Speed, quality, and scalability are paramount to our daily operation, and our customers can take advantage of this infrastructure to improve their business operations in the critical area of logistics, especially for e-business.”

Providers develop a customized solution through a detailed analysis of your business, which can include

1. *Needs assessment and design.* The 3PL will analyze your business needs and review current business practices and goals. An operations management strategy is put together based on the number of stock keeping units (SKUs) you ship, your product offering, customer relationship practices, the way in which you want to handle back orders, and other relevant business practices.

2. *Logistics partners.* A 3PL will select business partners that fit your business from warehousing to customer service.

3. *Integration and implementation.* Electron Economy coordinates the design and build of the logical warehouse and connects it to the physical warehouse, integrates it to other logistics partners' systems and to the customer service call center, and connects it with any operations you plan to maintain in-house.

4. *Client operations.* Once the system has gone live, a client operations team will take over the e-commerce operations. This includes interacting with logistics partners.

SIX FEATURES TO LOOK FOR IN A WEB-BASED PROCUREMENT SOLUTION

The costs of conventional procurement processes can average \$50 to \$250 per transaction, but these costs can be reduced to the range of \$5 to \$20 using Web-based procurement solutions. These solutions automate routine purchases, direct purchases to preferred suppliers, and create worldwide supplier trading communities.

Here are six of the most important features that logistics managers should look for in a Web-based procurement solution.

1. *Give the customers a voice.* When considering how to do business online, companies need to address the amount of power that customers should have in the decision-making process. When asked how important the customer is in Web-based procurement, nearly half of the respondents to a survey from Zona Research (Redwood City, Calif.; 650-298-4000) considered them somewhat or extremely important (see Table I-6.5). Almost 28% were fence sitters who considered it neither important nor unimportant, and about one quarter said it was somewhat or extremely unimportant.

Typically, smaller firms tend to be better tuned to the needs of the customer, partly as a matter of survival. Because small firms may have difficulty

Table I-6.5 Zona Research Survey of Logistics Managers (%)

<i>Web Procurement Solutions Should Permit Customer-Defined Purchase Decision Rules</i>	
Extremely unimportant	8
Somewhat unimportant	12
Neither important/unimportant	24
Somewhat important	19
Extremely important	23
<i>Web Procurement Solutions Should Support Dynamic Online Catalogs</i>	
Extremely unimportant	5
Somewhat unimportant	21
Neither important/unimportant	21
Somewhat important	21
Extremely important	18
<i>Web Procurement Solutions Should Be Tailored for Specific Industry or Vertical Needs</i>	
Extremely unimportant	4
Somewhat unimportant	13
Neither important/unimportant	19
Somewhat important	19
Extremely important	28
<i>Web Procurement Speeds Requisition and Order Fulfillment Cycles</i>	
Extremely unimportant	3
Somewhat unimportant	3
Neither important/unimportant	14
Somewhat important	29
Extremely important	42
<i>Web Procurement Permits More Efficient Use of Preferred or Best Suppliers</i>	
Extremely unimportant	2
Somewhat unimportant	11
Neither important/unimportant	23
Somewhat important	30
Extremely important	23
<i>The Price of My Organization's Web Procurement Matters More Than Features and Contract Length</i>	
Extremely unimportant	2
Somewhat unimportant	19
Neither important/unimportant	27
Somewhat important	27
Extremely important	9

Source: Zona Research.

matching the lower prices that their larger counterparts can offer, they can differentiate themselves by offering customer-defined purchasing. Giving the customer a voice can prevent their migration to competitors.

2. *Support online catalogs.* To keep current inventory levels, managers are seeking procurement solutions that support online dynamic catalogs. Solu-

tions that can be automatically updated will eliminate the customer's going to the competitor because of an out-of-stock situation. According to the Zona survey, 45% felt that it was somewhat or extremely important for solutions to support dynamic catalogs.

3. *Tailor solutions to industry needs.* Company- or industry-specific solutions are a prime element of effective Web-based procurement. When asked if Web procurement solutions should be tailored for specific industry or vertical needs, 57% said that the feature was somewhat or extremely important, whereas over 20% considered it to be somewhat or extremely unimportant. The remaining 23% believed that such features were neither unimportant nor important.

Lack of support for industry-tailored solutions came predominantly from companies with more than 1,000 employees. Because many large enterprises, such as those in manufacturing, procure bulk materials via pre-arranged contracts with preferred suppliers, they may find that the options facilitated by tailored solutions are of little benefit. On the other hand, small businesses with limited resources seek the best possible ways to reduce costs and locate the vendors that are best suited to meet their needs. In this case, they would find the range of supplier and product options offered by tailored procurement solutions to be a perfect match for their needs.

4. *Increase speed of order cycles.* The shortening of order cycles was more important for Web-based procurement than were whatever savings that might be achieved. The reason was that timing of order cycles is often part of a complete maze of project management delay times that can determine whether the product is delivered on time.

As such, half the respondents thought that speeding cycle times was essential to Web-based procurement. Another 47% need a bit more convincing, in that they either somewhat agree or neither agree nor disagree. Only 6% of the respondents disagreed with the fact. This subset, researchers believe, represents a combination of those whose procurement process is relatively simple.

5. *Use suppliers more efficiently.* Probably the most revolutionary element of Internet business processes is the ability to link organizations with their partners and customers effectively, regardless of their locations or schedules. Thus it is not surprising that when managers were asked if they thought Web-based procurement permits more efficient use of preferred or best suppliers, 60% agreed completely or somewhat. One in four neither agreed nor disagreed, and only a combined 14% disagreed somewhat or completely.

Table I-6.6 Web-Based Procurement Solution Providers

Oracle Corp., 500 Oracle Parkway, Redwood Shores, CA 94065; 650-506-7000.
American Management Systems, Inc., 4050 Legato Road, Fairfax, VA 22033; 703-267-8000.
Process1.Net Ltd., Bank Chambers, 29 High Street, Ewell, Surrey KT17 1SB, UK; 0181 786 3643.
EDS, 5400 Legacy Drive, Plano, TX 75024-3199; 972 604-6000.
TradePath Technologies, LLC, 1690 Enterprise Way, Suite A, Marietta GA 30067; 800-755-3033 or 770-612-1205.
Compaq Computer Corp., Houston, TX; 800-888-0220.

6. *Establish the right price.* More than four out of 10 respondents said that they somewhat or completely agreed that price is the most important criteria they consider when making a decision about their Web procurement solution. One in four believe that product features and length of contract with the vendor are more important than price. Respondents indicate that they need some handholding during the purchasing process and rely on the solution provider to tailor systems and point out what the buyer really needs.

A representative list of procurement solution providers appears in Table I-6.6.

ERP PAYBACK CALCULATION MUST INCLUDE PROCESS IMPROVEMENT AND SAVINGS

Logistics managers who focus ERP return on investment (ROI) measures solely on cost reductions may miss the forest for the trees. It is as productive, if not more so, to assess the process improvements that result from the ERP and instill the need for ongoing performance improvement at all levels. To broaden the way you measure success of your ERP solution, we suggest that logistics managers heed the following points identified by AMR Research, Inc. (Boston; 617-542-6600), before embarking on an ERP implementation.

1. *Realize that process improvement can reduce costs and create competitive advantage.* Effective processes should always be the goal, and the most important processes are those that touch the customer. Some goals that managers identify for process improvement are to reduce transactions and eliminate non-value-added steps, to shift transaction costs through supplier and cus-

tomers self-service functions, to improve asset utilization through reduced cycle times, and to assign process owners and organizational responsibilities. One company reports a 300% ROI in the first 12 months after start-up, attributing its success to a focus on on-time delivery and replenishment.

2. *Remember that performance improvement ensures focus and efficiency.* To show the value of the ERP implementation, managers must demonstrate ongoing progress in critical performance measures to gain and maintain senior-level support. Create performance metrics that measure the customer's perceived benefit or expectation. Order fulfillment and customer response time are two examples of good performance measures.

3. *Recognize that ERP payback is not all about money.* Many consider the payback of the full ERP implementation to be realized through cost savings, but the real payback comes through improved corporate productivity that supports increased sales, readiness to change, and streamlined processes for a speed-oriented marketplace.

4. *Identify business strategies.* Your vertical industry will determine the business strategy. Strategies can include low-cost production, fast order fulfillment, fastest time to market for new products, best customer service, product performance and reliability, and customized products. An essential task in business case development for ERP investments is to assess the potential benefit that results from the strategy. Realize also that the benefit derived from the ERP will not occur overnight, so you should not set expectations too high and risk losing executive support for the project.

5. *Identify required processes.* Break the strategy into processes that enable the company to improve and succeed. This will help you monitor and measure the process to a detailed level for easier tracking. Examples include return on assets at plant and corporate levels; product profitability; sales by person, region, and product; sales by channel; profitability by customer; margin by product and channel; and incremental sales by customer.

6. *Create meaningful KPIs.* Managers must collect benchmarking data and determine which measurements will most closely track the progress of creating a process advantage. During the information-gathering phase, assess the potential and achievable goals for the process.

7. *Monitor processes.* Develop self-monitoring processes as part of the ERP implementation. While ERP applications are just beginning to address KPIs at the process level, reporting tools and other capabilities can be applied to monitor process improvement.

LOGISTICS MANAGERS' NEEDS INCORPORATED INTO NEW PRODUCT DEVELOPMENT SOFTWARE

Logistics managers' needs are being tightly integrated into new product development (NPD) projects and various software applications. Why? Because supply chain considerations have become so critical to the NPD process. The following sections describe some of the leading NPD programs and the way in which they are incorporating logistics.

Supply Chain Planning Systems Analyze Designs

One of the difficulties in strategic planning of new products consists of analyzing the supply chain implications of design options. Some of the supply chain planning vendors traditionally known for Advanced Planning and Scheduling (APS) in the manufacturing supply chain are expanding their applications into the development phase of a product's lifecycle, making these a valuable tool for NPD strategic planning by providing what-if analyses of proposed designs. They allow visibility across the product lifecycle, including visibility into effects on downstream supply chain for distribution, service, and end-of-life transitioning of products.

Supply chain planning vendors providing expanded applications include the following:

- i2 Technologies, Inc. (Irving, Tex.) has added the Product Lifecycle Management (PLM) module to its Rhythm product suite. PLM allows the supply chain planning process to begin at the product development stage. Modules include Requirements Planner, Portfolio Planner, Design Optimizer, Development Scheduler, and Transitional Planner.

- Adexa, Inc.'s (Los Angeles) iCollaboration product manages the NPD process across the product lifecycle. A Product Design module develops resource requirements and optimizes the allocation of those resources. The global Strategic Planner module allows a strategic view of developing new products. Marketing, sales, development engineering, executive management, and other departments can view and share the information.

ERP Applications Prove Invaluable for Inventory

ERP applications are also a critical tool for NPD. Their strength in inventory management provides logistics people with the capability to leverage financial data about inventory. Some solutions include the following:

- Oracle (Redwood Shores, Calif.) provides Oracle Projects to help manage project activities. Reporting capability is available for project costs, allowing analysis of actual versus budgeted expenditures.
- SAP AG (Walldorf, Germany) has expanded its *R/3 Project System* into the NPD arena as part of its PLM application.

View Products via Portfolio Management

Portfolio management applications provide a view of all products under development. They allow managers to assess project status quickly in terms of risk, resource allocation, schedule, and benefit. Portfolio management vendors include the following:

- Integrated Development Enterprise, Inc.'s (Concord, Mass.) IDweb defines the critical information needed from the project teams. Managers can see resources and allocate resources. The data required to drive the application are entered manually.
- XIS, Inc. (San Francisco) developed Novare. Lights indicate the status of project schedules.

Track Project Status

Project management applications are ideal for tracking project status and focus on resource requirements and task and schedule status. Enterprise project management applications include the following:

- Primavera Systems Inc.'s (Bala Cynwyd, Pa.) Concentric provides project planning and cross-project viewing of resources, cost, cash flow, and earned value.
- Artemis Management Systems' (Boulder, Colo.) Views provides enterprise multiproject analysis and a link to Microsoft Project for more detailed scheduling activities.
- Nemosphere, Inc.'s (Palo Alto, Calif.) Enact Enterprise System is a Web-based project management application that helps dispersed teams collaborate.
- Framework Technologies Corp.'s (Burlington, Mass.) ActiveProject, also a Web-based application, provides teams with access to schedules, documents, and other information. Documents can be marked up with comments to share with team members.

- Vite's (Palo Alto, Calif.) Vite Project is a desktop application that runs on Microsoft Windows. It is used for strategic planning rather than for tracking project status. The application is used to identify bottlenecks and potential failures based on the skills of the assigned resources.

Requirements Management Deters Failure

If a project does not meet the initial specifications defined at the start, it is a failure. Thus, requirements management software applications should be used to define the customer specifications of the product or service and track changes throughout the life of the project.

- Quality Systems & Software, Inc. (Mt. Arlington, N.J.) offers Enterprise Doors, a Web-based decision-support tool.
- Technology Builders, Inc.'s (Atlanta, Ga.) Caliber RM helps define the expectations and goals of a product at conception and in tracking how well requirements are met throughout the project.

Visibility throughout the Project

Vendors are now providing ERP capability to allow managers to see within and across projects.

- ELabor.com, Inc. (Camarillo, Calif.) offers eLabor Project with expanded time and attendance capability. An EP Vision module allows multi-level viewing across projects to see capacity, cost, performance, revenue projections, and resource availability.
- PlanView, Inc.'s (Austin, Tex.) PlanView provides project and resource management based on the collection of time and labor from project members.

PLM applications allow the enterprise access to all product-related information. They handle the configuration of products, storage of product documents, and bills-of-material and maintain the definition of the product at each phase of its life. Vendors include the following:

- MatrixOne, Inc.'s (Chelmsford, Mass.) eMatrix models a variety of business process flows. It is built on an Oracle database, allowing the applications to share information easily at the database level.

- Eigner + Partner AG (Karlsruhe, Germany) takes a project approach to managing information in its CADIM product. Advance Resource Planning and Configuration Management modules provide the capability to calculate resource requirements and project length using a spreadsheet format.

Other applications in this category include Unigraphics Solutions, Inc.'s (Maryland Heights, Mo.) iMAN, PTC's (Waltham, Mass.) Windchill, and Structural Dynamics Research Corp.'s (Milford, Ohio) Metaphase. All have workflow and configuration management functionality that allow the capture of detailed product data.

Collaborating during Development

Collaboration applications are important for routing information to team members and for fostering communications during the development process. Vendors include the following:

- NexPrise, Inc.'s (Santa Clara, Calif.) ipTeam lets extended project teams collaborate on development projects. The iTracker module provides a user-configurable dashboard to view project performance indicators. Project Center provides a central Web portal for accessing all project activities and to organize team access privileges.

- CoCreate Software, Inc. (Fort Collins, Colo.) offers a series of products that allow real-time Web-enabled design collaboration.

- Enovia Corp. (Charlotte, N.C.) provides a group of design applications in its Enovia Portfolio to allow real-time collaboration.

- Lotus Development Corp.'s (Cambridge, Mass.) Notes/Domino recently added messaging and scheduling for collaboration.

- Microsoft's (Redmond, Wash.) Exchange/Outlook provides a scalable messaging platform and basic collaboration.

- Novell, Inc.'s (Provo, Utah) GroupWise has document management and work-flow capability. It is a good choice for corporations that have standardized on Novell for their network operating system.

- eRoom Technology, Inc.'s (Cambridge, Mass.) eRoom is a Web-based product targeted to highly distributed development teams. Real-time asynchronous discussion is provided.

Chapter I-7

Warehouse Management

HOW EFFICIENT IS YOUR WAREHOUSE NETWORK? FREE ANALYSIS AVAILABLE

In a quandary of where to locate that distribution center (DC) or warehouse? One resource you might want to consult is the *Ten Best Warehouse Networks* (see Table I-7.1), which lists ideal locations based on population statistics. “The networks listed are considered ‘best’ since they represent the lowest possible average distances in a network,” says Terry Harris, managing partner at Chicago Consulting, creator of the “10 Best” list.

For instance, the “recommended” three warehouse network would have facilities located in Allentown, Pennsylvania; Paducah, Kentucky; and Fresno, California. According to the data, these sites have the lowest-possible average distance to the U.S. population: 378 miles.

Free network evaluation for IOMA readers. For years Harris has offered readers the opportunity to avail themselves of a free evaluation of their networks. “An individual company’s warehouse should be designed to be low cost and to serve their specific customers, which may be different from the U.S. population,” he told IOMA.

For your free evaluation, mail your warehouse locations to Harris. “We’ll compute the service the network provides, contrast it with the ‘10 Best,’ and determine where the next warehouse should be located,” he offers. Additionally, he will explain what additional service you would achieve with this, and even recommend which warehouse you can eliminate from the network.

Send your warehouse network information to Terry Harris, Managing

Table I-7.1 The 10 Best Warehouse Networks

<i>Number of Warehouses in the Network</i>	<i>Shortest Average Distance to the U.S. Population (miles)</i>	<i>Best Warehouse Location</i>		
One	859	Terre Haute, IN		
Two	490	Chillicothe, OH	Fresno, CA	
Three	378	Allentown, PA	Paducah, KY	Fresno, CA
Four	322	Caldwell, NJ	Cincinnati, OH	Dallas, TX
Five	268	Summit, NJ	Macon, GA	Gary, IN
		Dallas, TX	Stockton, CA	
Six	241	Summit, NJ	Macon, GA	Gary, IN
		Dallas, TX	Alhambra, CA	Oakland, CA
Seven	222	Summit, NJ	Macon, GA	Gary, IN
		Dallas, TX	Alhambra, CA	Berkeley, CA
		Tacoma, WA		
Eight	204	Summit, NJ	Asheville, NC	Lakeland, FL
		Chicago, IL	Dallas, TX	Alhambra, CA
		Berkeley, CA	Tacoma, WA	
Nine	189	Summit, NJ	Gainesville, GA	Lakeland, FL
		Chicago, IL	Dallas, TX	Denver, CO
		Long Beach, CA	Berkeley, CA	Tacoma, WA
Ten	174	Newark, NJ	Gainesville, GA	Lakeland, FL
		Akron, OH	Chicago, IL	Dallas, TX
		Denver, Co	Long Beach, CA	Berkeley, CA
		Tacoma, WA		

Source: Chicago Consulting.

Partner, Chicago Consulting, 8 South Michigan Avenue, Suite 3600, Chicago, IL 60603; 312-346-5080; fax, 312-346-7206. Mention IOMA's *Inventory Reduction Report* newsletter to receive your no-charge evaluation.

FOUR EASY STEPS TO MOTIVATE AND RETAIN YOUR WAREHOUSE STAFF

Logistics managers must continually seek out innovative ways to attract and retain skilled employees—especially for their warehouses. A recent study by

the Warehousing Education and Research Council (WERC; Oak Brook, Ill.; 630-990-0001), *A Guide to Effective Motivation and Retention Programs in the Warehouse*, provides methods for improving productivity (morale and, ultimately, customer satisfaction).

The first step in determining which mix of techniques to use (see Table I-7.2) is to clearly define your goals.

Table I-7.2 Most- and Least-Frequently Used Techniques

<i>Technique</i>	<i>% of Firms Using the Technique</i>	<i>% of Firms Using Technique and Indicating It as Most Effective</i>
Parties/catered lunches	87	26
Company logo merchandise	76	10
Incentives (safety, attendance)	75	32
Company newsletter	70	5
Company service awards	70	7
Formal recognition (plaque)	69	25
Company picnics	69	14
Tuition reimbursement	68	3
Monetary awards	67	58
Birthday recognition	63	6
Holiday gifts	63	11
Formal recognition (ceremony)	60	25
Gift certificates	57	7
Tickets to events	50	3
Personal counseling	48	1
<i>Technique</i>	<i>% of Firms Using the Technique</i>	<i>% of Firms Using Technique and Indicating It as Most Effective</i>
On-site day care	1	67
Mass transportation	4	13
Recreational travel	8	0
Laundry drop-off	9	3
On-site gym/recreation center	13	0
Stock bonuses	14	18
Gifts to family members	17	5
On-site cafeteria	24	6
Career counseling	25	6
Employee-of-the-month awards	29	22
Scholarships	29	2
Financial planning seminars	32	1

Source: Warehousing Education and Research Council.

Getting Management to Understand

An important aspect of any program is getting management understanding and commitment for what you want to accomplish. The management team needs a shared understanding of the importance of motivation and retention and how they relate to the way managers treat associates.

WERC suggests the following guidelines to gain management support:

1. Point out discrepancies between current and desired states. Present data about current turnover rates, productivity levels, morale issues, quality goals, and so on. Discuss how improving the status quo could positively impact organizational results.
2. Discuss the importance of encouraging and reinforcing behaviors that support your mission, values, and objectives.
3. Sensitize management to the rationale for change. Put dollar amounts on the high cost of recruiting and replacing valued associates. Discuss the advantages of a proactive approach to keeping key contributors. Gather benchmarking statistics on turnover rates, productivity levels, and other relevant measures. Compare your organization with others in your industry, size, geographic area, and so on.
4. Communicate realistic, positive expectations about the results of implementing a proactive motivation and retention program. Cite results from other organizations that have made a commitment to valuing associations.

Get Associates Involved

Associates are the best source of information about what will motivate or influence them to stay with a company. How do you find out what associates want? Here are a few common methods of data collection:

- *Questionnaires.* A specific set of written items with open-ended or forced-response questions is distributed. Although questionnaires are relatively easy to quantify and are an inexpensive way to obtain large amounts of data, they are viewed as a cold approach, and response rates may be low.
- *Interviews.* An interviewer asks questions of interviewees (alone or in small groups). Interviews allow you to study a wide range of topics and give you a better sense of the issues impacting associates. However, interviews can

be expensive and time-consuming, and answers will depend on the skill of the interviewer.

- *Observations.* The observer goes on site and watches the work behavior of people on the job. This great way to collect firsthand information could reveal unexpected problems. Pros warn, however, that it can be difficult to interpret what is observed.

- *Organizational records.* The analyst classifies, studies, and interprets the meanings of numbers in records. Examples include turnover data, absenteeism, and filed grievances. Although the numbers tend to be believable and can identify accurate baselines, it may be difficult to locate the data.

A Variety of Techniques

There are various methods for motivating and retaining employees. Your final selection should be based on your ultimate objectives, but you also need to consider what is important to associates. Realize that once a program is put into place, it is very difficult to discontinue its use. Thus, it behooves management to evaluate an incentive or motivational program carefully.

If management recognizes that a particular program is not achieving its goals, it may be necessary to reexamine the goals, evaluate the benefits associated with the program, and analyze the cost/benefit of keeping the program versus discontinuing it. Also, companies may want to examine whether they are using some techniques just because they are “easy.” Company logo merchandise, company newsletters, company service awards, picnics, and birthday recognition are fairly easy to implement and are frequently used, but they are not rated as highly effective.

Cost may be the common denominator of many techniques. For example, incentives such as on-site day care, recreational travel, on-site gym/recreational centers, and scholarships for associates’ children are relatively costly options. However, several respondents who provide day care indicate that it is most effective.

Three Final Bits of Advice

The study suggests that when evaluating current motivation programs, you should keep in mind three key learnings:

1. It is most effective to use several motivation and retention techniques. Think of the program as a portfolio with a variety of methods to tar-

get different needs. Be sure to include a combination of spontaneous informal recognition and rewards, awards for achievements and activities, and formal reward programs.

2. When implementing the motivation and retention portfolio, involve associates. Also, make sure you have items that focus on different elements of the total job situation.

3. When designing techniques, get associate input and feedback. Conduct worker surveys to make sure that feelings and opinions are in sync with management's.

TWO STUDIES IDENTIFY SAVINGS FROM WAREHOUSE SITE RELOCATION AND CONSOLIDATION

A recent study from *Managing Logistics* reveals that one-third of logistics managers have recently moved or redesigned their facilities or will in the next year. The reason: Consolidation has dramatically increased logistics savings. The manager of a beef company in Kansas, for example, says, "We had two distributors move within five miles of our site into a combined warehouse, one for operating and one for repair parts. We worked with them to hold slow-moving items, be a safer control point, and use a JIT [just-in-time] system. The two companies have worked as a true team spawning ideas to make the system work better each month. Savings this year have been at least \$500,000, with more than \$1 million potential for the second year."

Likewise, the vice president of logistics for a generic over-the-counter (OTC) company reveals, "We moved from outside leased space to owned warehouses. Savings have approached \$1.5 million for each of the two facilities."

Indoor Productivity Excels

In addition to financial savings, logistics managers have bolstered productivity since relocating, consolidating, or redesigning sites. "We have increased productivity by decreasing the amount of walking since reorganizing our DC," explains the manager of distribution operations for an Illinois-based automotive parts company. Another manager who redesigned his layout using more racks to increase storage and facilitate a high-velocity picking operation has reduced overtime 25% and cut his labor force 15%.

The vice president of logistics for a construction equipment firm in Iowa has seen an increase in the level of productivity not by redesigning his warehouse but by selecting a new one. “We centralized inventory from multiple sites and streamlined our picking and packing process. We realized a 20% productivity improvement by implementing a Baan ERP logistics module, which has improved data collection and timeliness of reporting.”

Location-Seeking Software

Supporting our findings are the results from a survey that was conducted by Case Western Reserve University and the Massachusetts Institute of Technology and analyzed the use of facility location software. These software programs locate intermediate facilities in the supply chain network: plants, warehouses, pool points, DCs, and cross docks.

The models allow tradeoffs between major costs that affect location (production, warehouse handling and storage, inventory carrying, and transportation) when seeking the proper facility number, location, and size. Restrictions on facility throughput and customer service are also considered. The software may find locations within the accuracy of a three-digit zip code.

Logistics Pros Describe Model Usage

Eight out of 10 respondents reported that they would conduct an analysis of the firm’s warehousing system or distribution network during the next year. Five percent say that they have already done so. When asked if a computerized model would be used to conduct the analysis 73% said yes. Among those who would not be using a model, a few added that their system was “too simple” to benefit from a computerized analysis.

The surveyors also asked respondents to identify the model that they use: 20% are proprietary models, such as from a consulting firm; 18% are using internally developed models; 52% are using third-party models; and 10% are still searching for a model.

The Best and Worst of Them

Logistics pros were also asked to describe what they consider to be the best and worst features of the software models that they use (see Figures I-7.1 and I-7.2 and Table I-7.3). Flexibility, which generally reflected the model’s abil-

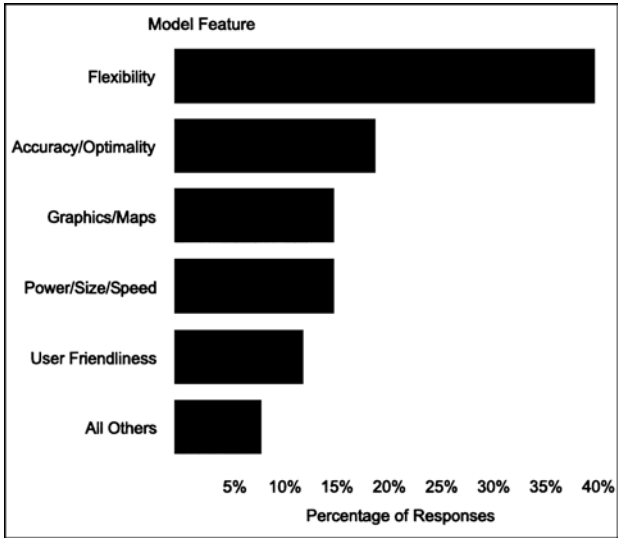


Figure I-7.1 Model Performance: Best Features of Model Currently in Use

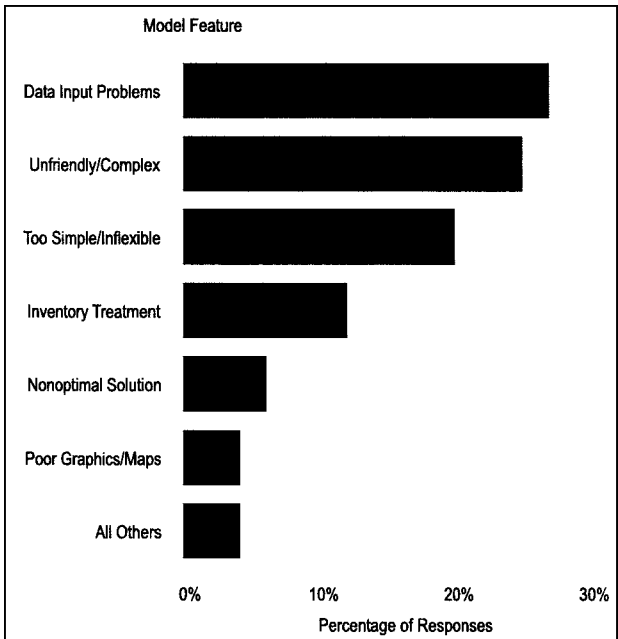


Figure I-7.2 Model Performance: Worst Features of Model Currently in Use

Table I-7.3 Location Software Models

<i>Company</i>	<i>Model Name</i>	<i>Pricing</i>
Herbert W. Davis & Co. One Executive Drive, Suite 2000 Fort Lee, NJ 07024 201-944-5580	ASSIGN	\$15,000/year
CAPS Logistics, Inc. 2700 Cumberland Pkwy. Atlanta, GA 30339 770-432-9955	CAPS Logistics Toolkit	\$60,000–\$85,000
CSC Consulting 5885 Landerbrook Drive, Suite 300 Cleveland, OH 44124 216-449-3600	LOCATE	N/A
KETRON Management Science 1755 Jefferson Davis Hwy., Suite 901 Arlington, VA 22202 703-432-9955	LOPTIS	\$12,200 for license \$2,440 for annual support
Chesapeake Decision Sciences 200 South Decision St. New Providence, NJ 07974 8300-8300-8300	MIMI	\$200,000 for first- year, one-site, one- application license; 15% annual maintenance fee
Ronald H. Ballou Dept. of Operations Research and Operations Mgt. Case Western Reserve University Cleveland, OH 44106 216-368-3808	NETWORK	\$1,500/month or \$12,000 for first year; \$2,400/year for continued lease
Micro Analytics 2200 Clarendon Blvd., Suite 1002 Arlington, VA 22201 703-841-0414	OPTISITE	N/A
Bender Management Consultants 1755 Jefferson Davis Hwy., Suite 904 Arlington, VA 22202 703-412-0840	PHYDIAS	\$25,000 or more
INSIGHT, Inc. 1411 King, Inc. Alexandria, VA 22314 703-683-3061	SAILS	\$9,000–\$14,000 to lease per year
CGR Intl. Ltd. 38 Miller Avenue, Suite 101 Mill Valley, CA 94941 415-381-0338	SITELINK	\$50,000 for DOS and \$65,000 for Windows; Annual lease is 10,000
J.F. Shapiro Associates, Inc. 226 Commonwealth Avenue Boston, MA 02116 617-267-0338	SLIM/2000	\$50,000

ity to do what the respondent wanted, was cited most frequently as the best. The worst features included difficulty generating input data, the unfriendliness or complexity of the model, and poor treatment of inventory and inventory costs in the analysis.

PUT TOGETHER A WMS STRATEGIC PLAN IN ELEVEN STEPS

Even though hundreds of logistics managers will purchase a WMS this year, the power of these systems to reduce errors, increase space utilization, and decrease labor costs will more often than not be offset by lack of a strategic plan. Following is a guideline to help you put together such a plan and ultimately select a WMS solution that will meet your logistics goals.

Step 1. Establish a project team; plan objectives and priorities. Though seemingly obvious, the importance of a cross-functional project team cannot be stressed enough. The team should consist of both warehouse information systems personnel and accounting personnel. The team may also consider bringing in an outside consulting resource if necessary. The team should be limited to around five members who will establish the objectives and priorities of the warehouse strategic plan. The team will quantify these objectives and priorities to guide final selection. Finally, the team will obtain a consensus on the objectives, priorities, and evaluation criteria.

Step 2. Establish a database. You will need the following data:

- Planning horizon (5 years)
- Growth (sales and product)
- Receiving and shipping requirements
- Storage and throughput requirements
- Control system requirements
- Operating procedures
- Present warehouse layout
- Material flow volumes
- Unit load definitions
- Present operating cost

- Economic evaluation criteria and factors
- Present storage, picking, and packaging procedures
- Order profiles
- Activity-based costing (ABC) analysis (velocity movement of product by number of times picked)

Step 3. Identify and document alternative warehouse strategic plans. After the database is established, you should consider material handling, storage, and control systems. The methods of receiving, storing, picking, packaging, and shipping, along with the quantity of stock keeping units (SKUs) in all locations, should be questioned. Creativity, innovation, and practicality should be pursued when making your plan. Various operating and material handling systems, as well as storage/handling systems, should also be considered.

Step 4. Evaluate alternative warehouse strategic plans. Define the investment, installation, and operating costs for each alternative plan. Perform an after-tax economic analysis of each alternative plan. Select the best warehouse strategic plan based on the overall economic and qualitative evaluations. Qualitative factors are flexibility, expandability, safety, security, integration, and ease of implementation. The project team should determine these factors.

Step 5. Specify the plan. The warehouse strategic plan must clearly illustrate the material handling systems, storage systems, and control systems. This step should result in a detailed document that will be helpful if the team is required to present their recommendations to senior management. The document will detail the four previous steps.

Step 6. Establish a bidder's list. Contact the appropriate equipment and system vendors and establish a qualified list of three to five vendors for each.

Step 7. Develop and release equipment and system functional specifications. An equipment and system functional specification is a document that clearly and logically defines the required functionality and bid requirements for the equipment and systems. The document ensures that all vendors provide an equal level of functionality for the quoted price. The company or its representative prepares the document and then sends it to the appropriate vendors. The vendors then respond with a proposal that addresses all areas of the document. Documents can range in size from 10 to 80 pages, depending on the complexity of the required equipment or systems.

Be sure to provide functional equipment and system specifications with information including the following:

General requirements

- Company description
- Quantity
- Dimensions
- System overview
- Features and options

Operational requirements

- Performance
- Capacities
- Throughput

Definition of functional areas of the warehouse

- Receiving
- Putaway, storage, and replenishment
- Order initiation and picking
- Shipping
- Miscellaneous functions (returns, cycle counting)

Integration and interface requirements

- Communication protocols
- Mainframe interface requirements

Software and hardware requirements

- Reports and inquiries
- List of hardware and software
- System development and implementation requirements
- System performance

Project guidelines

- Training
- Maintenance

- General instructions to bidders
- Terms and conditions
- Pricing format
- Schedule requirements

Step 8. Vendor interaction. The team will provide input to vendors during the bid process. The vendors should be allowed four to six weeks to complete the bid process. Items include the following:

- Respond to questions during the bid process
- Receive bids

Step 9. Coordinate site visits. The team will establish dates for vendor site visits and document the requirements of equipment and system demonstrations.

Step 10. Evaluate and select vendors. The team will perform an analysis of the equipment and system bids.

Step 11. Finalize layout. Redesign the conceptual layout based on selected vendors' feedback. Lay out the facility to maximize storage and minimize congestion. Show details and dimensions on layout for items such as staging lanes, aisles, section views of storage equipment, forklift maintenance areas, and lighting requirements.

After the above 11 steps are completed, the team is now ready to consider implementation and execution. For more information, contact Tompkins Associates, Inc., at 919-876-3667.

A LESSON IN CUSTOMIZED WAREHOUSING FOR THE STILL-SKEPTICAL MANAGER

Although the concept of customized warehousing—storing generic product in the warehouse until receipt of a customer demand—is not new, the logistics community has been slow in adopting this practice. This is possibly due to a lack of understanding in its implementation or because logistics managers are still skeptical of its merits, the basics of which appear in a special report by the WERC (630-990-0001), *Enhancing the Warehouse's Role Through Customization*.

Shift from Production to Warehousing

Customized warehousing blurs the line of responsibility between manufacturing and warehousing. Tasks that the factory completes will be moved to the warehouse, resulting in significant changes in four areas:

1. *Facilities.* Due to manufacturing's producing generic product, there will be a simplification of manufacturing and a reduction in the amount of space required for finished goods. At the same time, the warehouse will need more space for customization. This may include storage space for labeling, wrapping, packaging, and manufacturing supplies; working space for staging, palletizing, kitting, painting, plating, pricing, packaging, and assembling; and flexible space for continuous evolution of customized warehousing.

2. *Equipment.* As a result of changing storage requirements and the addition of some manufacturing functions to the warehouse, new equipment will be required for customized warehousing. Depending on the customization to be provided by the warehouse, the equipment must be as flexible as necessary.

3. *Technology.* To handle the demands of customization, the warehouse must have a real-time, bar code-based, radio frequency (RF) communication WMS. In addition to the typical WMS functionality, the customized WMS must have the functionality to kit materials required for customization, to schedule production tasks through a bill of material processor, and to track work in progress.

4. *Labor.* Depending on the specific customized warehousing design, more labor may be required, and in some cases, less labor. Nevertheless, it is clear that enhanced skill sets and levels of flexibility will be required. Some production workers may be transferred to the warehouse to perform the tasks that have shifted from production to the warehouse.

Pursuing Customization

Successful customized warehousing applications should be based on a Customized Warehousing Strategic Master Plan. Following are the seven steps in developing such a plan:

1. *Understand the current status of customization and customized warehousing.* As a baseline to the Master Plan process, the following questions should be addressed:

- What breadth of SKUs is presently being offered?
- What additional breadth of SKUs have your customers requested?
- What additional breadth of SKUs is marketing requesting or considering?
- What customization is presently done in the warehouse?

2. *Establish objectives, priorities, and evaluation criteria.* Interact with company leadership to establish the short-term, midterm, and long-term objectives of customized warehousing. Understand the organization's priorities with respect to customer service, competitive threats, weaknesses, strengths and opportunities, inventory reduction, capacity constraints, and other factors that may impact the strategic direction of customized warehousing. At the same time, understand the evaluation criteria to be used in analyzing alternative levels and approaches to customized warehousing (see step 4).

3. *Establish a database.* Obtain the following operation information:

- Market forecast for overall business and SKU growth
- Twelve-month production schedule
- Twelve months of orders to determine order profile and ABC analysis
- Identify product characteristics (unit load definitions)
- Current facility layout, site plan, and restrictions
- Current operating costs
- Economic evaluation criteria and factors
- Current storage, picking, and packaging procedures
- Monthly view of inventory levels by product for one year
- Level of computerization utilized in the warehouse

4. *Identify and document alternative customized warehousing strategies.* Using the data that have been gathered, determine what is common among the various product offerings. Then, analyze the production process to determine at what point customized warehousing would be most beneficial and least disruptive.

Investigate alternative customization approaches, including the development of requirements for equipment, materials, labor, systems, and capital dollars. With each alternative, review the customization process to determine the cycle time, and then compare it to the current order lead time.

Based on this analysis, determine the correct mix of generic product to

finished goods inventory. Once the mix is determined, project the appropriate levels of inventory. Based on these projections, develop alternative storage configurations and define space, equipment, and personnel projections for each alternative.

5. *Evaluate alternative control system strategies.* Evaluate the alternative WMS strategies available that meet the customized warehouse's overall functionality. Ensure that the WMS can incorporate a production scheduling function. It is critical that a bill of materials is established. Determine the costs of pursuing with the existing WMS or buying and interfacing to another solution.

6. *Evaluate alternative Customized Warehousing Strategic Master Plans.* Define the investment, installation, and operating costs for each alternative plan. Perform an after-tax economic analysis and a qualitative analysis of each. Select the best Master Plan based on the overall economic and qualitative evaluations.

7. *Develop an action plan.* The selected Master Plan must be translated into a firm action plan. The action plan must be time-phased and clearly illustrate the material handling systems, storage systems, production and packaging systems, and material control systems for the recommended Master Plan.

Making It Work

James A. Tompkins, who wrote the WERC Special Report, points out how various manufacturers have made customized warehousing work for them. The case of SureLock, Inc., a small appliance manufacturer, is particularly interesting. This manufacturer has experienced steady growth of 15% per year, which has impacted operations in several ways:

- *SKU proliferation.* An original 17 designs exploded to 75, and each has a variety of models, which have also increased. There are now over 700 different SKUs.
- *Scheduling/productivity/capacity.* The manufacturing operation, designed to accommodate up to 20 designs, has exceeded capacity. In addition, the production line was designed to produce large batch runs of a single design. Low-volume and high variability are the new requirements, resulting in numerous short runs and changeovers.

- *Inventory.* The SKU volume and mix have generated high inventory levels and low inventory turns. The company faced having a warehouse full of the wrong product.

- *Product repack/damage/dunnage removal.* To meet customer requirements, the warehouse often had to pick existing SKUs, unpack them, tear them down, remanufacture the appliance, and then repack and ship the product. This was very time-consuming and required products to be handled multiple times, often resulting in damaged product.

- *Customer delivery.* Fifteen percent of customer orders were shipped short, resulting in a significant amount of charge-backs.

After recognizing that the cost of continuing business in the current format was impossible, customized warehousing was considered as an alternative. Several product lines were identified as candidates for generic production. For one, Class B, customization was limited to promotional stickers, with the outer carton remaining the same. The Class A products required a variety of alternative lockout devices and handles.

Class A products, which require additional manufacturing, were taken to the warehouse as soon as generic assembly was complete. The generic product would be stored in collapsible pallet bins in the warehouse until shipment. Class B products are assembled and stored in generic cartons, palletized and put away until an order is received. At that point, final assembly steps are completed, and the product is shipped. Because the current order lead time is five days, all inventory within SureLock's warehouse is generic, allowing final assembly to occur while still meeting customer requirements.

For SureLock, customized warehousing has had a positive impact on the business because

- it circumvented the bottleneck at process and inspection for high-volume, high-variability items
- it minimized the impact of continued SKU proliferation and occurrences of the warehouse being full of the wrong SKUS mix
- it reduced the number of charge-backs from customers, the amount of damage/repair/rework, and the amount of obsolete inventory and slow movers

TEN STRATEGIES FOR MAKING WAREHOUSE OPERATIONS A SUCCESS IN THE TWENTY-FIRST CENTURY

Warehousing in the new millennium requires that logistics managers put into practice everything from customer service partnerships to cross docking and electronic data interchange (EDI). A recent report from Tompkins Associates (Raleigh, N.C.; 919-876-3667), *10 Trends Warehouses Must Follow for 21st Century Success*, highlights the top ten tactics that managers must incorporate into their warehouse organizations.

1. *A focus on the customer.* Successful firms will talk and listen to customers and develop true partnerships with suppliers and customers, benefiting from information sharing, joint planning, and win-win agreements. These firms also understand that warehouses must add value by being efficient and responsive to customer needs.

2. *Compression of operations and time.* The trend toward more frequent shipments and more activity in receiving, putaway, picking, and shipping will place greater demands on material handling systems. In addition, the trend toward consolidation will require bigger DCs to process more orders per day.

3. *Continuous flow.* The focus will be on pulling product through the logistics system and avoiding huge inventories.

4. *Cross docking.* Streamlining shipping and receiving operations is among the top five ways that managers use to control logistics costs, according to recent *Managing Logistics* data. Cross docking is the common tactic that companies use to facilitate those activities.

Tompkins points out that fewer warehouses handling more orders will transform most operations to cross-docking practices. Collaboration and the ability to exchange information in real time will facilitate handling product in this manner.

5. *Electronic transactions.* Implementing a paperless warehouse can simplify and streamline tracking. Electronic data will increase tracking capabilities and reduce overall labor requirements and training. Electronic control systems can eliminate secondary data entry delays, update inventory, and make product available when received. These systems can then allocate inventory to either pick locations or bulk storage locations upon receipt of confirmation. Electronic transactions between companies will continue to

provide huge opportunities, linking warehouses to suppliers and other distributors.

“We are expanding our EDI capabilities,” says an inventory manager for an Illinois-based electrical supplier. “We service 115 locations in 25 states. Our efforts are to reduce cycle time—the time from when an order is placed to when the invoice is paid. With the expansion of our EDI software, we can reduce that time.”

6. *Customized warehousing.* Compliance labeling, dunnage, palletization, and on-demand packaging are just some of several customized services essential to warehousing. These services will continue to evolve and expand.

7. *Third-party warehousing.* More small and medium companies will use third-party warehousing to leverage capital and increase service levels. This statement is supported by data in the *Guide to Third Party Logistics Service Providers*, published by Armstrong & Associates, Inc., (Stoughton, Wis.; 608-873-8929). According to the report, 70% of the *Fortune* 100 are using third-party logistics providers (3PLs), compared to 44% of the *Fortune* 500. The reason is that these relationships tend to offer greater opportunities for profitability and long-term partnerships.

8. *Shrinking orders.* Better information availability, improved technology, vendor managed inventory programs, and the elimination of on-site retail warehouses will facilitate smaller orders.

9. *Automation.* Warehouses will increase automation, not labor, to handle work volumes. More conveyors will be needed to move small totes and cases across long distances and to sort to the repacking station or loading dock. More automated picking equipment, such as A-frames and dispensers, will improve throughput capacity without building additional space.

Many warehouse managers say that RF, bar coding, and material handling equipment are working to minimize the movement of materials in-house and decrease the search for product by material handlers.

According to one operations manager for a large plumbing tool supplier in Ohio, the hiring of a material handling consultant to assist in the layout, design, and installation of the equipment resulted in an 11% increase in productivity and a 22% reduction in employee overtime, and fill rates increased to 99.8%.

10. *The human factor.* The rising presence of automation means that workers must continue to enhance their technical skills, particularly as they relate to computers. Companies must retain the best workers, train them in new technologies, and cross-train them in all warehouse job functions.

One manager of a manufacturer of power generation equipment in Connecticut reports that he reassigned warehouse tasks to reduce clerical staff and cross-trained the remaining staff to take on more strategic initiatives.

Ultimately, the warehouse depends on its leaders. These leaders must visualize where the organization is going and know how to lead the company to get there. A leader must communicate this vision to employees to bring out their best performances and allow them to assume accountability for their own actions.

“Success really depends on a quality workforce with inspirational leaders,” says Brian Hudock, managing principal at Tompkins.

WERC STUDY IDENTIFIES BEST METHODS TO INTEGRATE WAREHOUSE TECHNOLOGY

A recent survey of 200 warehouse and information technology (IT) executives provides the latest thinking on distribution, WMSs, and enabling technologies, and on how to apply these tools successfully. *Warehousing Systems and the Supply Chain: A Survey of Success Factors* (WERC), is the result of an exclusive survey developed by Accenture (formerly Andersen Consulting). It is packed with ideas, hints, and recommendations for navigating this technology maze successfully.

Overall, we consider this report to be required reading for all those who are directly or indirectly affected by WMS technology. The following excerpts from the report relate to some of the more controversial aspects surrounding the technology and provide guidance on dealing with them.

No Shortage, but Which Work?

Today’s warehouse management professionals can use the warehouse module of their enterprise resource planning (ERP) system. Or they can use a custom software solution, designed for their operation. A third choice is employing one of the rapidly growing “packaged” solutions typically bolted-on to the ERP system.

What the survey concludes is that ERP systems are not providing the required functionality for most of today’s distribution operations. The data indicate that about 6 in 10 ERP purchasers reject the use of the ERP’s warehouse module for their operation (see Figure I-7.3 and I-7.4).

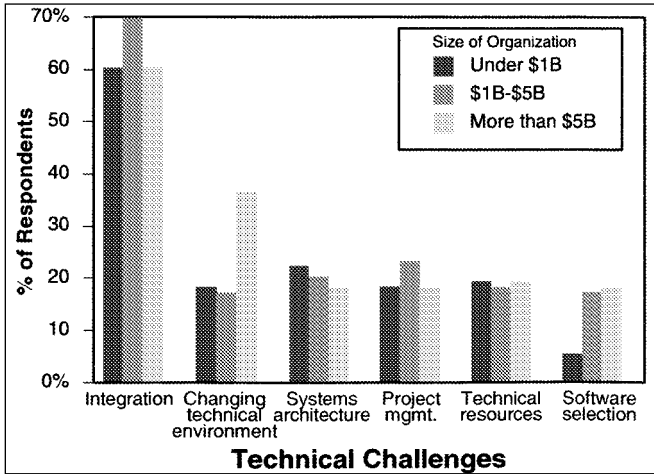


Figure I-7.3 Integrating WMS With Other Systems Emerges as Most Critical Technical Challenge for Systems Selection and Implementation

Source: Warehousing Systems and the Supply Chain: A Survey of Success Factors.

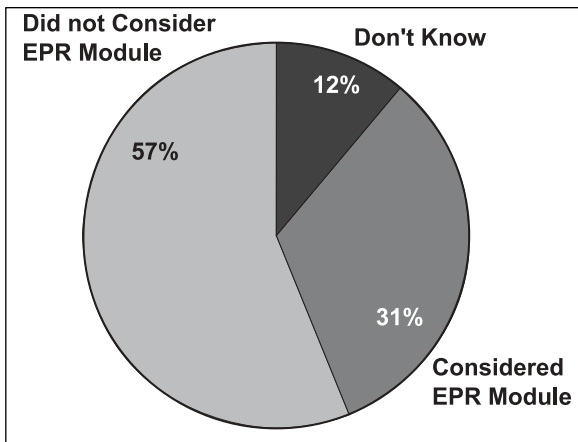


Figure I-7.4 Warehouse Professionals Choose Not to Select ERP Suppliers' Warehouse Management Modules

Source: Warehousing Systems and the Supply Chain: A Survey of Success Factors.

Also, the well-known challenges associated with custom software solutions for managing the warehouse are spurring a movement to an emerging sector: the packaged WMS solution. The advantages of buying a package versus a customized solution include

- Faster implementation
- Quicker realization of benefits

- Easier maintenance
- Allowance for future upgrades, enabling a company to take advantage of new and improved functionality as it becomes available.

WMS package solutions emerge, but there's no clear market leader. From an industry that was nonexistent four years ago, market share for packaged WMS solutions has risen to 65%, according to the survey. However, the WMS market is fragmented, with many small players and, historically, no clear market leader. For example, 45% of respondents from midsized companies answered "Other" when asked what WMS vendors they use. Of the vendors mentioned, none has more than a 10% market share, and the top seven vendors account for less than 40% of the market.

Raging debate: Fit the software to the operations, or fit the operations to the software? The traditional WMS implementation approach was to fit the software to the existing business model. Today, according to the report, the trend is toward fitting the operation to the software. Companies that are putting in ERP systems are more likely to fit the operation to the software, and "rightly so," the study agrees. The rationale? "Large software vendors have built good business processes into their systems, including best practices," the report offers. They also provide a lot of flexibility in setting up the system.

Most software packages are parameter-driven. They allow companies to tailor software to their facility layout and operational requirements. "Because the software is so much better now, companies should be able to fit their operations to the software in most cases," the report concludes.

According to the report, "WMS vendors are starting to take a true package approach with their products. They understand what it means to develop and maintain package software and are starting to hire the right people to create these capabilities." Also, vendors understand the importance of industry-specific functionality and are enhancing software to meet these needs.

If You Must Modify

The report advises that if you require functionality that is not well supported, try to negotiate with your vendor to add the functionality to the package. Most WMS packages are still evolving, and if your requirements are common in your industry, and the vendor is committed to supporting your industry, chances are that they will be interested in adding functionality to the base package.

However, if the process is unique, evaluate the business benefit before

you customize, the report urges. There may be other ways to accomplish the same results. “You should only develop modifications that truly create competitive advantage or add value for your customers.”

Finally, if there is a need to make modifications, design them so that they reside at the periphery of the system. By avoiding modifications to the base package, “software updates still can be facilitated.”

Focus on the Overall Solution

Despite the critical role in executing the integrated supply chain, software is not the ultimate answer; it is a tool. Like any tool, you must understand the role it plays and the value it brings. Too often, companies focus on technical success. “But you can only get value from your distribution software if you understand how it fits into your operations,” the report advises. Therefore, to create your overall solution, you need to

- *Develop a comprehensive strategy on how business processes will be improved.* Also, consider the values that they will deliver and how the technology will facilitate these improvements. To get the desired results, a company needs a comprehensive strategy that aligns technology, people, and processes.

- *Design processes so that they meet both your short-term and your long-term requirements.* WMS implementations often fail because management did not pay enough attention to aligning business processes with technology and software solutions.

- *Understand the organizational changes needed to sustain the benefits.* Organizations do not always fully understand that the organizational structure has to change and that training, new skills, and incentives must be developed. Many respondents commented on the importance of training and preparing people for change.

- *Build in flexibility.* Ensure that flexibility is included in all the dimensions of the organization, processes, and physical assets so that you can align more easily with future strategy changes.

Warehousing Systems and the Supply Chain: A Survey of Success Factors is available at \$30 per copy for nonmembers and \$15 for WERC members (not including \$4 shipping and handling). Contact Warehousing Education and Research Council, 1100 Jorie Boulevard, Suite 170, Oak Brook, IL 60523; 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; www.werc.org.

WMS AND EDI CAPABILITIES NOW VIRTUALLY MANDATORY

Today's better warehouses are no longer just static repositories for parts and materials. Leading providers have now become indispensable value-added participants of the supply chain. Propelling this change, and so many others, is new IT. EDI and RF inventory tracking, specifically, are essential to keep pace with the evolution of today's warehouses.

WMS Demand

The "outside" pressure to automate a warehouse is relentless. Dan Trew, vice president of product strategy at Catalyst International, Inc. (Milwaukee, Wis; 414-362-6800) says, "The reason most people put automation in their warehouse is because customers demand it—specifically for value-added services and information."

Similarly, two recent research studies from the WERC (*Warehouse Systems and the Supply Chain* and *The Changing Role of Warehousing*) observe, "Several large manufacturers were equipping plant warehouses with client/server warehouse management systems." In addition, "Several manufacturers characterized WMS and EDI capabilities as 'mandatory' for any warehouses they do business with."

Trew makes the following observations:

- Of the 980,000 commercial warehouses in the United States, less than 15% are automated.
- Customer-specific, value-added services performed by warehouses, such as vendor compliance, custom labeling, kitting, and vendor managed inventory, will increase by 50% over the next two years.
- More dollars will be spent on information systems to support the supply chain than on inventory carrying costs, which range from 15% to 35%.

Why the Emphasis on WMS?

Warehousing leaders participating in the WERC (Oak Brook, Ill.; www.werc.org) research cited the following as rationales for their WMS installations:

- Better IT is necessary to speed operations and decrease errors. WMSs, EDI, and RF inventory tracking are becoming mandatory.
- A WMS is the means to control the transactions and to produce visibility in the supply chain.

J. Eric Peters, associate partner at Accenture (formerly Andersen Consulting), San Francisco, emphasizes that warehouse management systems must “help deliver a business solution as opposed to something that is put in the warehouse to reduce labor.” In fact, he sees WMS as being more strategic than in the past. “It’s now being looked at more as a strategic tool to have efficiency in the supply chain,” he told his audience at a Distribution/Computer seminar.

Others echoed similar sentiments. For instance, Olin Broadway, managing associate at PricewaterhouseCoopers, LLP (Atlanta, Ga.; 770-643-5042), described WMS as “an integral link in a good supply chain. To do available-to-promise JIT purchasing and accurate transportation planning, you need a block-and-tackle foundation that can provide real-time visibility of accurate inventory. Warehouse management systems, I contend, are that foundation,” he emphasizes.

WMS Essentials

According to Trew, the essential building blocks include real time updates, validation, interface to equipment, EDI, RF, and bar codes. He explained, “You have to know what your exact quantities are in real time. And every activity in the warehouse, whether it’s a move, replenishment, pick, or store, must be validated. It’s the only way to maintain high levels of inventory accuracy.”

For automated warehouses, you should expect 99+% inventory accuracy by location. RF terminals and bar codes help achieve this objective. In addition, Trew argued, “Once you put in an automated system, you should no longer be in the business of doing physical inventories.”

Meanwhile, John M. Hill, partner at Cypress Associates, agrees that most WMS providers can deliver on the “typical WMS functions.” However, where they differentiate themselves is in the resource management features, such as

- Order planning and scheduling
- Inventory allocation
- Lot and serial number tracking

- Shelf-life monitoring
- Unit of measure conversion
- Task assignment and monitoring
- Location management
- Cycle counting
- Replenishment and consolidation
- Real-time updates and reports

At the Distribution/Computer seminar, Hill emphasized that “some features are far more important, depending on your company and the application you’re trying to achieve, so make sure to focus on the differences when looking for your WMS solution.” Further, he warned, “All too often, people get turned on by technology and overlook the fundamentals of the basics. I prefer to take a hard look to determine what is meaningful to my particular operation.”

Project Creep

“Project scope control is the single biggest problem we see on warehouse management system projects,” maintains John Seidl, partner at Deloitte Consulting (Atlanta, Ga.; jseidl@dtus.com). It is part of the education process once you get into the project and realize what the full capability of the selected system is.

However, although scope creep is a natural part of these projects, he warns of the need to manage it and keep it under control. Additionally, where the scope is changed, you should document and reset the expectations, Seidl emphasizes. “It’s a big mistake to change the deliverables without changing the cost, time, and resource expectations.”

Further, he cautions that testing and training schedules often get compressed. “We go into the construction phase and things begin to stretch; then scope creep impacts the schedule,” he explains. However, the original deadline remains. “What people tend to do to save the deadline is to cut back on testing the system and training the operators.” He explains. “I’ve seen implementations where ‘going live’ was, in fact, the first time the team did an integrated production test of the system. This you don’t want to do,” Seidl counseled. “You’re setting yourself up for disaster,” he declared at the Distribution/Computer seminar

But the basic message, as issued by the WERC research, is not going to

change: WMS technology and integrated supply chain management are the foundations that a warehouse must have to build success.

MANAGE THESE “HIDDEN” COSTS TO KEEP YOUR WMS INSTALLATION UNDER BUDGET

Warehouse management systems are often considered a technical and operational success but are deemed a failure from a financial standpoint. This is not a situation in which you want to be. In too many cases, however, WMS justification is based primarily on the purchase price of the software and hardware cost. This misses a variety of other costs that can explode the budget and invalidate the cost justification if not considered (see Table I-7.4).

“Capturing these costs at the justification and budgeting phase of a project will ensure that financial expectations are set at the appropriate level,” says Jon Pildis of PricewaterhouseCoopers (Atlanta, Ga.; 770-643-5178). Similarly, Christopher R. Barnes, manager of supply chain management practice at Accenture (formerly Andersen Consulting; Atlanta, Ga.; 404-880-9100), offers, “It is critical for the investment component to be as accurate as possible to provide a meaningful ROI [return on investment]. However, there are many cost components of WMS that frequently go unnoticed.”

The People Element and “Hidden” Internal Costs

“You’re going to have dedicated resources on the team, so you’re going to have to account for more than just salaries,” explains Pildis (see Table I-7.5). For instance, there will be extra warehouse labor during start-up. Typically, efficiency drops very dramatically after start-up (see Figure I-7.5). Every

Table I-7.4 Origins of WMS Costs

<i>Budget Category</i>	<i>% of Total Cost</i>
Software and hardware	30–35
System integrator	30–35
Software vendor assistance	10–15
Host system modifications	5–10
Internal corporate costs	5–10
Contingency and other	Varies

Source: Accenture, formerly Andersen Consulting.

Table I-7.5 Frequently Overlooked Costs When Justifying and Budgeting for Warehouse Management Systems

<i>Capital Cost Element</i>	<i>Investment</i>
Project team (salary, benefits, and travel)	\$50,000–\$200,000/team member/year
Interface development/testing	1,000–2,000 man-hours
Technology infrastructure	
WMS hardware redundancy	\$25,000–\$250,000/site
LAN/WAN development/upgrade	\$0–\$100,000
Site preparation	
Location labels	\$10,000–\$30,000/site
Data center printer stands and workstation furniture	\$5,000–\$50,000
Extra warehouse labor during start-up	25%–50% increase in headcount
<i>Annual Operating Expense</i>	<i>Investment</i>
Standing WMS team	
WMS coordination	\$40,000–\$90,000
Database administrator	\$50,000–\$100,000
WMS supplies	
Label stock and printer ribbons	\$2,000–\$10,000/site
Preprinted forms and LPNs	\$2,000–\$10,000/site
Third-party hardware support costs	7%–15% of original capital cost

Source: PricewaterhouseCoopers.

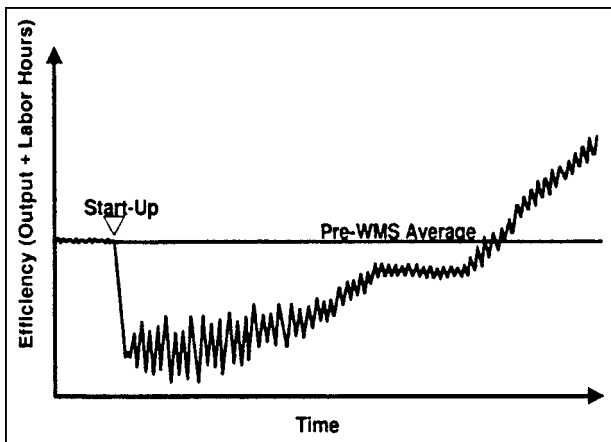


Figure I-7.5 “Hidden” Cost of Initial Warehouse Efficiency Loss at WMS Start-Up Must Be Included in Budget and Justification Process

Source: PricewaterhouseCoopers.

WMS goes through it. "To counteract that, if it is unacceptable to have the output fall, you're going to experience an increase of labor for the first couple of months after start-up," he outlined at a Distribution/Computer seminar (C. S. Report, Inc.; Uwchland, Pa.; 610-458-6410).

Meanwhile, Barnes points out that "software training courses may be required for internal personnel who will work on the implementation." Typically, the WMS software training cost is part of the purchase price, and training is done at the client site. However, it is not uncommon for vendors to request client training at the vendor site, where "facilities may be more conducive to an effective training process." Therefore, training fees, airfare, lodging, and related expenses should be budgeted for employees who will travel to attend training sessions, he itemizes in *IIE Solutions*. Also, he reminds, if systems are being installed in multiple sites, "anticipate additional travel expenses."

Retention Bonus for Key Employees

"An often overlooked indirect cost of system setup is long-term employee retention, especially those employees directly involved with the implementation project," warns Barnes. "In a market where technology is a hot corporate trend, the demand for people with experience in implementing and running WMS is growing." It is not unusual, he points out, for someone with major WMS implementation and user experience to confront a significant increase in salary from other organizations that are in need of this "short-supplied skill set."

In fact, Seidl strongly recommends putting in a retention bonus for those who "stay the life of the project." He believes that it is worth the investment. "After you do one of these projects successfully, the phones will be ringing off the hook as headhunters come looking for members of the implementation team."

Data Entry Cost

During the configuration stage of a WMS, up to 60% of the time spent at the terminal is spent manually entering stock keeping unit and storage location information, according to Barnes. Typical SKU data include part number, description, product family, ABC class, as-picked unit of measure (UOM), and inventory status. Location data include warehouse name, address, dimensions, constraints, type, and comments. "Approximately 70% to

80% of the information for each record will be the same,” Barnes notes. However, a separate record is required for each SKU and location.

“When you consider that there are several tens of thousands of SKUs and several thousand locations in a typical facility, setting up a SKU and location records can be a tedious and burdensome process,” he acknowledges. To expedite this data entry process, several software packages are available that can be programmed to perform scripted iterations of data entry into the WMS records.

This data entry software may ease the data entry task, but it still requires significant setup and data validation costs. An alternative to purchasing mass data entry software is to use either internal or external administrative support. If this approach is used, it is common to use temporary personnel to provide short-term assistance for this laborious task. “Either way,” he advises, “build data entry cost into the budget.”

Overlooked Annual Operating Costs

“A standing WMS team is a requirement once the implementation is complete,” offers Pildis. “A few folks will remain on-site to support the operations for complex configuration changes, such as expansion to the warehouse, new racks, and revised processes.” This cannot be left to the warehouse manager and his or her team to put into the WMS. Also, if using a third party relational database, such as Oracle, certain maintenance activities will require in-house personnel.

Other costs include third-party hardware. “When negotiating the contract with the WMS provider, you talk about their annual maintenance costs, which might be 15% of the license fee,” Pildis mentions. “However, there’s a whole slew of these types of costs that are rarely talked about during contract negotiations.”

“Most organizations have standard project cost contingencies,” adds Barnes. “Whether 5%, 10%, or 15%, it is recommended to plan for the unexpected.” Among these “other” expenses are the ongoing licensing fees for WMS software, middleware software, and Unix servers.

“The cost of the agreement varies and depends on the level of future effort expected from vendors,” Barnes explains. Additionally, maintenance contracts generally will be made on RF equipment and other hardware peripherals used throughout the facility. “Even if equipment maintenance is done in-house, costs should be built in to purchase and maintain backup equipment and MRO supplies for the production equipment,” says Barnes.

With the greater emphasis on the speed of the WMS implementation, other costs besides those for hardware and software will require closer inspection. Therefore, it will be imperative for readers to be vigilant in identifying and considering all these “other” costs when planning and budgeting WMS to achieve a more accurate financial perspective of the project.

FIFTEEN POINTS TO CONSIDER WHEN MANAGING WAREHOUSE LOGISTICS

As margins are squeezed and the pressure to find cost-saving opportunities builds, logistics managers are setting their sights on the warehouse as the last frontier in managing logistics. Everything from material flow to physical layout represents a chance to save hundreds of thousands of dollars every year. This potential has led software developers to design systems around warehouse logistics and practitioners to rethink their facility processes and procedures.

Here are some issues to consider about your own warehouse:

1. *Focus on the interior.* “Warehouse logistics is a subset of logistics,” says Doug Walker, vice president and general manager of the NxTrend Logistics Division (Colorado Springs, Colo.; 719-264-4734). “The focus is on being an extension of inventory management. Managers should know what is occurring within the warehouse and how the product is managed.”

Focus on the functions that occur inside the facility as well, such as receipt, putaway, replenishment, stocking, cycle counting, and so on. The point, says Walker, is to have visibility of the product at any given time in an effort to improve accuracy.

2. *Consider moving your location.* As the primary supplier to its customers, Refrigeration Suppliers Distributors (RSD; Lake Forest, Calif.; 949-380-7878) moved its warehouse location to gain transportation efficiencies. (Chicago Consulting recommends setting up warehouse networks closest to the U.S. population. See Table I-7.1 and the first section of this chapter.)

3. *Use automatic identification.* The move that RSD made into a new setting gave the distributor an opportunity to implement state-of-art technology, explains Carl Vaughn, general manager of RSD.

Bar coding is one of those technologies to consider, believes John Marek, senior partner with Beltech, Inc. (Grand Rapids, Mich.; 616-531-

0725), a consulting firm. He says that it is wise to have product enter the warehouse with a bar code label for easier tracking. And the use of handheld RF units brings real-time activity to the worker in the picking area.

“The warehouse is a moving target,” says Marek. “It is all about transactions—the time of day orders come in and go out.” Bar coding is a great tool for keeping track of those transactions, he adds.

4. *Install a WMS.* In conjunction with automatic identification, use a WMS or similar solution. Vaughn says that RSD is using the Total Warehouse Logistics (TWL) solution from NxTrend to gain control and instill a level of organization that the distributor was not getting from its previous paper-based system. “We were falling short in terms of efficiency and turned to TWL to improve our efficiency and accuracy in supplying our 50 branches.”

“Distributors are coming to us looking for these solutions,” says Walker. “The warehouse has been the last frontier to adopt the technology, but now companies realize that they should take advantage of the power it offers.”

Make sure that the warehouse package can interface to the ERP system that you may already be using. This ensures a total supply chain planning solution.

5. *Examine physical layouts.* Traveling inside the warehouse just to pick product is the most time-consuming activity (see Figure I-7.6), so it makes sense that you should start with the layout of the facility when designing your warehouse logistics system. “You can’t make improvements if the site is laid out wrong or improperly racked,” says Marek.

Vaughn explains how changing racking systems has sped up the rate of selecting product. “Our fastest movers are shipped out in case quantities. We have installed flow rack in the fast-pick area to increase the pick faces and eliminate the need to reach for items that were too high or too low in our previous layout, which supported pallet storage.” When a case is removed, the next one slides forward, replenishing from the back end. The flow-rack design has improved pick performance from 80 lines per hour to 180 lines per hour.

6. *Perform order cycle counts.* RSD counts A items every quarter, B items twice every six months, C items once every six months, and D items once a year. Vaughn says that this has increased accuracy significantly.

7. *Consider market demand.* What pressures do your customers put on the warehouse that force you to do things a certain way? Do you have enough labor to handle the material flow?

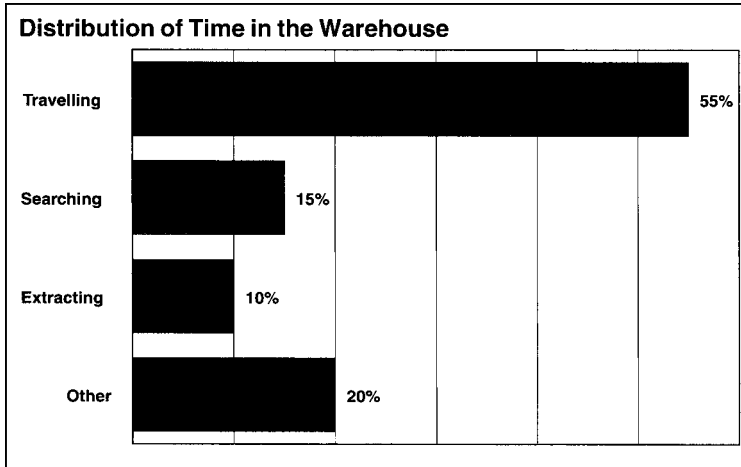


Figure I-7.6 Distribution of Time in the Warehouse

Source: World-Class Warehousing.

8. *Conduct a warehouse operations audit.* This includes a warehouse performance and practices gap analysis. The purpose is to reveal if and how a change would benefit the operation.

Seven Additional Basics

Once you have reviewed your warehouse operations, you are ready to take action. World-class warehouse operations, or those that hope to be, should focus on seven basic physical principles, developed by Edward H. Frazelle:

1. *Profile.* Create and maintain order profiles, item activity profiles, and planning profiles to identify process impediments and opportunities for improvement.

2. *Benchmark.* Measure warehouse performance, practices, and operating infrastructure.

3. *Simplify.* Eliminate as much work content as possible. Because most of the work involves material and information handling, focus process redesign initiatives here.

4. *Computerize.* Incrementally justify and implement WMSs, paperless warehousing systems, and decision support tools to maintain the warehouse activity profile, to track warehouse performance and resource utilization, and to enforce warehouse processes.

5. *Mechanize*. Incrementally justify and implement mechanized material handling and storage systems to improve throughput and storage density and to assist warehouse operators in difficult material handling activities.

6. *Lay out*. Lay out the warehouse processes and material handling and storage systems to form a smooth flow of material and information between processes and to maximize floor space and building cube use.

7. *Humanize*. Involve warehouse operators in redesigning warehouse processes. Develop team and individual performance goals and implement ergonomic improvements.

WERC STUDY IDENTIFIES THREE BEST METHODS FOR IMPROVED ORDER ACCURACY

Because of a push for quality improvements, logistics managers have made increased order accuracy a top priority. Using a combination of methods, managers report significant improvements in accuracy levels and expect to achieve even more in the next few years. Here are a few of the tried and true order accuracy tools that will work in any organization.

Methods for Improving Order Accuracy

The order accuracy rate, as defined by the WERC (Oak Brook, Ill.; 630-990-0001), is the percentage of the total orders that a warehouse picks, packs, and ships correctly to customers.

In a recently published report from WERC, *Order Accuracy: How High Is The Hurdle?* managers cite factors influencing increased order accuracy (see Table I-7.6) and activities that increase order accuracy (see Table I-7.7).

The report highlights three proven methods for improving order accuracy:

Table I-7.6 Factors Influencing Increased Order Accuracy (%)

Push for quality improvements in overall products/services	85
Top management interest in industry best practices	46
Customer suggestion/requirement	44
Competitive pressure	39
Top management pressure to reduce costs	36
Establishment of management controls process	34
Warehouse layout	10

Source: Warehousing Education and Research Council.

Table I-7.7 Operational Activities to Increase Order Accuracy (%)

Refining pick methods/practices	63
Increasing inventory controls	60
Improving shipping processes	59
Checking orders	56
Refining layout and flow	47
Implementing quality initiatives	41
Changing management procedures	36
Upgrading material handling systems	32
Improving sorting/consolidating processes	29
Increasing supervision	27
Revamping receiving systems	25
Changing storage techniques	19
Upgrading packaging procedures	17
Upgrading storage equipment	15

Source: Warehousing Education and Research Council.

1. *Use employee training programs.* Respondents to the WERC survey indicated that the most popular human resources (HR) method for increasing order accuracy was additional employee training. Incentive programs finished a distant second.

Other HR suggestions are aptitude testing, discipline-based programs, employee involvement programs, split shifts, process improvement team meetings, and the development of smaller, high-paid core groups.

2. *Use WMSs.* Sixty percent of total respondents reported that their firms use some type of WMS for inventory accuracy. When comparing company size, only 46% of smaller companies reported using a WMS, compared to 58% for medium-size firms and 62% for larger organizations.

The level of order accuracy using a WMS depends on system sophistication, degree of employee training, degree of control over procedures, and the number of SKUs.

3. *Use locator systems.* Approximately 27% of the firms reported no use of a static system, and 20% indicated that their companies were not using any type of random locator system. At the other extreme, 18% report using entirely static systems, whereas 25% use random systems exclusively. Overall, the average facility utilizes 43% static and 57% random locator systems.

Firms using a static system estimated a higher percentage of order accuracy than did those using random systems. Around 30% of the respondents report a 99.5% or greater level of order accuracy with a static system compared to 23% for the companies using random systems.

Overall, a total of 86% of the firms with static locator systems experi-

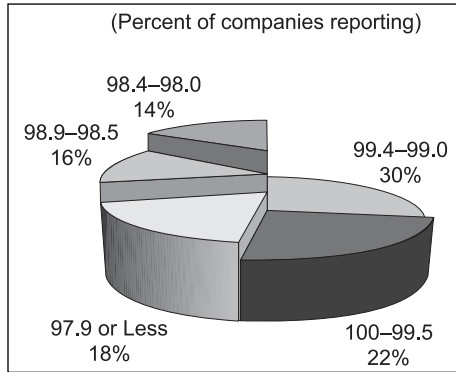


Figure I-7.7 Orders Shipped Accurately

enced a 98% or better order accuracy level compared with 80% of those using random locator systems.

Industry Benchmarks

Whether deploying one or a combination of the above methods, respondents have seen improvements in order accuracy. For instance, when asked the percentage of orders shipped accurately in the last 12 months, more than 50% estimate that their companies performed in the 99% plus category (see Figure I-7.7).

Overall, 82% indicate that their firms achieved a 98% or higher performance level. On average, the percentage of shipping accuracy for all respondents was between 99% and 99.4%.

Respondents were also asked the percentage of orders shipped on time according to customer expectations. Ninety-five respondents indicated that their organizations achieved a 99.5+% level in the last year. Overall, 77% estimated a 98% or better on-time shipping performance (see Figure I-7.8).

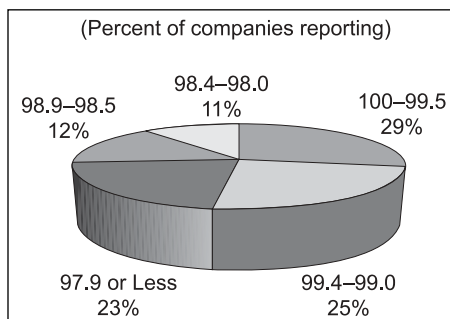


Figure I-7.8 Orders Shipped on Time Based on Customer Expected Ship Date

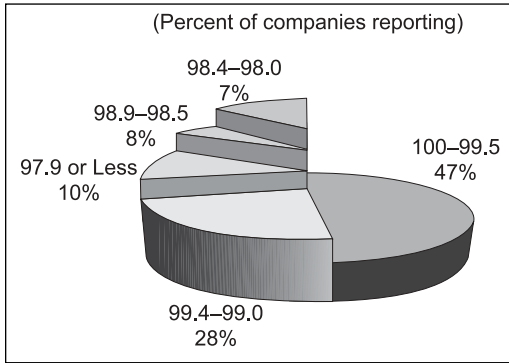


Figure I-7.9 Orders Shipped with Correct Documentation

With regard to the percentage of orders shipped with correct documentation—bill of lading, manifest, or packing lists, freight bills, and delivery receipts—over 90% estimate that they have accomplished a 98% or better documentation accuracy level. More than three-quarters reported a 99% or better score (see Figure I-7.9).

Finally, managers were questioned about the percentage of orders received damaged. About 53% estimated that their firms had delivered less than one-half of one percent of all orders damaged to customers. Overall, 96% of the individuals indicated that their organizations experience a two percent or less damage rate (see Figure I-7.10).

As a result of these accuracy levels, firms report increased customer service, reduced warehouse costs, improved standard warehouse operating procedures, better management controls, reduced inefficiencies in order processing, and improved facility use (see Table I-7.8).

Thus, nearly 86% of respondents claim that their firms will increase their order accuracy practices in the next two years.

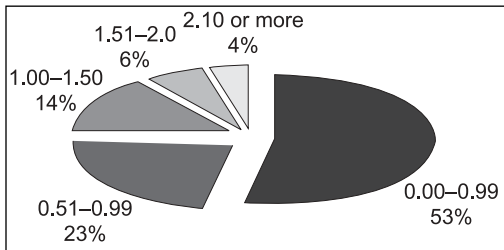


Figure I-7.10 Total Orders Received Damaged by Customers

Table I-7.8 Primary Benefits from Improving Order Accuracy (%)

Improved customer service	96
Reduced warehousing costs	56
Improved standard warehouse operating procedures	50
Better management controls	47
Reduced inefficiencies in order processing	44
Improved utilization of facilities	25

Source: Warehousing Education and Research Council.

Are Managers Meeting Their Goals?

Despite valiant efforts, firms are not doing a great job of meeting their accuracy goals. According to the survey, almost two-thirds of respondents (65%) indicated that their targeted percentage was between 99.5% and 100%. Ninety-six percent say that their goal is set at 98% or greater. Only about one-third report meeting their target goal, and nearly 85% say their firms' goal is being met almost three-quarters of the time. Of the 65% reporting a target between 99.5% and 100%, only 20% are actually reaching the goal.

All firms, on average, operate at a success rate of 75% or better, no matter the size or type of industry.

WHAT THE RETAIL SECTOR CAN TEACH LOGISTICS MANAGERS ABOUT VIRTUAL WAREHOUSING

Many companies striving for an online presence are loath to rely on another company to handle fulfillment and customer service. If the contractor provides lackluster performance, it reflects poorly on the seller and can be a real problem, especially if the firm is a retailer.

Fortunately, many fears are being put to rest as third-party providers have made great strides in perfecting their distribution processes and are able to perform warehousing activities for online retailers. The benefit to their customers is that they need not worry about the logistics of order fulfillment.

Trading Profits for Warehousing

Case in point, Global Sports. The Philadelphia-based sporting goods supplier has convinced its retail partners to allow it to warehouse goods and ful-

fill orders for them and, in return, earn 90% of all sales revenue that the retailer brings in on orders that Global Sports fills.

Why would a retailer want to give up those profits? Consider the experience of Sport Chalet CEO Craig Levra. Two years ago, he decided that the company needed to have a substantial Net presence, but the more Sport Chalet learned about the investment that such a presence would require, the less appealing the idea became.

“It would require \$10 million—plus to get it done the way we wanted to do it,” Levra says. “Setting up an online shop is never as easy as it looks.” By linking with Global Sports, Sports Chalet turned over all the warehousing and fulfillment processes to Global Sports, lowering its Web investment significantly.

At this point, other e-tailers taking advantage of virtual warehousing through Global Sports include Foot Locker, The Athlete’s Foot, Sports Authority, and Fox Sports.

Automating Customer Service

Another company that has jumped on the virtual warehousing bandwagon is iQVC, the online retailing division of QVC.

CommerceHub (www.commercehub.com; 518-886-0700), a leading provider of virtual warehousing solutions for online retailers and catalog merchants, will provide electronic business communications between iQVC and its participating vendors, enabling the automated management of the iQVC customer service operations from point of sale through delivery. The CommerceHub Solution is currently in operation at iQVC, following a successful test period.

“During the past nine months we have worked with CommerceHub to test and enhance their solution, which we are now rolling out to our drop-ship vendors,” says Stephen Hamlin, vice president of operations at iQVC. “The implementation of the CommerceHub supply chain management solution has substantially improved our customer service.”

“Our investment in CommerceHub will allow us to extend our participation in e-commerce to the fast-growing and vital area of third-party fulfillment,” says Jeffrey Branman, president of Interactive Technology Holdings, LLC. “The rapid expansion of business interconnectivity has made it possible for retailers to offer outstanding customer service without the need to own, warehouse, and distribute goods.”

The Glamour of Shipping

ANETorder.com is a third-party fulfillment organization serving e-tailers. “We are our clients’ virtual shipping department,” says Shane Randall, CEO and president of aNETorder.com. “We focus on the not-so-glamorous backend of cyber shipping—the actual picking, packing, and shipping of orders.”

Customers include Reader’s Digest Association, National Geographic Society, and Guideposts, which look to aNETorder.com to handle inventory management, warehousing, and individual and bulk pick-and-pack capabilities.

Do It Yourself

For those who are still leery about turning over warehousing and fulfillment activities to a third party, consider Internet-based software that can virtually eliminate storage and inventory costs in your own DC.

White Plains, New York-based Optum, Inc.’s (914-993-3403) TradeStream enables companies to aggregate fulfillment content across a trading community and leverage this information to slash inventory levels up to one-third and achieve 100% fulfillment for all customer orders.

The application leverages the Web to tie together existing transactional systems to capture, coordinate, and manage product inventory information throughout an enterprise and its suppliers, distributors, and customers. “TradeStream has extended our four walls to surround Invacare’s multipartner trading community with a virtual warehouse,” says Gerry Blouch, president and COO at Invacare, a \$1 billion manufacturer of home health care equipment and mobility aids based in Elyria, Ohio. “It provides real-time visibility of inventory positions and order status across our enterprise, distributors, and customers. TradeStream will allow us to establish a direct replenishment program to smooth demand volatility and eliminate costly safety stock—a benefit to both Invacare and our customers.” “TradeStream is a direct hit in dramatically reducing the trillion-dollar inventory investment U.S. companies have sitting still in warehouses,” says Bruce Richardson, senior vice president of research at AMR Research.

Eliminating sitting inventory was the main goal at ecampus.com. The online college bookstore felt that it could achieve that goal by using old-school methods of warehousing and distribution. It has taken a number of

steps to integrate its inventory and distribution network with its Web storefront to ensure that distribution is as fast and efficient as are browsing and shopping the Internet.

A fully conveyered, state-of-the-art automated distribution system supports the fulfillment architecture. Inventory availability and shipping estimates are shown on the site for every product sold.

Ecampus.com's latest innovation is an enhanced cross-docking system designed to further speed the process of getting merchandise into the hands of customers. The cross-docking system enables ecampus.com to turn incoming books into outgoing shipments in as little as an hour.

"We have easily put as much time and effort into building our distribution network as we have our Web storefront," says Wallace G. Wilkinson, chairman and CEO of ecampus.com. "One of the strengths of any successful Internet company is the technology and infrastructure it employs to deliver the product once the customer has purchased online. Cross docking gives ecampus an added advantage in customer satisfaction."

The decision made in the early stages of the Company's development to integrate the Web site fully with the distribution channel is paying dividends. "We are in a much better position than other companies that do not manage their own fulfillment to grow and adapt as changes occur in the marketplace," adds Wilkinson.

Prior to the implementation of cross docking, all inventory was handled in the same way. An item was received, processed into the warehouse management system, conveyed to the proper zone, and slotted awaiting allocation to an order. Cross docking enables ecampus to bypass the slotting and allocation process and move items for which an order exists directly to shipping. The entire process takes one hour.

WAREHOUSING PROFITABLY: A GREAT NEW RESOURCE FOR INVENTORY MANAGEMENT AND STAFF

Your warehouse staff should not be without a copy of *Warehousing Profitably: A Manager's Guide*. The book, written by Ken Ackerman, a leading authority on warehousing issues, is a major reworking of the book he originally published in 1994. This "update," as it is called, contains almost 50% new and original material that is critical to modern warehouse management.

Just the Facts

The value to the reader is that it is a fact-filled, straightforward presentation of the technology, techniques, and concepts that warehouse managers confront almost daily. In addition, *Warehousing Profitably* can also serve as a much-needed reference for the warehouse manager's boss.

Ackerman easily brings the warehouse manager into the twenty-first century of warehouse issues. For example, he discusses the supply chain, an unknown concept in 1994, but widely touted now, frankly. As is his style, he prods readers by asking, "Is supply chain management really different from logistics management, or is it just a different name for the same thing?"

His answer: "Supply chain management, logistics, and warehousing are closely related. Logistics is the process of filling the gaps, and supply chain management is the process of closing them. A company can achieve excellence in logistics without supply chain management. However, it is not possible to have a great supply chain without also being effective with logistics. At the same time, that effective logistics systems requires a competent warehousing function."

Cycle Counting Addressed

In the original book, cycle counting was not discussed. However, in the contemporary warehouse, Ackerman believes that cycle counting is an indispensable tool. In fact, he is rather blunt: "Failure to consider cycle counting suggests that your managers are not in touch with state-of-the-art inventory control methods."

In describing cycle counting, he advises: "It is important to recall that a prime objective of cycle counting is the identification and elimination of errors. Therefore, investigation of each bad count is a critical process." He then offers some tips:

If the counted quantity is verified as less than the inventory record, there are two possibilities, which are easy to check:

- A request for this item was filled without recording the transaction.
- A sales or production order was incorrectly subtracted from the inventory.

Likewise, if the variance shows that count quantity is higher than book record, replenishment orders should be reviewed to see if product was

received and improperly recorded. Recent sales or production orders should be checked for erroneous subtractions from the records.

Technology and Warehouse Management Systems

The entire subject of the information age is largely new material. Taking it to the leading edge, Ackerman discusses simulation in the warehouse. “Until recently, computer simulation was too expensive and time-consuming to be justified for most warehouse operations,” he expresses. “Simulating materials-handling systems before buying is somewhat like taking the test drive at an automobile dealership. Before spending big money for a new distribution center or a new handling system, it makes sense to take it for a test run,” he voices. Computer simulation makes this possible.

Simulation can help answer the following questions:

- Are there enough dock doors in the warehouse?
- How many lift trucks are needed?
- How many order pickers are needed?
- Where should products be slotted?
- How should workloads be balanced?

The most significant result of simulation is the confidence that management will gain from visualizing the design.

When it comes to warehouse management systems, Ackerman recommends that the manager consider the following three tasks:

- Identify the key differences among the various software packages.
- Identify common deficiencies in the WMS software.
- Provide guidelines for developing the request for information (RFI).

He goes on to list differences among crucial features among WMS packages. Among them are the following:

- Every system should have a means of measurement.
- The better WMS will use a unit of measure method, and it will analyze and define specific cubic volumes per unit.
- The best systems support carton selection and pick-to-carton functions. The WMS that uses pick-to-carton method can save money by eliminating packers and packing.

- A good WMS uses a bin locator system to tell the receiving worker where to store each inbound pallet.
- The bin locator system should evaluate physical factors of the facility as well as storage rules established by management.
- The same system should compare optional travel paths for picking, put-away, and replenishment, and then indicate the best path for filling an order.

According to Ackerman the deficiencies that are commonly found in WMS packages include the following:

- Some vendors have not integrated the handling of hazardous materials into their systems.
- Some systems do not store error data.
- Some systems have productivity reporting but do not have productivity standards.
- Many systems omit the load-planning feature. This is desirable if you frequently build pallet loads or container loads.

Outsourcing Reverse Logistics?

This is a topic that is becoming increasingly important for today's warehouse operations. Ackerman's advice: "In considering products, the first appraisal is the value of returned-goods inventory. If that value does not reach an economy of scale, the reverse logistics process may not be worthwhile."

"Warehousing and inventory control specifications will be governed by answers to the following":

- What is the total volume moving through a reclamation center each week, month, year?
- What portion of each reclamation center will be devoted to returned goods?
- How much warehousing time will be devoted to returned goods?
- How many inventory turns per year can be expected in each returned-goods category?

We highly recommend *Warehousing Profitably* for the practical knowledge, information, and guidance it provides. It's an excellent reference for

issues and topics of concern to warehouse managers and their bosses. For information, or to order a copy (\$79.95), contact The K. B. Ackerman Company, 2041 Riverside Drive, Suite 204, Columbus, OH 43221; 614-488-3165; fax, 614-488-9243; www.warehousing-forum.com.

SLOTTING TECHNIQUES THAT WILL ENHANCE WAREHOUSE EFFICIENCY AND PRODUCTIVITY

Matching inventory to the right area, location, and equipment is the first step toward saving money and improving productivity in the warehouse. That is why proper slotting plays such a critical role in warehousing operations. The following advice will help you develop a slotting strategy for your warehouse inventory handling needs.

Operator travel time is a significant non-value-added task. Proper inventory slotting helps eliminate the excessive travel and search associated with order picking. It also improves operator productivity and helps establish the warehouse layout to an optimum condition. Thompson Brockmann, senior consultant at Tompkins Associates (Raleigh, N.C.; 919-876-3667; www.tompkinsinc.com) lists the following advantages of proper product slotting:

- Reduces picking labor requirements by locating product in the optimal pick sequence
- Reduces replenishment labor requirements by matching product unit loads with the appropriately sized storage slot
- Reduces response time and improves flow by balancing workload between operators
- Increases pick accuracy by separating similar products to avoid proximity picking errors
- Reduces possibility of injuries by placing product in its ergonomically best location
- Reduces product damages by organizing heavier product first in the pick path, ahead of crushable product
- Increases palletizing productivity by arranging product by case height allowing the building of tighter pallets for better trailer utilization
- Defers capital expansion by maintaining the optimum warehouse layout and cube utilization, reducing the need for building expansion

Warehouse slotting/re-slotting methodology. Warehouse managers must play the role of a minor sleuth to gather the required data found throughout the warehouse. “What we are doing is setting up data to do item profiling to determine the proper slotting,” maintains Dan Basmajian, senior vice president, Manhattan Associates, Inc. (Atlanta, Ga.; 770-955-7070; www.manhattanassociates.com). “If you focus on selector productivity gains, in most instances that will turn into productivity gains in replenishment and receiving as well.”

Several sets of data must be deciphered, he notes. One set accounts for the SKU mix kept within the pick lines. Included in this data must be an understanding of product dimensions; unit movement, which includes unit volume or turnover; hits or popularity of the item; and cube measurement. “In addition, pick density, which takes into account the popularity of the product in ratio to the cubic movement of the item, provides managers with the information of how many picks a product generates per unit cube of itself,” he details in *WERCSheet*.

Similarly, Brockmann proposes doing a demand analysis phase to determine the picking and replenishment attributes of each product. He suggests breaking each line of the shipping file into its full pallet picks, full case picks, and each pick component. Then assign each SKU to an A, B, or C classification, with the As being the fastest movers and the Cs being the slowest movers.

Choosing slot types that are already available within the warehouse or that can be added. Warehouse managers must know opening dimensions, weight limitations by level, proximity to shipping dock or pick path, and movement values of each item.

Brockmann’s location analysis includes obtaining data relative to:

- Location identification
- Location type (reserve or forward pick)
- Storage equipment (pallet, drive-in, bulk)
- Pick equipment type (pallet flow, carton flow, carousel)
- Pick type (full pallet, full case, broken case)
- Location height, width, depth, and capacity

Defining the slotting strategy. “Although all of these factors are available, slotting schemes are typically based on either the popularity or the volume of an item, but rarely both,” asserts Edward Frazelle, executive director at

Logistics Management Center (Atlanta, Ga.). “This is one of the most common mistakes made in slotting, and what gets us into the most trouble.”

Brockmann explains that products should be assigned to locations in accordance with the objectives identified during the goal identification phase. It is clearly the first step in any product relocation program. He breaks goal identification into objectives (efficiencies to be achieved by reslotting) and constraints (barriers that must be taken into account when slotting). Barriers, which usually require some of the efficiencies (minimizing travel distance, increasing pick rates) to be forfeited, include weight of the product, size of the locations, and picking accuracy.

For facilities with multiple areas or equipment for picking, product slotting is a two-step process, he notes. First, the item must be assigned to the area or equipment type; then the item is assigned an actual location. Common slotting objectives and a brief description of their associated strategies help guide the location process (see Table I-7.9).

Slot maintenance must become an essential fact of life for warehouse managers. “Usually as soon as an item is slotted properly, something changes,” observes Frazelle in *WERCsheet*. “Slot maintenance is very important,” stresses Basmajian, as it can eliminate the need for a “reset” of the facility, where many products are moved over a short period in a massive attempt to fix slotting problems.

An approach that he favors is to determine how many fixes to an existing pick line can be made in one night to provide the biggest return. Then,

Table I-7.9 Common Slotting Objectives and Associated Strategies

<i>Objective</i>	<i>Strategy</i>
Reduce stockouts within the pick line	Level the replenishment requirements over all SKUs. Assign SKUs with higher cubic throughput to locations with more capacity. If necessary, assign multiple adjacent locations for the fastest moving SKUs.
Balance picker workload between zones	Spread the workload between each zone. Using the “hits” per day for each SKU, distribute the As, Bs, and Cs equally among each zone.
Travel distance	Minimize travel distance by placing the fastest-moving SKUs closest to the point of exit or the shipping doors.
Increase pick rates	Place the fastest moving SKUs in the locations that are easiest to retrieve the product. For example, place the heaviest product at a height at or near the the waist of the pickers.

Source: Tompkins Associates.

slowly over time, managers can fix other problems by identifying seasonal items and moving them only when needed or by ensuring that new product is placed in the proper location right from the beginning.

Another way to manage slot maintenance is to look at tools that maintain statistics for every day. Frazelle explains, "If I know where an item is and how much space it is occupying today, as well as the storage mode and location of the mode, and I also know where it should be based on forecasts, I will know which items aren't properly slotted anymore." When there are discrepancies, or when an item is not in the right place, the warehouse manager should rank them by importance and program the reslotting work that should be going on," he advises.

TOMORROW'S WAREHOUSING TECHNOLOGY IS AVAILABLE TODAY AT DISTRIBUTION/COMPUTER EXPO

Warehouse management is never ever going to be the same again. That was the buzz at a recent Distribution/Computer Seminar/Expo (C. S. Report, Inc.; Uwchland, Pa.; www.logistar.com). The new organizations, new technologies, and new concepts provided a first-hand look at what tools and techniques inventory, logistics, and warehouse managers will soon have at their disposal.

James A. Tompkins, president and founder of Tompkins Associates (Raleigh, N.C.; www.tompkins.com), captured this moment of upheaval precisely when he declared, "What we really have to do is take most of what you and I know and throw it away and start over again."

The new age of warehouse and inventory management. The tools and technologies we called "advanced" and "innovative" as recent as a year ago are now outdated, replaced by those that are Internet-involved or ratcheted up to even greater levels of sophistication. The following is a digest of what made us stop and take notice:

- *Catalyst debuts warehouse simulator.* The Catalyst Warehouse Simulator provides users of Catalyst's Warehouse Management System with a tool for the graphic, real-time display of warehouse and DC operations via their desktop computers. The module is able to simulate both current and future envisioned environments, as it interfaces with WMS to create a baseline for prospective changes in warehouse operations. Users can simulate the

reconfiguration of warehouse layout, equipment, orders, items, staffing, methods, and procedures and immediately view the results. It provides a barometer for users to fine-tune warehouse operations and strategies, respond to business changes quickly, and improve the quality and consistency of project justifications.

Contact: Catalyst International, Inc., 8989 North Deerwood Drive, Milwaukee, WI 53223; 414-362-6800; fax, 414-362-6794; www.catalystwms.com.

- *Celerity Solutions announces new e-business division.* Slingshot ecity is developing a new version of Celerity's existing MS Windows-based applications. Its browser-based, web-centric suite of applications enables mid-sized businesses to model and manage a global supply chain. The first four core modules include eSell, eBuy, eStock, and ePlan. For example, eStock is the hub of Slingshot's e-business suite, providing global inventory visibility, valuation, and transaction control across multiple warehouses and organizations. EStock offers three levels of inventory control: a basic capability for smaller "paper-based" warehouses, advanced warehouse management for large RF-controlled facilities, and "virtual warehousing" for tracking supplier and customer inventories.

Contact: Celerity Solutions, Inc., 270 Bridge Street, Dedham, MA 02026; 781-329-1900; fax, 781-329-1655; www.slingshot-ecity.com or www.celeritysolutions.com.

- *GOwarehouse.com launches horizontal logistics network.* The network provides vertical market makers, merchants, manufacturers, and other trading partners with Internet-based resources that enable them to manage the logistics of physical inventory in real time. The resources include a logistics network that provides order process automation, fulfillment data aggregation, and virtual and physical inventory synchronization. A management portal is available for online order inquiry and tracking, supply chain visibility, inventory analysis, trend forecasting, and supply chain performance reporting. A 3PL exchange matches buyers and sellers of logistics and warehousing services around the globe.

Contact: GOwarehouse.com, 3000 Ocean Park Boulevard, Suite 2001, Santa Monica, CA 90405; 310-664-1678; fax, 310-664-6002; www.GOwarehouse.com.

- *Logility releases its latest technology for Internet-based internal and external collaboration capabilities.* Logility Voyager Solutions, Version 5.4, powers two new Internet-based VICS CPFR-compliant applications. Logility Voyager

XPS (eXtensible Planning Solution) enables supply chain trading partners to share jointly in developing sales forecasts and replenishment plans among retailers, manufacturers, and suppliers. Logility Voyager XES (eXtensible execution solution) is an Internet-designed supply chain execution application that provides customer-facing views into the supply chain for collaboration between customers, suppliers, and transportation providers to optimize transportation and warehouse management functions.

Contact: Logility, 470 East Paces Ferry Road, N.E., Atlanta, GA 30305; 404-261-9777; fax, 404-238-8450; www.logility.com.

- *McHugh Software unveils the Logistics Suite.* This is a comprehensive set of technology and application components for warehouse, transportation, and labor management. The new class of software employs highly configurable industry solution sets and logistics metrics to close the loop of innovation in e-Business. Sets are available for dot-com, consumer products, food and beverage, packaged chemicals, high-tech/electronics, spare parts, and 3PL industries. The sets contain components, such as shipment planning, wave picking, labor and resource utilization, slotting, and optimal carrier assignments that are strung together in “event-action” work flows defined by the best practices in each industry.

Contact: McHugh Software International, Inc., 20700 Swenson Drive, Waukesha, WI 53186; 262-317-2000; fax, 262-317-2001; www.mchugh.com.

- *PEAK Technologies discloses PEAK Warehouse.* A single-source, comprehensive turnkey solution for midsized manufacturers and distributors, this consists of warehouse and logistics best practices, professional services, warehouse management software, wireless data collection and printing solutions, implementation, and on-going support. The software component of the PEAK Warehouse solution is the LIS Dispatcher-CS warehouse management system. This single-source approach provides PEAK’s customers a full-service consulting and implementation resource.

Contact: PEAK Technologies, A Moore Company, 9200 Berger Road, Columbia, MD 21046; 800-950-6372; fax, 410-309-6219; www.peaktech.com.

- *Radcliffe Systems shows ROC 8 as an ASP.* Newly released ROC 8 warehouse management system is now fully graphical-user-interface (GUI) and includes numerous functional enhancements. The technical structure of ROC 8 supports Web browsers and enables customers to access ROC via the Internet. The company now offers ROC via an application service

provider model where Radcliffe hosts the WMS application and data on a special server farm. Customers make no commitment to a capital expenditure because Radcliffe buys the server and RF hardware and supplies the entire system for a monthly usage fee of approximately \$30,000. The new functionality of ROC 8 includes a new approach to picking and loading trailers, meaning that loads will be balanced and maximized before the warehouse starts picking the orders.

Contact: Radcliffe Systems Inc., 200 Consumers Road, Suite 305, Willowdale, Ontario, Canada M2J4R4; 416-493-3844; fax, 416-493-1616; www.radsystems.com.

- *TECSYS delivers FullStream e-fulfillment solution for dot-com companies.* FullStream is a complete e-commerce solution that manages the entire order fulfillment cycle, from online order capture and processing, to picking and shipping, to forecasting and replenishment. Among the modules are warehouse management, transportation routing, reverse logistics management, and datamart key performance indicators. The company also announced EliteWorld.Net, a Web portal to give distributors and their supply chain partners access to intra- and intercompany resources, including enterprise applications, third-party software, and sales order information.

Contact: TECSYS Inc., 1840 Trans-Canada Highway, Dorval, Quebec, Canada H9P 1H7; 514-333-0000; fax, 514-333-0109; www.tecsys.com.

- *TranScape releases Conquest software.* A fully integrated transportation and order fulfillment software system, this product is designed to handle order and shipment processing, task scheduling, documentation and confirmation, and up-to-the minute shipment and delivery status for express, parcel, and less-than-truckload (LTL) shipping. It is also a multicarrier rating engine that allows customers to shop for the best prices and optimal service. It integrates with ERP and WMS applications to allow data to move quickly and accurately between programs.

Contact: TranScape, a Pitney Bowes Company, 10800 Lyndale Avenue South, Bloomington, MN 55420; 612-885-7287 or 612-885-7220; www.pbTranScape.com.

- *Vocollect demonstrates Blue Streak speech recognition software.* The new software program offers significant enhancements in areas such as digit recognition and noise rejection. It will be integrated into existing Talkman OPEN products and the newly unveiled Mike voice-directed order picking system. The software rejects irrelevant background noises and out-of-vocabulary responses. Blue Streak also accurately handles spoken sequences

of letters and numbers such as catch weights, serial numbers, SKUs, and zip codes.

Contact: Vocollect, Inc., 701 Rodi Road, Pittsburgh, PA 15235; 412-829-8145; fax, 412-829-0972; www.vocollect.com.

- *Voxware announces Web-based voice solution for e-Logistics.* VoiceLogistics, a voice-based solution set of software, hardware, and professional services, expands distribution and logistics capabilities of e-commerce, retail, direct-to-customer, wholesale, and business-to-business operations with integrated voice solutions for fulfillment. It uses the XML (extensible markup language) standard, and the software applications include picking, receiving, putaway, inspection, returns processing, cycle counting, and value-added services. System-wide monitoring and reporting capabilities are accessible through a standard Web browser. Its architecture is scalable.

Contact: Voxware, Inc., 305 College Road East, Princeton, NJ 08540; 609-514-4100; fax, 609-514-4102; www.Voxware.com.

TRANSFORMATION OF THE WAREHOUSE NOW KEY TO INVENTORY REDUCTION

The brick-and-mortar warehouse, believed to be a dinosaur just a few short years ago, has reemerged as a strategic operation in this drop-and-click era. “Sophisticated warehouse operators are responding to market demands by restructuring operations and installing technology, letting them speed inventory through their facilities while adding value to the products,” observes industry analyst Chris Newton of AMR Research, Inc. (Boston; www.amrresearch.com).

“Yesterday’s static cost-center warehouses are morphing into dynamic distribution centers that often function as profit centers,” he explains in a special report, *Warehousing Isn’t Just about Storage Anymore*. The facilities are highly automated and rely on sophisticated information systems and material handling equipment.

The warehouse as DC. “The DC is the cornerstone of the supply chain,” Newton maintains. It schedules inbound material, maintains inventory-level information across multiple locations, coordinates final assembly and value-added processes, and plans for outbound transportation. The DC is the place where supply responds to demand in a JIT world.

Many dedicated flow-through DCs are now being established by large

retailers as forward-consolidation centers to receive, mix, and consolidate merchandise coming in from many suppliers, according to Newton. To adequately support retailer requirements, DCs must be equipped to handle cross-docking operations; automated high-volume sortation; break-pack and piece-pack activities; and custom labeling, packing, and kitting. Additionally, they must be able to process inbound and outbound advanced shipping notices and returns. And it is this latter item that bears watching in the e-commerce environment.

“Typically, items purchased over the Web have higher return rates,” notes Lou Cerny, vice president of Sedlak Management Consultants, Inc. (Richfield, Ohio). For example, he mentions in *WERCsheet* (WERC; www.werc.org) that apparel returns run as high as 25%.

Blurring the boundaries between manufacturing and warehousing. “With their product life cycles often measured in months, high-tech manufacturers moved final assembly and configuration of products out of the manufacturing plants and into the DCs,” Newton reports. High-tech manufacturers typically postpone the final configuration of the product until the order is placed.

Although the high-tech industry relies on postponement to lower inventory levels and cost, reduce the risk of obsolescence, and increase customer loyalty, the benefits come with many complexities for the DC. “The DC must handle goods at the component level instead of solely at the finished goods level,” he maintains. “The DC operations must also ensure that all the parts needed for customization are in stock and that the facility has the capability and capacity to perform the extra final assembly.”

The postponement-centric DCs must employ supply chain execution software that can handle tasks such as merge-in-transit operations, multi-warehouse inventory visibility, multilevel bills of material (BOMs), and coordinated movement of component parts. Also, light assembly and kitting and reverse logistics functions.

e-Commerce to further change the traditional warehouse role. “During the transition from traditional to Internet fulfillment, companies often try to fulfill e-commerce demand from their existing DCs by sending out teams of workers to pick individual orders manually,” cites Newton. While Internet sales volumes are small, the strategy will work.

However, as has been discovered, high-order volumes bring such fulfillment operations to a screeching halt. To fill Internet orders successfully, DC operations, according to Newton, must be set up as flow-through facilities, using automated material handling equipment such as A-frames and carousels to speed up the processing of high volumes of individual orders.

“The operations must use sophisticated warehouse optimization, or slotting, software applications that continually determine the best location of products within the DC based on current demand, which can change daily or even hourly with e-commerce,” he explains.

The importance of real-time inventory visibility accelerates in this environment. “Only having real-time information on the activities within the walls of the facility is no longer sufficient for the DC,” Newton warns. The WMS running the DC needs to be part of a closed loop of information systems that feed and receive real-time information to and from Order Management System, Transportation Management System, and Supply Chain Planning applications.

“Such a close loop provides DC operations with the current status of orders, inbound freight, and outbound shipments to enable them to optimally manage orders, inventory and assets,” he declares. “Without access to such information, the DC’s ability to handle merge-in-transit, flow-through, cross-docking, and light manufacturing is greatly reduced.”

When it comes to the software, use extreme caution. “Most WMS vendors are still focusing on the core warehousing tasks and are unable to meet the advanced need of DCs,” notes Newton. Most vendors offer little in the way of real-time process and inventory monitoring outside the four walls of a warehouse, decision-support capability related to labor management and warehouse optimization, or support for transportation, order, or yard management.

However, leading WMS vendors “clearly understand the changing role of the warehouse in the supply chain and have been actively building or acquiring functionality to meet advanced requirements of DCs,” he observes. “Although no single vendor has completely integrated a full supply chain execution suite of products,” he reports, “a DC can significantly improve operational performance by using products from a vendor that has broadened its SCE [single connection emulation] offering in areas such as transportation management execution, yard management, labor management, and value-added service.” Other areas he highlights include

- *Order management integration.* This allows orders to be added, modified, or canceled in real time, even after the order has been released to the warehouse floor for picking. Such integration provides order takers with visibility into finished goods inventory across multiple storage locations.
- *Warehouse optimization.* Also referred to as slotting, this optimizes the placement of items in the pick line on a continuing basis. It also calculates

the operational cost of reslotting recommendations and generates instructions of all accepted moves.

- *Cross docking.* This allows DCs to direct incoming shipments straight to the shipping dock to fill outgoing orders, eliminating the costly putaway and picking operations.

- *Reverse logistics.* This allows the WMS to receive postreturn and disposition codes and screen for noncompliant returns. It adjusts inventory levels, makes goods available for allocation, and maintains lot tracking and history data. It also supports reverse BOM to break kitted or assembled items back into components.

ADVANCED VOICE-BASED TECHNOLOGY SHARPENS WAREHOUSE OPERATIONS

Sophisticated speech systems are making their way into warehouse operations, reducing costs, improving operator productivity, and establishing accuracy records. The new speech-based technology replaces many of the least automated, manual warehousing processes, such as picking operations. Speech systems are also being extended into other operations, such as receiving, putaway, replenishment, loading, returned goods processing, and cross docking.

Ken Finkel, vice president of business development for Voxware, Inc. (Princeton, N.J.; www.voxware.com), explained, “Warehouse operators, armed with wireless wearable computers using advanced speech recognition technology, Java-based voice browser, and VoiceXML applications, are transforming the industry and its operations.”

The new technology provides hands-free, eyes-free operation. “Warehouse operators are able to hear instructions and perform the task without having to look down at a handheld computer display or fumble with a pack of picking labels,” says Patti Satterfield, formerly director of marketing at Vocollect, Inc. (Pittsburgh; www.vocollect.com).

The voice computer interacts in real time with the host WMS via radio frequency data collection (RF/DC), prompting the operator through a task with audible commands and waiting for their verbal confirmation or request, she explains.

The reality of speech-based technology applications. Not long ago, speech systems were a poor choice for the warehouse because technology was limited and prone to errors. However, Finkel points out the following:

- Voice is now used on a regular basis in facilities that regularly operate at 90 dB to 95 dB of background noise (which is like having a lawnmower next to you).
- Voice systems can be personalized to accommodate accents and foreign languages.
- Strong out-of-vocabulary rejection and highly directional microphones are used in today's systems.
- Headsets only cover one ear, and eyes remain free to be focused on potential safety hazards.
- Training is intuitive and averages 15 minutes for one-time personalization. Procedural training is significantly faster than is that for screen-based applications.

Types of speech systems now available. “Speech systems don’t just listen to voice patterns anymore,” Bert Moore, director at IDAT Consulting (Pittsburgh), explains in *WERCSheet*. “Speech systems now recognize words.”

Based on the needs of the warehouse, users have a choice of speaker-dependent or speaker-independent systems. With the latter, a voice prompts the operator to say a variety of numbers or certain words, as the system only recognizes a certain number of words or numbers.

With the speaker-dependent system, the speaker who will be using it often trains it. This allows for much greater complexity and vocabulary. New advancements now allow dependent systems to be reprogrammed and personalized from one user to the next.

When considering speech systems (see sidebar), users also must determine whether they want discreet or continuous service. “With a discreet system, you must pause between words and be very precise,” Moore offers. “In contrast, continuous systems allow you to talk without a pause. This may, however, result in a more limited text, but that’s beginning to change.”

Bringing voice technology to the WMS. Two recent announcements highlight how speech systems are being integrated with WMS software systems. OMI International (Dallas), a provider of logistics and distribution management systems, announced that they would provide a speech-based interface to its OMI TRICEPS Warehouse Management System using Voxware’s VoiceLogistics system. The companies have completed a joint development effort that integrates the VoiceLogistics system to the OMI TRICEPS WMS using standard application programming interface developed for using speech with TRICEPS.

What to Look for When Selecting a Speech-Based Solution

Adding speech systems to your warehouse opens a whole new world. Because it is most likely an unfamiliar world, Bert Moore, director at IDAT Consulting, offers these tips to make the selection process easier:

- Understand the capabilities of speech systems; define the type of data you need to capture.
- Know how many words your system will need to recognize.
- Consider the noise levels in your warehouse.
- Ask vendors how rugged the equipment is (i.e., Will it work in a variety of temperatures if needed?)
- Match the available systems to your requirements, and then see how they integrate with your current equipment.

The best way to narrow your selection is to determine how many words you will need it to recognize. “That will instantly eliminate a number of potential packages,” says Moore.

By clearly understanding your needs, you can research the available packages and match them up with an eye toward the future. Most importantly, he says, “remember that one size doesn’t fit all.”

Source: WERCsheet.

Catalyst International (Milwaukee, Wis.), a supplier of warehouse management software, will incorporate in its Release 8.1 product a suite of speech-based applications from SyVox Corporation (Boulder, Colo.; www.syvox.com). The SyVox RxP suite of speech-based applications is tailored for mobile workers who operate in warehouses and DCs.

Speech-based systems in action. According to Satterfield, “Voice-directed picking can slice a half-second to four-and-a-half seconds from each selection. Eliminating incorrect product picks can allow accuracy rates of 99.9%, and maintenance costs decrease with the elimination of dedicated label printers and handheld computers.”

“Labor productivity increases as workers hear their next location upon confirming the last completed pick,” Satterfield adds. “To verify that the picker has reached the correct location, they are often asked to read a randomly assigned check digit on the slot.”

U.S. Foodservice, Inc., is using the VoiceLogistics suite of software for pilot deployment in one of their U.S. warehouse operations, with a potential

rollout to six additional sites. According to Bernie Cassetori, regional operations manager, “We will increase the accuracy of our order picking, substantially increase productivity in our picking operations, and eliminate data entry of catch weights and order status. The VoiceLogistics implementation is specifically designed to integrate with our WMS software and will increase productivity and optimize the use of our labor resources,” he declares.

CRITICAL ATTENTION TO DETAILS BRINGS CANON WMS PROJECT SUCCESS

The promises of a WMS are improved productivity, greater inventory accuracy, and increased velocity. The perils relate to technology complexity, budget and time constraints, and operator acceptance. Nonetheless, in redesigning the role of its warehouse, Canon U.S.A. successfully evaluated and selected a WMS that met their demands and brought their inventory management technology into the twenty-first century. Here’s how they did it.

The three rules. James J. Gordon Jr., vice president and general manager of the logistics division at Canon U.S.A., Inc. (Lake Success, N.Y.; jgordon@cusa.canon.com), explains that the project was guided by the following three rules:

- Rule 1: A WMS will not make a poorly run warehouse operate efficiently.
- Rule 2: A perfect off-the-shelf solution does not exist.
- Rule 3: You must plan for timing and cost variances.

“In 1998 we were operating our parts support division with a five-day turnaround on orders; our fill rates were below 80%; and it was taking an average 96 hours for merchandise on the receiving dock to be available in inventory,” he explained at *INTERLOG2000* (Worldwide Business Research; New York; www.wbresearch.com). Applying rule number one, he went about addressing the management problems even before considering implementing a WMS solution.

“The management techniques we put in place resulted in our on-time shipping performance improving to 99.6%, fill rates rising to 94.5%, and putaway time falling to seven hours, from 96,” Gordon details. Inventory accuracy, before the implementation of the WMS, moved to 99%.

“We had phenomenal success with that system, in which inventories

were controlled by clipboards placed on every item in the warehouse,” he notes. “But it was time to move into the future; Canon, a high tech company, has to have a warehouse that is equally technically competent.”

The quest for a WMS. Gordon is responsible for six U.S.-owned regional DCs, seven U.S. third party supporting warehouses, and seven non-U.S. warehouses.

In addition, there are 14 business divisions, 9 independent subsidiaries, 4 direct retail subsidiaries, and 12 key distribution channels for which he is responsible. The division he heads handles the logistics for the entire line of Canon products.

Establishing the parameters. “Among the parameters we set for the warehouse management system was that it had to be broad enough to cover the entire spectrum of our operation, which includes pick and pack service parts operations, case goods and pallet loads, and oversized crates and unit loads,” Gordon details.

In addition, the system needed to be multilingual (French, English, Spanish, and Portuguese) as the system was to be installed throughout Canon’s facilities in the Americas. Japanese was not a requirement at the time but has since been included.

“I also required no modifications to the system, and I wanted a turnkey implementation because my intent was not to engage a consultant to manage the installation,” he shares. “I wanted my team to go through and clearly understand the steps involved and develop that expertise of the system ourselves. That was very necessary for our future plans to roll out installations beyond the Americas, into Europe and the Far East.”

Project objectives. “We were looking to improve our asset management and manpower utilization,” he explains. Improved inventory management also was a goal, especially serial number level functionality. “We historically had a problem controlling returned assets. As a world corporation, Canon is not used to a leased operation, and our system was designed without these capabilities.” Assets are never returned in Japan, he points out. “In the U.S., they are returned quite frequently,” he notes.

In addition, he wanted to enhance their EDI capabilities and also wanted to create a base for the development of ERP and e-commerce activities.

Canon’s selection process. The key was the selection of the project team. There was a headquarters team and a field team. Management participants included the director of national logistics, the DC manager, and IT system support manager. The headquarters representatives included a logistics associate and a staff IT associate.

The DC operations team had a local IT coordinator, an operations supervisor, and two lead warehouse operators. “The idea was to have decision makers and those who are going to direct the users to participate in the implementation process,” Gordon explains.

“Additionally, I went to the warehouse and selected a senior supervisor as the team leader,” he continues. “The reason is that every time I asked a difficult question regarding processes and operations, the managers all turned to one senior supervisor and asked him. So it was logical to tap him for the leadership role.” They also involved the various stakeholders (sales, marketing, purchasing, finance, and logistics partners) in the process.

The first stage of vendor qualification identified 20 potential vendors. That was quickly reduced to five after reviewing the key criteria in the general request for quote (RFQ). Among the criteria were WMS specialization, complete stand-alone system, broad operations characteristics, and multimodal. “We were not looking for a vendor who would come in and sell me a complete supply chain execution package; we did not want to buy an ERP system,” he reflects. “We required someone who was truly focused on WMS.”

They also wanted a stand-alone system so they could operate their major warehouses independently. “We also required broad operations characteristics as we wanted to maintain flexibility within the logistics network so we could blend product in the same warehouse, whether it’s moving a camera, or handling a large copier,” Gordon describes.

Vendor qualification, stage II. The five potential vendors were reduced to just two. This was done on the basis of a very detailed RFQ, where pricing was a very important factor. “In this particular market, prices can vary up to \$3.5-million for the same set of specifications,” he notes.

The team also considered license fee methodology (site-specific vs. user-specific). With the multigeographic network they are managing, the user option made more sense. Furthermore, there was a careful review of implementation costs. “These often can run equal to the cost of the software license,” he states. Other consideration was given to support fees, hardware assistance, and corporate culture.

“I needed to be absolutely sure that the diverse culture we had at Canon would be compatible with any vendor we did select,” Gordon explains. “Our implementation team was approximately 25% Japanese and 75% American, and we have different ways of viewing projects.”

In stage III of the multistage vendor qualification process, the two finalists submitted a complete white paper outlining all technical specifications of their system. They were then force-ranked. “The top choice (Catalyst International) was submitted to IT for full technical qualification,” Gordon

explains. The key issues included interfacing to legacy systems, compatibility with future IT planning, technical competency of the vendor personnel, and compatibility with Canon's IT staff.

Two recommendations. In reviewing the project, Gordon emphasized complete training, including vendor's classroom, conference room pilot, and on-site. "The conference room pilot is especially critical, as it will help you understand detail functionality of the system before laying the big check on the line, and it is an excellent way of making a final decision."

Additionally, do a process engineering review and document all existing processes first. "We did not do it before the first installation, but are doing it in the other facilities," Gordon explains. "Doing the diagrams up front is critical to avoiding some of the problems that you typically run into on a project like this."

STATE-OF-THE-ART TOOLS BOOST BAKERY CRAFTS' INVENTORY ACCURACY

Need to replace your old paper-based inventory replenishment with a new WMS driven by bar code technology—this year? Here's how one inventory manager did and improved accuracy in the process. Bakery Crafts (West Chester, Ohio), maker of edible ornaments, has had three expansions within the past 10 years and moved into its new facility two years ago. This growth has caused pressure on all departments of the company, and especially in the warehouse, where up to 9,000 finished part and raw material items are stored.

"Four years ago we were not only growing, but we also had an ineffective manual, hand-written inventory management system that was woefully inadequate and causing our warehouse operators great frustration," relates Dave Houliston, inventory manager. The operators printed out an inventory master report daily based on manual inputs, and multiple copies were duplicated daily.

Inaccuracies abound despite frequent inventories. The problem, quite frankly, was that the data were at least eight hours old, and a great deal of clerical time was needed to maintain the old system. Not surprisingly, the daily report displayed a record accuracy of "50% to 60%."

Additionally, Bakery Crafts took major inventories quarterly in addition to the annual physical inventory. The annual took at least two weeks and involved some 25 individual full-time operations during that period.

Operator productivity also suffered. "With the old system, manual replenishment was very time-consuming," says Houliston. An operator had to

walk along the home pick locations and write down what was needed, go to a warehouse map and learn where it was, find it, and then return it to the home pick location. "Many times when the operator got to the rack where the material was supposed to be, it wasn't, meaning he had to search the warehouse," Houliston explains.

Making the great technological leap. Houliston conceded, "These were the symptoms of a company that had outgrown its old paper-based system. It was obvious we needed something better." They opted to look for a system that has "solid" warehouse management software and incorporates new technology like RF and bar coding.

After conducting a thorough review of available systems to fit their needs, Houliston and his team selected the RT Locator system (RT Systems; Ann Arbor, Mich., 734-662-7099).

"RT Systems worked with us to develop design specs and added custom coding to the RT Locator product," says Houliston. The solution reflected how Bakery Crafts wanted to operate their warehouse. Only after thoroughly testing the modified system was it then installed in the new warehouse, he mentioned.

The Bakery Crafts warehouse solution to better inventory accuracy. The final configuration uses 12 RF handheld terminals (Intermec Technologies Corporation; Everett, Wash., 425-348-2600). These operate off a single Intermec control unit interfaced into the RT Locator PC installed on the Bakery Crafts UNIX network. The company is now thinking about converting their existing system to the newer NT network operating system.

The Bakery Crafts/RT Systems software operates on the PC and responds to the RF terminals operating in the warehouse in real time. Also, almost all of the transactions in the warehouse now involve bar code scanning "for accurate and easy data entry," he declares.

Bar codes an integral part of the new system. All product cartons and storage locations in the warehouse are bar coded, including pick rack, back stock locations.

"Our suppliers are mandated to include on their incoming cartons a Bakery Crafts bar coded label," Houliston describes. "We supply vendors in the Orient printers and labels along with new item database updates to facilitate the bar coding of incoming material." A bar code printer in the West Chester warehouse replaces labels that are missing or that have been defaced.

RF tracks inventory throughout. When product is received, it is identified and skidded, and the item number and quantity are entered into the RF terminal. The skid is then put away into a rack location by a reach truck.

The operator scans the item number on the skid and the location label that it is being put into. "The RT Locator keeps track of the number of cartons of the particular product in location," Houliston explains.

Pick list generation now automatic. When replenishment to the back stock location (pick rack) is needed, it is requested by an RF terminal by scanning the part number needed (label on back of pick racks) and the quantity.

"This creates a task that directs the stock pick operator to a particular location to pick a specific number of cartons and deliver it to a particular back stock area," he describes. "The stock picker operator confirms this move by scanning the location of the back stock area."

If an item is needed in the pick area and has just arrived on the receiving dock, the system will direct some of the received material directly to picking without being placed into a high rack location. "Thus, we also have cross-docking capabilities, now," he offers.

Annual physical done in hours instead of weeks. One of the benefits of the new system is that the former two-week annual physical inventory now takes just six hours. That's a savings of 1,850 man-hours (92.5%) annually.

"That part of the inventory controlled by the RT Locator system does not have to be physically counted at the annual inventory due to its significant improvement in inventory accuracy," maintains Houliston. "This is possible because of the daily cycle counts we continue to do through the RT Locator system."

Typically, they do an aisle per day. They simply request the locations in that aisle, and the system creates cycle count tasks for the operator. The operator will then select the cycle count transaction, and he will be taken by sequence through the aisle. Discrepancies alarm the RT Locator and are investigated by supervisors. "These daily cycle counts can be done during the day shift while other transactions are occurring," Houliston notes.

Operators now typically trained in just one day. The original implementation took a "good year before warehouse personnel were able to use the new system fully," according to Tim Jordan, lead person in receiving. "However, that was mainly due to our leap from a manual system to an RF one. Our operators needed time to understand a computer system," he explains. Today, a new operator is given one-day training and is "cut loose the second day to do the replenishment activity with the handheld RF terminal with bar code scanner," Jordan declares.

Chapter I-8

Fifty-Four Tips for Improved Logistics Operations

1. Next generation advanced planning and scheduling software reduces inventory

“To improve our competitive position and meet market demand for sustained growth, we decided to reengineer our procedures for forecasting demand, accepting work orders from customers, making commitment for orders, and completing product deliveries,” describes the logistics project manager at a large semiconductor fabricator. The project manager and her team considered a number of advanced planning and scheduling software solutions before they selected the one from Paragon Management Systems (Los Angeles). In part, the software enabled them to improve visibility for cycle times, inventory levels, and other key performance measures. In addition, it offered intelligent routing, including product overrides for operations. “With the new software, we have been able to improve our throughput by better managing starts and product mix,” she explains. “Overall, we have been able to reduce inventory levels significantly, and improve cycle time by 10%.”

Managing Logistics *asked logistics managers where they have made the most cost reductions over the past year.*

2. Reduced logistics-related customer service costs

Among respondents in the logistics/transportation sector, reducing customer service costs was a critical cost control method implemented within

the past year. "The most successful logistics cost control idea that was implemented was shipping direct from customer sites to our gateways," explains the general manager of an international logistics company in Pennsylvania. "Utilization of our LTL [less-than-truckload] carrier agreements eliminated bringing freight into each station and line hauling to the gateway. One-year savings were approximately \$60,000."

Others took a more technological approach to customer service. For example, the distribution manager for a California-based printing company says that his firm developed an extranet site to provide detail on orders and shipment status to all customers. "We have been able to reduce customer service personnel and warehouse time tracing shipments."

3. Reduced throughput costs into and out of warehouses

Logisticians also report success in decreasing costs associated with material flowing in and out of their warehouses. Again, those in the logistics/transportation sector as well as respondents working in consumer manufacturing say that this was a beneficial cost control method over the past 12 months.

"We examined every process of receiving, shipping, and selecting to identify unnecessary processes," says the director of distribution for a retail company. "Our team members led the effort, developed new procedures, and implemented the results. We outsourced our freight planning to a broker. In both areas, we reduced our costs by more than 20%, and on some routes by 50%."

"We implemented a program to print individual box and carton labels overseas, reducing our label costs by 60%," explains the distribution center (DC) planning logistics manager for a footwear distributor in North Carolina. "Our consolidator is also responsible for notifying factories that the labels are ready, therefore giving us advance notice of production delays and ensuring vendor compliance on packaging and labeling. This enables merchandise to flow through the distribution center without delay and gives our buyers advance notice of production."

4. Reduced order processing and communication costs

Finally, respondents told *Managing Logistics* that significant savings could be achieved by enhancing these practices. "We reduced the total cost per order by 50% compared to our previous fiscal year," shares the corporate manager

of logistics for a printing company in Kansas. “The total cost was for material handling, receiving, inventory control and shipping.”

The warehouse manager of a large automotive parts supplier in Missouri tells a similar story: “The primary cost control focus has been on enhancing the order processing system not only to eliminate excessive production of inventory but also to decrease the number of stockouts and lost sales.”

Managing Logistics *asked logistics managers what technologies they have implemented in the past year, how they are using them, and what results they have achieved.*

5. Shipping activities greatly improve with dedicated software

Logistics technology has had the greatest impact on reducing freight/transportation costs and on helping to negotiate shipping rates and select new carriers, according to our survey. Respondents also reveal, however, that the tools have greatly improved the overall efficiency of their logistics departments. For instance, the materials manager for a large high-tech firm in South Carolina says that integrating shipping software with operations software to forecast and predict timely shipments has resulted in more balanced workforce requirements to order flow and scheduling trucks and carrier selection for meeting customer ship dates.

Another respondent shares that significant savings have been realized through a more efficient shipping process. “Using SCOR [supply-chain operations reference] methodology, we sought improvements in our customer on-time delivery,” says the director of factor logistics at a company in North Carolina. “We also implemented an advanced planning shipping system, re-engineered our order management processes, and diligently pursued strategic partnerships. As a result, we improved our order management costs—reduced 1.5% from total logistics cost—increased our schedule achievements to 95%, and improved our supplier on-time delivery for key commodities to 93%. These overall improvements resulted in an increase in customer on-time delivery to the high 90s.”

6. Distribution packages control inventory

Reducing inventory obsolescence, damage, and pilferage are among the greatest challenges logistics managers say they face daily. Many indicate that the software systems implemented this past year have made great strides in

helping them meet those challenges. “We implemented MFG Pro; now we can truly get a handle on controlling inventory and production needs to our customer requirements,” says a materials manager for an automotive molding company in Indiana. “Different scenarios can be played out in the system to keep the inventory at the desired level and still monitor our suppliers’ delivery performance.”

The vice president of corporate logistics for a retail home furnishings company in New York shares, “We implemented a forecasting and distribution system requirements planning [DSRP] software package. We were able to justify the purchase with a cost-freight analysis and payback in terms of inventory reduction and productivity gains in product supply planning.” The logistics pro says that a survey after the first four months of installation revealed that inventory reduced from 29,500 pieces at \$5.1 million to 26,400 pieces at \$4.1 million, with no impact on customer service level or stock-outs.

7. Networks are easily managed through various technology tools

The Internet, intranet, and electronic data interchange (EDI) are helping many logistics managers carry out sophisticated shipping activities. For instance, the product inventory manager for an electrical supply firm in Illinois says, “We serve 115 locations in 25 states. Our efforts are to reduce cycle time from the time a branch places an order until the invoice is paid. With the expansion of our EDI software, we can reduce time and paper.”

Modeling tools are also popular among *Managing Logistics* readers. According to the vice president of supply chain management for a pet food company in Kansas, his firm has optimized its distribution network using the SAILS location-modeling tool. “You have to get the network efficient before you can work on reducing individual components.”

Managing Logistics asked logistics professionals what they consider their supervisors’ greatest concerns.

They said that exceeding the limits on customer service is an issue close to the hearts of their supervisors, with almost 30% responding. There was just a slight difference in what size of organization places a higher value on customer service, as 30.6% of managers in firms with under 500 employees say that their bosses place a great emphasis on that area, whereas 24.3% of managers in companies employing over 500 people feel that way.

One of the more surprising results to come out of the survey is that lo-

gistics managers working in logistics/transportation firms say that only 10% of bosses are overly concerned with customer service. This is a much lower response rate than that in the industrial/manufacturing sector (23.1%) and in the consumer manufacturing area (33%).

Following are some of the ways in which logistics managers are tackling the issue of improving customer service for their supervisors.

8. Improved communication with customers

Managers said that the personal touch that they can give to customers seems to make the most difference in resolving customer issues. “We are addressing customer concerns by empowering our own colleagues to make independent decisions regarding how to solve customer problems and issues,” says the logistics manager for a pet product company in Virginia.

“We revamped our telephone system to service customer calls on the first try,” says the director of fulfillment logistics for a personal protection device manufacturer in Pennsylvania, who reports to the company vice president.

“We are improving the time it takes to process customer orders by eliminating non-value-added steps in our process,” says the director of operations for a model trains manufacturer in Wisconsin. “However, if we are hit with an out-of-the-ordinary amount of orders, we cannot respond as quickly as we’d like.”

9. Established benchmarks of customer service

Others tell us that only when they truly understand what the industry standards for ideal customer service levels are can they then rise to the occasion. “We introduced a continuous process improvement model and benchmark against best-in-class standards for customer satisfaction,” says the logistics manager for a fruit-based juice company in Nevada, who reports to the plant manager. The result has been a 184% increase in productivity in the last 12 months and a 56% reduction in labor-related costs—all without company layoffs.

“We developed a delivery benchmark for 48 states and negotiated with carriers to meet those service levels,” says the logistics manager for a manufacturer in Illinois.

The results of managers’ efforts this past year shows that 5.2% of the companies had 8% or more customer shipment complaints; 47.7% say that

their customer shipment complaints were between 1.1% and 7.9%; and 47.1% say that customer complaints were 1% or below.

Managing Logistics asked logistics professionals which costs they have reduced most drastically in the past year.

10. Reduced warehouse storage/inventory costs

According to the survey, almost 35% of the respondents have spent their time reducing storage/inventory costs. The majority of these (41.6%) are in the consumer manufacturing sector. A key similarity among respondents is that they worked with suppliers to achieve their goal. "Our most significant cost control idea was eliminating dependence on outside services," says the purchasing manager for an agricultural components manufacturer in Wisconsin. "We are now managing a separate facility from our current site. This has reduced warehousing and transportation costs by \$25,000 annually. This was also achieved by working with suppliers to hold and ship inventory as needed with no additional costs."

"We implemented a cost-cutting strategy aimed at reducing warehouse storage and inventory carrying," says the director of a health care product supplier in Illinois. The strategy he describes is a four-step process: (1) consolidating warehouses; (2) evaluating needed pallet space; (3) eliminating hold time and turning inventory faster without loss of service; (4) asking suppliers with bulky products to deliver just-in-time (JIT).

11. Reduced inventory carrying costs

Again, the consumer manufacturing sector shows that it spent the most time uncovering savings associated with carrying inventory, with 29% responding. Managers reveal that while costs are cut, other benefits have been achieved as well. "We have begun implementing an improved order-to-deliver vehicle ordering system," explains the logistics manager for a vehicle manufacturer. The results, he says, have been improved information gathering on customer preferences, shortened order cycle times, and a pull versus push strategy on order fulfillment.

"We reduced inventory carrying costs by about 10%, which has resulted in more storage space for other materials, such as cardboard packing and pallets," says the manager of manufacturing services for a flexible packaging company in Pennsylvania.

12. Reduced international logistics costs

Not all cost-cutting strategies were focused within the warehouse, or even within the United States. Many say that international logistics costs were a primary focus last year. For instance, the distribution supervisor for a medical products supplier in Minnesota explains, “We began shipping with DHL [Airways] to allow our European customers to receive their product sooner. Thus, they didn’t need to carry as much inventory. DHL had lower rates than regular freight forwarders, and they delivered most packages in only two business days.”

“For our cargo to Russia, we manage to use a lot of shipside trucking deliveries to save on storage and labor costs,” says the logistics specialist for an international trading company based in Georgia. “We closely coordinate deliveries with truckers and cold storage at wharf, saving up to 10% on storage and loading costs.”

“We centralized our U.S. operation,” says the logistics senior manager for a fine jewelry distributor in New York. “We went from receiving shipment from overseas to each individual location to having everything shipped to a central location.”

Managing Logistics asked logistics professionals how prevalent outsourcing has become to their operations within the past year.

As a means of controlling logistics costs, about 18% of all respondents are outsourcing various logistics activities. The industrial manufacturing sector is making the most use of outsourcing with 20% responding, 17% in the consumer group, and 18% in the logistics/transportation industry. Outsourcing seems to be a practice that is more predominant in firms with under 500 employees (17.9% respondents) versus those with over 500 employees (15.7%).

So which non-value-added services are logistics managers outsourcing? One logistics manager eliminated in-house messengers, saving the company \$35,000; another subleased his facility to reduce distribution expense by 30%; outsourcing forecasting and planning resulted in a \$27 million savings in less than one year for one company. Still another saved 10% in annual freight costs by outsourcing with a freight management firm. Here are some other examples of how managers are taking advantage of outsourcing:

13. Use contract carriers

Whenever respondents could turn over transportation activities to a third party, they did so, resulting in significant service improvements and savings

opportunities. “We outsourced our private fleet to contract carriers,” says the director of supply operations for a large propane company in New Jersey. “We selected carriers that had an interest in rolling over our drivers into their operation, contracting for rate consideration and forming a strong relationship with us.” The vice president for a small steel processing plant in Ohio shares a similar story: “Our outsourcing activities began with the elimination of our company fleet to an asset-based logistics carrier. This has increased the utilization of our facility, and annualized cost savings are projected to be over \$1 million.”

14. Enlist help with international shipments

Managers dealing with international shipments sought out ways to outsource parts of that business. “We contracted a third-party surface logistics company to manage/route and deliver all international inbound ocean and rail containers from Brazil and Mexico to service our North American automobile manufacturers,” explains the logistics specialist for an automotive supplier in Michigan. “This allowed us to become more flexible and responsive to changing customer needs and allowed logistics personnel to focus on better inventory management and cost reduction ideas and to improve communication internally with our customers.”

“Outsourcing our order fulfillment process for international service and parts business to a freight forwarder has reduced expenses by \$150 per year and reduced our cycle time,” relays the manager of transportation for a manufacturer of power generation equipment in Connecticut. “The forwarder executes all activities from expediting through shipment at a fixed cost per order.”

15. Reconsider outsourced activities

Although outsourcing remains a viable option for many managers, the percentage of users to our survey a year ago was 24%—6% more than this year. One reason for the decrease may be that some managers are bringing outsourced activities back in-house. “We decided to bring our inbound logistics operations back in-house,” says the corporate director of logistics planning for a large grocery distributor in Texas. “It just did not make sense to keep it outside the business. Even though our business partner performed to the letter of the contract, I just felt that we could save over \$1 million if we handled the activity ourselves.”

Ocean shipping rates continue to rise. How are logistics professionals working around this fact?

16. Renegotiated shipping rates and more

Many of the managers are learning to renegotiate ocean shipping rates like they have traditionally done with over-the-road haulers. For many, this has reduced freight charges significantly. For instance, the associate director for a chemical distributor in Hawaii says, "We renegotiated ocean shipping rates for bulk coal from Australia to Hawaii. As a result of this, we reduced our ocean shipping cost by \$3.00 per metric ton."

In addition to negotiating rates, some managers are forging arrangements to have the ocean carrier provide more than shipping services. "We negotiated an agreement with a vessel line to provide additional services (free warehousing overseas) with no demurrage charges in exchange for a large shipment," says a traffic manager from Texas. Product produced/shipped from us to Rotterdam for clearance, transhipped to Italy (stored in ocean containers) for several weeks, with eventual delivery to client in Italy minimized product handling and provided needed warehouse space."

17. Obtain discounted rates

Cost savings are also being achieved through discounted rates offered by the carriers. "With most carriers, we carry a 65% discount on freight," says the shipping team leader for a company in North Carolina. "On some carriers, we carry a discount with FAK class exception of 60, 70, and 77.5, saving our company thousands of dollars per year."

Discounts can also be realized through volume purchases. The transportation manager for a pharmaceutical distributor in Illinois explains, "We leveraged our buying power with other business units within the company. We were able to reduce ocean container rates by \$900 per load."

18. Reduce costs through volume

Respondents told *Managing Logistics* that if they can promise to ship more product with the ocean carrier, they will be guaranteed lower rates. Says the transportation planning manager for a beverage company in New York, "With regard to ocean imports, we have increased shipment yield (heavy shipments) in containers through the use of special permits. In addition, we

are using more intermodal services by steamship companies. We estimate a 5% to 10% cost-reduction overlap.”

The operations manager for a firm in Maryland tells a similar story: “We worked on a promise of turning inventory around within 30 days. We worked with dealers and the customer to ship LCL [less than container load], LTL, and air when there was not enough inventory to ship by container. We therefore reduced demurrage costs and container storage costs and were able to control our inventory more efficiently.”

19. Why did Heineken USA, Inc., win the Voluntary Interindustry Commerce Standards Association (VICS; www.vics.org) Best in Logistics Award?

Heineken received this prestigious award for developing innovative internal systems dedicated to cost-effective service and supply chain improvement. Andy Thomas (914-681-4175), vice president of operations planning at Heineken, explained how.

What is the best logistics improvement made at Heineken in the last year?

“We have set up a communication link with our distributors to work more effectively with them on planning issues and forecasting.

“We also automated a lot of our manual processes on the back end, which has enabled us to redeploy our workforce for more value-added functions. We eliminated a lot of the paper-pushing activities so that we now have more time to be managerial instead of clerical.”

What obstacles have you faced in making these logistics improvements?

“We had to ask our distributors to work with us in managing the supply chain. We needed them to plan forward-looking forecasts with us and to give us a better idea of what they would need three months out versus only one month out. We also asked the distributors to place their orders with us over the Internet and share information with us about inventory management.

“We realize that anytime there is change, there is a tendency to resist. Fortunately, our distributors recognized the benefit of these changes, such as greater efficiency and improved customer service levels.”

What are the greatest benefits Heineken is achieving as a result of these logistical changes?

“By having tighter relationships with our distributors, we are able to be more responsive, not reactive, to the market. We are working to reduce lead times to the distributors through improved forecasting and planning, as well as by automating some of our more labor-intensive processes.”

Other winners of the VICS awards include ShopKo Stores (920-429-4800), Best in Retail Award for developing and implementing innovative internal systems and practices dedicated to meeting consumer demand; the Warren Featherbone Company (770-535-3000) and Dillard’s, Inc. (501-376-5500), Best in Retailer/Supplier Relationship for work in collaboratively creating end-to-end supply chain integration and cooperation; and Bob L. Martin, former president of Wal-Mart International (501-277-3017), VICS Lifetime Achievement Award for setting standards in the Quick Response movement.

More tips for improving logistics operations.

20. Using the Web to track inventory in motion

Problem: For companies like Pacar Automotive and Lucent Technologies, freight shipping involves many people and services to handle inventory in motion, increasing the chance of delays. Proprietary enterprise systems fail to track inventory from point-of-origin to destination, leaving shippers unable to track arrivals and resulting in billions of lost dollars annually.

Solution: A Web-hosted solution servicing the international community, developed by Passage Inc. of Seattle, provides global visibility of current shipment status to users at any time. Shippers, consignees, and service providers have secure, designated access to information about auditors, brokers, carriers, financial agents, tariffs, currency conversions, shipment preparation, load planning, and event tracking. Members pay for the services on a transaction basis.

Results: “The software has made my job more efficient and enables me to track a package from the moment it leaves my hands to when it reaches the receiver,” says Martha Davis, manager of special orders with Pacar Automotive.

“Passage saves us time when dealing with multiple freight forwarders by using one platform, rather than having to learn multiple vendors’ proprietary software,” says Robin Franko, traffic manager with Lucent Technologies.

21. Software brings SCOR model to life for supply chain managers

Problem: Supply chains are being pushed beyond their performance limits by rising consumer expectations for new products and services, faster delivery, and personal attention. At the same time, supply chains have become more complex as organizations integrate more tightly with their vendors and customers.

Solution: D-SCOR, from Gensym Corp. of Cambridge, Massachusetts, was developed to help select the most effective supply chain configurations, policies, and practices based on operational data. It supports critical decisions such as make versus buy, centralized versus distributed operations, facility location, single-versus multivendor sourcing, and best responses to changes in the market.

Results: “D-SCOR has enabled us to improve our customers’ supply chain operations,” says Koei Ohgi, general manager of Itochu Techno-Science Corp.

“D-SCOR promises to be an effective vehicle in analyzing our client’s business problems and in helping to visualize and improve their operations,” says Chris Holt, director of Ernst & Young’s Accelerated Strategic Modeling Environment for Supply Chain.

22. Establish benchmark for order visibility and customer service

Problem: Every year, Lanier Worldwide, Inc., a private label distributor of copiers, receives over 50,000 calls inquiring about an order. “The cost involved in man-hours alone to take the call, research the status of the order—not to mention often contacting other people within the company for additional information—added up,” says Bill Cook, Lanier’s vice president of logistics.

- Solution:** Lanier will use Provia Software's integrated Warehouse Management System and Transportation Management System modules, with Viaware Decision Support System, providing the shared data of information that will reduce inventories and operating costs by providing order visibility throughout the organization and to customers.
- Results:** Lanier customers will be able to track the status of their orders via the Internet. "The software will allow us to set a new benchmark for customer service not seen in our industry," says Cook. "Instead of our customers having to call to inquire about the status of an order, they will be empowered to view all of their order information and the real-time status of their orders."

23. Reverse logistics for online retailer becomes more efficient

- Problem:** Online and catalog operations carry the highest product return rates in the retail industry. This is exactly the situation that Value America was facing when it decided to look for a reverse logistics solution to handle the disposition of its returned items, in an effort to streamline that process.
- Solution:** Value America selected USF Processors, a logistics subsidiary of USFreightways Corp., as its reverse logistics solution. USF Processors will process and account for returned and damaged merchandise in its returns facility in Memphis, Tennessee.
- Results:** Integration of tracing data from Value America's return shippers into USF Processors' database for reports generation will allow Value America to have a more cost-effective and efficient operation for returns.

24. WMS takes control of improved AS/RS

- Problem:** Hamilton Sundstrand, a supplier of aerospace products, needed a warehouse management system that would support an automated storage and retrieval system (AS/RS), which stores 25,000 SKUs in over 80,000 locations.
- Solution:** The MARC-CS warehouse management system from MARC Systems was chosen as a more user-friendly application over Hamilton Sundstrand's former operating system.

Results: The MARC system will offer Hamilton Sundstrand better warehouse activity control and improved interleaving capabilities related to picking, putaway, and counting tasks, says Tom Harms, Hamilton Sundstrand's material control manager. The system will also allow like products to be stored in the same location, improving storage utilization and order processing.

25. *Managing Logistics* spoke with the president of the Council of Logistics Management (CLM), Herb G. Johnson.

We asked about the challenges he faces as a logistics professional and about where he thinks the industry is headed. Johnson is the executive vice president of supply chain for Premiere Inc. (San Diego; 858-509-6386).

What are the greatest logistics challenges facing logistics managers today, and what skills are required to meet these challenges?

"Human resources is one of our greatest challenges. The level of talent of those who are qualified is lean, and at the senior level positions are tough to fill. And at the lower levels, kids are coming out of university programs and going to work for consulting companies rather than logistics firms because they can make more money.

"Another challenge managers face is finding employees with the right skills, as these skills have changed over the past few years. They must have marketing experience to deal with electronic commerce and possess an understanding of technology. Everyone is ready to jump on the electronic commerce bandwagon, but does everyone really understand how e-comm and technology connect?"

What is the one tool that logistics managers need to do their jobs most efficiently?

"The biggest tool that has helped me is a strong, creative staff. As a manager, you can't manage; you have to lead. Give your staff goals and provide the resources to let them do their jobs. In most cases, a weak staff will lead to failure.

"In addition, make sure that this staff stays current on industry trends. I would say that only around 15% of the logistics organizations out there provide the resources that let their employees stay current, and those are the firms that lead the game. The rest are just followers.

“I’m not touting CLM, but trade organizations are a great way to get the information that allows you to stay abreast of change and technology. I am the first to admit that trade organizations are not a panacea to solve all problems, but they do offer an opportunity to find out how everyone else is handling similar issues.”

What is the one change you have made to your logistics operation in the last year, and what have you seen as a result?

“I have been in my job for three months, and one of the best changes I have made is bringing on well-rounded supply chain talent. They possess knowledge in many areas, not just one, from order entry to distribution management to inventory control to procurement and warehousing and transportation management. The diverse talent has made the organization more robust.”

How are today’s top logistics managers using fleet management technology, and where is it having the greatest impact?

26. Improves customer service and fleet operations

Feesers, Inc., a food service distribution company in Harrisburg, Pennsylvania, is using a wireless communication system that enables the company to maximize routing efficiency, automate Department of Transportation (DOT) and International Federation of Technical Analysts (IFTA) compliance, and automate the payroll process. “We are using the Fleet Advisor system from Eaton Corp. [Clemmons, N.C.; 800-423-1525], which we expect will improve our customer service and help us achieve our operational goals,” says John Tighe, executive vice president and COO of Feesers.

27. Maintains competitive advantage

When Somerset Food Service wanted to outfit its 23-truck fleet with on-board computers, it selected a solution from XATA Corp. (Minneapolis; 612-894-3680). According to Tim Williams, owner and CEO of Somerset, the system allows the distributor to maintain its advantage in a highly competitive industry, where meeting customer delivery expectations is significant. “We wanted better control of our fleet and less hours on the delivery

route,” he says. “The XATA system allows us to make powerful decision support for the fleet by automatically recording and processing driver and vehicle activity.”

28. Optimizes nationwide transportation network

Lower transportation costs, decreased delivery times, and improved customer goals are the objectives that Sugar Foods Corp. hopes to achieve with its NetWORKS Transport solution from Manugistics Group, Inc. (Rockville, Md.; 301-255-3063). The food distributor will use the solution to optimize transportation plans and execute outbound transportation operations simultaneously. “Sugar Foods operates in a highly customer-focused industry where both service and cost must be fully optimized,” says Jim Walsh, vice president of information systems. “We expect this system to meet the needs of this competitive industry.”

29. Enhances trailer tracking

Schneider National Inc. is using untethered trailer tracking—the ability to determine and report the position and status of trailers in the absence of conventional tractor or power connections—to better manage the productivity and efficiency of its trailers by linking trailer location and status data directly to its fleet management and logistics systems via a satellite network from Vantage Tracking Solutions (Dulles, Va.; 703-406-5068).

Communications and sensor technology embedded in 43,000 trailers detects when a trailer is connected or disconnected from a tractor, if it is loaded or empty, as well as its global positioning system (GPS) position and a number of other status reports. “Untethered trailer tracking represents the next major breakthrough in transportation technology,” says Don Schneider, president of Schneider National, Inc. “We expect our trailer productivity to improve, meaning better service to our customers.”

Dart Transit Company, a nationwide truckload carrier, will soon test the TrackWare solution from HighwayMaster Communications Inc. (www.highwaymaster.com). Combining GPS and wireless data transmission, Dart expects the solution to help it receive critical information in managing its mobile assets. “The promise of untethered trailer tracking is an opportunity to redefine how we manage trailer productivity and security,” says David Oren, executive vice president of Dart.

We recently asked logistics managers how they reduced or controlled costs through improved warehousing.

30. Revamped warehouse layout or moved locations

About one-third of all the logistics managers surveyed by *Managing Logistics* say that redesigning their facilities and selecting new locations were their most successful logistics cost control ideas this past year. This has resulted in some pretty significant savings.

Consider the case of one manager who completely changed how product mobile electronic parts are picked in his DC. “We reengineered our distribution center layout by pulling out pallet racking and setting up pick aisles with bucket storage, and we added a conveyORIZED system for improving throughput. This resulted in a 19% increase in pallet storage and a 30% increase in throughput.”

Moving the warehouse location can also make a big difference in slashing costs and can possibly result in some unexpected savings. The vice president of operations for a third-party logistics company explains how the provider redesigned a warehouse facility for one of its customers.

“We moved the warehousing operations out of the manufacturing site in Waco, Texas to a stand-alone facility in Lewisville, Texas. This resulted in improved warehouse layout, improved/lowered transportation cost, lower labor costs, and even reduced inventory carrying tax due to new free trade zone status.”

31. Consolidated DCs in the network

Respondents say that consolidating their distribution networks cut warehouse labor costs sometimes in half just by eliminating redundancy in the system. In one case, the director of materials tells how he centralized four distribution facilities into one site, which increased output by 40% and reduced handling costs by 20%.

The director of operations for a consumer goods manufacturer in Arizona shares a similar story: “We consolidated all return goods operations into one location, reducing duplicate labor, on-hand inventory, and cycle time.”

In addition to labor cost reductions, consolidation allows managers to select sites that put them closer to their changing customer base. The

projected savings for one director of a customer care service will be \$1 million when complete.

Some managers say that they have been able to be creative in their DC consolidation networks, as in the case of this operations manager in Oregon: “We established a hub-and-spoke arrangement with inventory locations centered in Portland, Oregon, to serve the Northwest. This has saved inventory dollars, improved service to customers, and improved order fulfillment activity.”

Managing Logistics *asked logistics managers to explain how they will address customers’ delivery standards in the next year.*

32. Third-party provider handles transportation and logistics

Harley-Davidson, Inc., and EGL, Inc., have signed an agreement under which EGL will provide logistics and transportation services for 65% of all domestic motorcycle deliveries.

“We have a plan that will help us manage the costs, quality, and control of our motorcycle delivery program,” says David Alamshah, Harley-Davidson’s director of transportation and general manager. Harley-Davidson also expects to benefit from improved travel time, as shipments will be handled by EGL, making them more time-definite in nature.

Thomson Multimedia also selected a third party to handle its transportation initiatives. Schneider Logistics will handle intra-North American shipments, outbound shipments originating throughout the world, and global inbound shipments to North America. The five-year contract will enable the electronics producer to address customers’ delivery standards better, says Dave Ruby, vice president of customer service and logistics for Thomson.

33. Better purchasing decisions lead to more timely deliveries

BP will deploy Aspen Technology, Inc.’s, supply chain software to manage 1,150 of its retail fueled distribution outlets in the United States. The technology will give BP the power to forecast customer demand, optimally schedule the distribution of product, and predict demand for fuel products on a daily basis.

The technology increases profits and lowers costs by reducing opera-

tional overhead, minimizing excess inventory levels, and lowering working capital requirements, the company claims. BP believes that its organizational efficiency will improve through better purchasing decisions, locking in customer demand, increasing utilization of transportation assets, and increasing motor fuel profitability.

34. Command center manages multiple transportation modes

John Deere will use supply chain solutions from Manugistics, Inc., to create an intelligent global transportation network designed to maximize customer service. A Manugistics-powered transportation command and control center located at John Deere's headquarters in Moline, Illinois, will help the company manage inbound freight movements across multiple modes of transportation.

John Deere expects to enhance significantly product flow to distribution centers, to improve the routing of multipoint freight movements, and to enhance communication with carriers through Web-enabled collaboration.

Managing Logistics *asked logistics managers to identify the most significant shipping strategy that they plan to implement in the next year.*

35. Automate multimodal shipping management

Bearing Distributors, Inc. (BDI), was looking for a system that would enable it and its suppliers to view detailed shipment information, from status of shipments to the contents of each package, in an effort to optimize customer service. BDI selected the Kewill.Ship Server from Kewill Systems PLC.

"The Kewill.Ship Server will enable us to collaborate more effectively with our global trading community, save on shipping costs, and optimize efficiencies throughout the supply chain—all of which are crucial to the success of our business," says Chris Shaffer, director of information systems at BDI. In addition, BDI will capture enterprise-wide shipping and transportation information.

The solution will enable BDI's enterprise to automate multimodal transportation and international export document processing. A main server in Cleveland will be configured as the Web server and will run all the sites and workstations via an Internet connection from one centralized database.

36. Convince partners to use same shipping platform

Millard Refrigerated Services, a leading refrigerated warehouse and distribution company, requires a system that maintains the integrity of the unit loads passing through its operation. The company also demands a system that complements its strategy of building state-of-the-art DCs with sophisticated logistics and transportation services and of creating a seamless package of storage, distribution, logistics, and transportation services.

The company decided that its partners needed to help maintain that strategy by moving to the CHEP pallet pool over floor loaded, pallet exchanges, and slip-sheet shipping alternatives. “We believe that the CHEP program allows us to service our customers and their customers most effectively,” says Lynn Mulherin, executive vice president of Millard.

Millard’s approach is based on strict financial economics. Having a sound product-handling platform is critical because the company takes total responsibility for moving inventory from warehouse to destination. For customers, risks are eliminated, costs are reduced, and resources are maximized. For Millard, any product damaged or any productivity lost because of poor product-handling systems comes off its bottom line. Mulherin believes that pallet pooling reduces risks for customers and Millard.

37. Product distribution via the Web

Coca-Cola Enterprises Inc.’s (CCE) logistics execution involves shipping to more than 350 distribution centers, using a combination of private fleet, common carrier, and dedicated logistics providers. Looking for a more efficient way to deliver beverages to its distribution centers, CCE will use the Nistevo.com network. CCE believes that this will help reduce processing expenses, cycle times, and inventory levels by increasing visibility through the supply chain.

Mike McNally, vice president of operations planning and development, says that CCE will gain real-time visibility for forecasting shipping needs using the Nistevo.com contract management, exchange, and execution systems. This will allow CCE to manage contracts online, share capacity to improve asset utilization, and track in-transit goods. “We continually strive to improve our distribution system by using solutions that benefit our entire supply chain network,” says McNally.

Managing Logistics *asked logistics managers which supply chain initiatives they have attempted in the last year or will attempt in the next 12 months.*

38. Build a global, enterprise-wide supply chain

Power tool manufacturer Black & Decker wanted to improve service to its customers, improve asset management, and provide the ability to manage growth. To achieve that goal, the company implemented a foundation for global, enterprise-wide supply chain management to shorten supply chain reaction time and ensure high customer service levels.

Black & Decker is using SAP R/3 and Manugistics' constrained production planning (CPP) solution. "We implemented the Manugistics solution because of the impact that it could have on our service levels and asset management capabilities," says Mark Dailey, vice president of supply chain for Black & Decker Power Tools.

The solution allows Black & Decker to predict future demand and, based on activities that occur in the marketplace (changes in customer orders, projections of promotional events), readjust the supply plan on a nightly basis. It also helps identify potential constraints in the system on the supply base side.

39. Shift responsibility to suppliers

Moving inventory into and out of Compaq Computer Corp.'s Houston facility was often a logistics nightmare, admits Bill Moore, Compaq's material logistics director. "No matter where inventory was stored, it was always in the way."

Compaq began working closely with third-party logistics provider Customized Transportation Inc. (CTI), which helped the computer manufacturer entirely reorganize its inbound supply chain operation. The company now requires its suppliers to keep most inventory in a CTI-run facility, while still meeting its 24-hour-a-day, seven-day-a-week manufacturing schedule.

In doing so, Compaq is a leader in a trend that seeks to shift much of the responsibility and risk for supply chain inventory and management from primary manufacturers to suppliers and third-party service providers.

40. Increase visibility and integrate with manufacturing

Rohm and Haas Co. selected a suite of Manugistics NetWORKS solutions to increase visibility into its global supply chain and to project future

customer demand accurately. The solutions are designed to provide Rohm and Haas with real-time decision-making capabilities that continually assess global supply chain performance and identify potential problems before they occur.

The chemical company will also deploy an enterprise resource planning (ERP) solution from Aspen Technology, Inc. (Cambridge, Mass.). Plantelligence is expected to improve the efficiency of Rohm and Haas's world-class production facilities by coordinating manufacturing operations with their global supply chain.

Managing Logistics *asked logistics managers about the efforts they plan to take either domestically or internationally regarding inbound logistics.*

41. Contract with a service provider

Tyco Healthcare, a business segment of Tyco Intl. Ltd., has contracted with Emery Worldwide to manage its inbound freight handling, customs clearance, warehouse and inventory management, and distribution of its medical products throughout Asia Pacific from a centralized logistics center in Singapore.

Tyco and Emery will jointly set up a DC and systems, explains Walter Tarca, area controller of Asia Pacific for Tyco. Emery will also ensure that the facility meets Tyco's standards, including temperature-controlled storage areas, sealed floors, and robust security.

42. Centralize logistics information

Sharp Electronics Corp. will use Celarix Visibility from Celarix, Inc., to manage its inbound domestic and international product movement by centralizing relevant purchase order and shipment information.

According to a Sharp spokesperson, customer service will be improved via real-time shipment information: "The black holes that lead to inefficient and redundant processes will be eliminated when we use this system."

43. Take advantage of the Internet

The HP Printers and PC Division of Hewlett-Packard Company (HP) uses EDI and Internet capability to streamline and speed up its inbound supply

chain. It uses an ERP system to send order information via EDI to an HP or logistics provider's warehouse, where component inventories are held until shipment to an assembly plant. Overall, supply chain capability has increased HP's fill rates and reduced inventories.

44. Tie manufacturing and logistics together

Ford Motor Company will work with SynQuest, Inc., to shorten order-to-delivery times and improve supply chain performance. Ford will leverage SynQuest decision-support software to help control Ford's automotive, distribution, and inventory costs. Ford expects to plan and simulate its logistics processes to help achieve precision and reliability in supply chain and distribution operations.

"We plan to use the SynQuest software to tie our manufacturing and logistics together more effectively," says Jerry Joyce, director of Global Logistics at Ford. "Our goal is to fulfill orders to customers faster."

Managing Logistics asked leading logistics professionals about their most successful method for delivering products in the past year.

45. Outsourcing inventory management

Jo-Ann Stores, Inc., needed to manage inbound seasonal and promotional merchandise coming from Asia to its retail stores and superstores. The company chose to outsource this process to Redwood Systems, which manages receiving, unloading, and inventory, as well as fulfillment services and distribution.

The merchandise is then delivered on a JIT basis throughout Jo-Ann's retail outlet chain, which is managed by a warehouse management system from EXE Technologies, Inc. An electronic data link between Redwood Systems' California facility and Jo-Ann's Ohio headquarters speeds the flow of proprietary information. The data link enables Redwood Systems to customize individual store orders and react quickly to specific JIT needs.

46. Optimizing lane assignments

Colgate-Palmolive has implemented OptiBid, an optimization-based bid and lane assignment system from Logistics.com. The tool helps shippers so-

licit proposals from freight carriers and analyze bid responses to determine the best solution based on price, capacity commitments, and historical service performance. Once the carrier-to-lane assignment is determined, OptiBid generates a set of routing files for integration into Colgate-Palmolive's load-tendering system.

"OptiBid will enable us to secure maximum network capacity, partner with the highest quality truckload motor carriers, and reduce overall transportation costs," says Jim Davis, director of U.S. company customer service and logistics for Colgate-Palmolive. "The auction capabilities provide us with the tools to generate cost-effective, service-oriented assignment of transportation service providers to lanes within our network operations."

47. Shipping directly to customers

Virtual Supply Logistics Pty Ltd. (VSL) of Australia is using DeliveryNet solutions from the Descartes Systems Group Inc. to streamline the order fulfillment process. VSL will create its own DeliveryNet using Descartes' e-Frame technology to connect retailers to suppliers and partners, enabling home delivery directly from supplier facilities, accompanied by value-added services.

"With Descartes' e-Frame architecture, we have real-time visibility of the movement of goods and information across our entire fulfillment and value-added service network," says Patrick Byrne, CEO of VSL. "The technology enables our clients to synchronize with their partners' disparate systems over a neutral information network. This will enable shipment directly from their suppliers' warehouses, reducing the cost of delivery and increasing service levels." He adds that the VSL service will greatly reduce the number of movements within the supply chain.

Managing Logistics *asked logistics managers about the order fulfillment strategies that they have implemented in the last year.*

48. System integration balances order and information flow

"We are integrating shipping software with operations software to forecast and predict timely shipments," says the materials manager for a high-tech firm in South Carolina that employs over 85,000 people. "This has allowed

us to balance workforce requirements to order flow and to schedule trucks—all meant to ensure that we meet our customer ship dates.”

49. Work closely with manufacturing to schedule production

“We are using intermodal transportation to our centralized distribution centers,” explains a traffic manager for a small food product producer in Oregon. “This allows our production facility to manufacture on a schedule versus a ‘knee-jerk’ reaction to customer orders and short delivery windows.” He says that overall savings are on track to garner between \$300,000 and \$400,000 per year on transportation alone.

50. Overhaul systems and processes

“We sought improvements in our customer on-time delivery by implementing an automated replenishment system, reengineering our order management processes, and diligently pursuing strategic partnerships,” says the director of factory logistics for a compact disc manufacturer. “As a result, we improved our order management costs [reduced 1.5% from total logistics costs], increased our schedule achievements to 95%, and improved our supplier on-time delivery for key commodities to 93%. These overall improvements resulted in an increase in customer on-time delivery to the high-90th percentile.”

New technology was also the answer for a firm in New Jersey, says the vice president of operations. “We instituted a new order fulfillment system into 11 of 20 distribution centers. This has reduced head count by almost 10%.” The idea, he explains, was to increase the service levels and cutoff time for shipping orders.

51. Make online fulfillment as good as in-store fulfillment

According to Michael Sanders, COO of LearningExpress.com, an online toy retailer, Web-based fulfillment is viewed as an increasingly efficient and critical link in delivering a winning on-line shopping experience. So when Learning Express (Ayer, Mass.) wanted to put its retail business on the Internet earlier this year, it sought a solution that would manage the fulfillment process from procurement to transportation. Sanders expects the NEXstep (Plano, Texas) solution to give online customers the same service “they’ve come to expect from our retail stores.”

Managing Logistics *recently asked logistics professionals how they are using supply chain management software and what impact it has had on their operations.*

52. Streamline order fulfillment

Problem: Service Merchandise Company, Inc., a retailer of fine jewelry and home lifestyle products, worked on an inflexible main-frame warehouse application that produced paper-based processes and required more human attention.

Solution: The company is now deploying the Optum SCE Series software in its three forward-serving distribution centers to support demand-driven replenishment across the supply chain. The Optum solution will automate complex material handling at the DCs, minimizing the number of human touches required to fulfill orders and accelerating the flow of merchandise.

Results: Service Merchandise will gain tighter control of its orders, inventory, and assets. In addition, the software is expected to better control costs.

53. Improve customer responsiveness

Problem: Customers of Roseburg Forest Products Company wanted the supplier to have systems and logistics capabilities to respond quickly to their changing needs.

Solution: Roseburg will use the TriStar 2000 decision support tool that will enable its logistics managers to consider simultaneously the impact of raw materials, product mix, and production efficiency on operational scheduling, product pricing, and market opportunities. TriStar gives managers the information to get the right product to the customer and to do so on schedule and profitably.

Results: “Our mills can operate as one to achieve the best response to market demands,” says the company president. “With TriStar 2000, Roseburg can analyze opportunities across the entire supply chain to identify leverage points, alternative strategies, and opportunities to improve customer service and responsiveness.”

54. Facilitate supplier collaboration

Problem: Furniture retailer Heilig-Meyers was looking for a way to improve the flow of product and enhance communications with its largest suppliers.

Solution: Heilig-Meyers, which operates over 900 stores in the United States and Puerto Rico, will use the Manugistics NetWORKS solutions to improve inventory forecasting and replenishment.

Results: As part of a newly designed supply chain process, the solution will foster integration along the supply chain, from consumers to raw material suppliers.

Chapter I-9

New Logistics Products and Services

A guide to cross-docking made easy. The Warehousing Education and Research Council (WERC) has released a new book titled *Making the Move to Cross Docking: A Practical Guide to Planning, Designing, and Implementing a Cross Dock Operation*. This resource provides an in-depth view of cross docking by applying various techniques to real-life scenarios. To purchase a copy of the book, contact the WERC office at 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; or visit the Web site www.werc.org for ordering information.

The top 10 ways to reduce warehousing costs. Consulting firm Herbert W. Davis (201-944-5580; www.hwdc.com) suggests the following for cutting your warehouse expenses: (1) examine receiving and shipping schedules and vary staffing to match the fluctuating workload; (2) monitor, benchmark, and improve the work pace by type of activity; (3) balance the use of overtime and temporary help to handle month-end and seasonal workloads; (4) relocate all slow-moving inventory to the side and concentrate activity (and travel) in a smaller area; (5) evaluate the feasibility of outsourcing all or part of the operation; (6) identify and evaluate the layout and material handling equipment capabilities and limitations; (7) measure cost and volumes of nonroutine warehouse functions and look for improvements; (8) use automated material handling equipment when appropriate and only when appropriate for current workload; (9) monitor and replace unreliable equipment to avoid work interruptions and high maintenance costs; and (10) review and adjust wage levels on a regional, as well as an industry-wide, basis.

Access to third-party providers not important to logisticians. How large a role do third-party logistics play in the Internet-enabled business world? When Zona Research, Inc. (Redwood Shores, Calif.), asked this question to logistics managers, more than 4 in 10 respondents rated it as unimportant or not at all important. Only in very large enterprises (over 2,500 employees) and in medium-sized organizations with annual sales of \$10 million to \$99.9 million was this an important factor. Thus, researchers conclude that access to such providers increases in importance once one reaches very large firms with considerable sales or higher levels in the corporate executive chain.

A performance link between customers and the organization. Research from Michigan State about today's supply chains shows that customer integration and internal integration are the most significant differentiators of overall performance on the network. Accordingly, managers seeking to leverage logistics and supply chain processes to enhance performance should focus on identifying current and future supply chains needs of key customers and then develop an effective fulfillment and replenishment process to satisfy those needs.

Not being a true supply chain partner can yield nothing but failure. The world's most profitable supply chains revolve around process-based relationships that integrate suppliers throughout the product's life cycle, according to a report from Best Practices, LLC. Managers who overlook the partner aspect of a supply chain relationship consistently yield lower profit margins due to higher processing errors and supply costs. *Best Practices in Supply Chain Partnership and Certification*, available online at www.BenchmarkingReports.com, reveals how top companies have improved supplier certification and partnerships to cut lead times and inventory by more than 50% and boast 100% elimination of processing errors and paperwork. The study contains detailed analysis of how benchmarked companies align with suppliers to meet supply chain improvement goals. For more information, contact Adam Bianchi at 919-403-0251.

Avoiding the perils of home delivery. Boston-based AMR Research, Inc., estimates that a total of \$60 billion to \$70 billion of goods will be shipped through home delivery channels by the end of this year. While a wide range of delivery services is available to merchants, the crucial issue is not how products are shipped but what is shipped. Order fulfillment is the critical link

and the last impression between a merchant and a customer, ensuring customer satisfaction and brand loyalty. "In order to be profitable, companies need to offer enough products with high delivery margins," says Chris Newton, senior analyst for Supply Chain Strategies. "Yet in order to be competitive, companies also need to offer a mix of products that may include some lower-margin items attracting a broader audience to their site." AMR's *Report on Supply Chain Management* recommends suggestions for merchants to make home delivery a win-win situation for both merchants and consumers: Offer a product line that can be profitably delivered through a home delivery channel; do not allow marketing alone to drive a home delivery strategy; carefully choose delivery partners; and make sure that only the best customers get free shipping, as it is a privilege, not a consumer right. For more information, contact Janelle Carlino of AMR Research (617-574-5217; jcarlino@amrresearch.com).

The Internet powers the growth of outsourcing. Parallel growth rates between the Internet and companies that outsource manufacturing and other in-house activities are no coincidence, according to Paul Tasner, vice president of OM2, a California-based outsourcing management company, who spoke at a summit conference of midmarket CEOs. "Web-based e-business tools allow companies to keep a close eye on increasing varieties of functions that are normally outsourced," Tasner said. "Now manufacturing processes are visible via the Web, and companies can maintain real-time control of supply chain functions, even when these activities are totally outsourced." Contact: Paul Tasner (510-595-2302; ptasner@OM2.net).

10 ways to reduce customer service costs. Consulting firm Herbert W. Davis (201-944-5580; www.hwco.com) recommends the following as successful ways to cut customer service costs: (1) document the correct methods to handle a transaction the right way the first time; (2) reexamine and eliminate the need for document retention whenever possible; (3) review, benchmark, and improve the methods and practices and work pace in each major functional area; (4) monitor hourly, daily, weekly, monthly, and seasonal workloads and staff accordingly, using overtime and temporary help in the best way; (5) implement state-of-the-art telephone routing and monitoring systems; (6) eliminate handwritten notes and fax-based data entry; (7) improve product availability to reduce inquiries and expediting; (8) consolidate multiple offices and eliminate duplication; (9) reduce the number of calls by

training your people to be the best at handling calls; and (10) evaluate the feasibility of outsourcing all or part of the operation.

New Web-enabled logistics applications debuted at Internet Commerce Expo. Neopost Logistics Systems (Hayward, Calif.), a division of the Neopost Group, has demonstrated its iLS.X family of Web-enabled Internet and intranet-based logistics solutions. The applications are designed to help businesses gain control of their shipping operations. The suite of products offers enterprise-wide shipping management, outbound logistics, tracking, and budgeting solutions operating from a central server. The suite allows companies to combine various functionalities to create their own customized virtual shipping room at each employee's, customer's, or business partner's desk. Visit Neopost online at www.neopost.com.

Survey reveals slow uptake of Internet-based supply chain by European organizations. The survey conducted by Datamonitor on behalf of PeopleSoft asked 200 key business leaders for their views about e-commerce. More than 60% said that their business contacts were not actively interested in online trading. Overall results show that just 1% of respondents said that they were getting requests from more than 91% of their partners, suppliers, and customers for online trading, while less than 6% said that half of their business contacts were interested in e-commerce. Contact: PeopleSoft (+31 0204625400; www.peoplesoft.com).

Logistics dot-coms worth checking out. *Global Business* lists several transport and logistics exchanges that can help you reduce freight costs and plan better transportation routes. They include BestTransport.com, Cargo-web.com, Bidfreight.com, CargoWerks.com, CargoSphere.com, CarrierPoint.com, Clicklogistics.com, DAT.com, eflatbed.com, eraterequest.com, FreightDesk.com, FreightGate.com, Freight-online.com, freightquote.com, FreightWise.com, GF-X.com, GoCargo.com, Logistics.com, LogTech.com, nte.com, Netshipbrokers.com, Nistevo.com, nPassage.com, portsnportals.com, OpenShip.com, RightFreight.com, RouteMaster.com, Tradiant.com, Transportation.com, Transplace.com, TruckStop.com, and Zulunet.net.

New study shows that supply chain collaboration delivers powerful advantages. The University of Tennessee interviewed 20 supply chain executives to find out what enables collaboration to take place in the supply chain. Common

interest, openness, mutual help, clear expectation, leadership, cooperation, trust, benefit sharing, and technology were identified as key enablers. Benefits include reduced inventory, improved customer service, better delivery through reduced cycle times, stronger focus on core competencies, enhanced public image, improved shareholder value, and competitive advantage over other supply chains.

Online exchange responds to shippers' demand for classified section. Transportation.com has introduced Classifieds, a service identified as an industry need by customers. The service provides the transportation community with a tool to buy and sell new and used industry equipment and allows members to post and set a selling price directly on the site. Buyers can search equipment listings by category and other criteria, review details, and select purchases by notifying the seller directly. For more information, call 913-906-6868 or visit www.transportation.com.

No link between superior logistics and competitive advantage can be found. That is the consensus from a recent study from Michigan State on supply chain competencies. The research provides support for the fact that superior supply chain performance will be the reward for high achievement across several key competencies, such as customer integration, internal integration, relationship integration, technology/planning integration, measurement integration, and supplier integration.

Savvy managers should evaluate suppliers beyond traditional considerations. According to Best Practices, LLC, logistics managers should forge valuable supplier partnerships by evaluating them beyond cost-per-unit considerations. Detailed analysis should focus on material quality, supplier responsiveness, and communication costs within the total cost of procurement. Other key drivers of supply chain management success include employing technology to improve supplier partnerships; supply chain software and extranets for order fulfillment accuracy; and certification of suppliers. Contact Dan Callahan of Best Practices, LLC, at 919-403-0251.

Managers can now get more detail in a request for information (RFI) and a request for proposal (RFP). Industrial Data & Information, Inc., has released version 3 of its Warehouse Management System RFI product for those wanting more detail. The Advanced RFI has approximately 700 questions on cost, receiving, putaway, warehouse functionality, lot control, inventory ownership,

routing issues, and more. The new version includes additional questions about inventory allocation techniques. The RFI is delivered as an unlocked Microsoft Excel spreadsheet. One can drop or modify questions that do not pertain to operations. When finished, e-mail the final WMS RFI to software vendors, and they will e-mail the results. Single copies of the Advanced Warehouse & Logistics RFI are available for \$895. Current customers can upgrade to version 3 for \$250. Contact IDII at www.idii.com or 918-464-2222.

Do companies want real-time supply chain management solutions? According to the Zona Virtual Logistics study, when asked to rate the importance of real-time monitoring and exception-based alerts in their organization's Internet-based supply chain management solution, respondents gave an evenly partitioned response. About one-third found such a feature of little or no importance; one-third were neutral; and another third found them to be either important or extremely important. Zona also noted that the responses showed no preference toward a particular size company, whether sorted by employee numbers or revenues; nor was there a tendency for respondents of particular levels within the organization to respond in a certain way. Contact: Zona Research, Inc. (650-298-4042).

10 ways to reduce inventory costs. Consulting firm Herbert W. Davis (201-944-5580; www.hwdco.com) recommends the following as successful ways to cut inventory costs: (1) identify obsolete inventory, sell it, and take steps to avoid making more; (2) identify slow-moving inventory; (3) identify obsolete inventory and centralize slow-moving inventory to one or two locations; (4) periodically conduct a formal slotting analysis to save labor and space costs of carrying inventory; (5) adjust safety stock levels often to support fill rates by class of product; (6) audit and update lead times, lot sizes, and economic order quantities (EOQs) in your inventory planning system; (7) improve returns processing to reclaim or dispose of returned merchandise as soon as possible; (8) implement a plant shipping option to bypass the warehouse network where economical; (9) store more common product in bulk, boxing and labeling at the distribution center (DC) just prior to shipment; and (10) conduct a geographic analysis of sales by item to focus on managing regional and seasonal items.

Speed, not salary, is a big factor in hiring candidates. According to a study by Lucas Group (Atlanta, Ga.; 770-565-5440), making a fast decision about

hiring an employee is more important than any other factor in the decision-making process. "While employers ponder hiring decisions, they lose opportunities," says Cathy deMartino, vice president of Lucas Group. Today, 72% of the time a candidate is hired within six weeks of a position's availability; just five years ago, the process took three months. The study also identified some recruitment enticements that managers are offering to potential employees: stock options, signing bonuses, paid vacation to an exotic location before starting the job, relocation and job placement for a fiancé or fiancée, afternoon telecommuting opportunity, six weeks of vacation, stay-on bonuses, and the opportunity to become a part-owner if the candidate stays two years.

Tracking system should help out in holiday season. ShipXact.com (www.shipxact.com), an e-fulfillment company serving Web-based logistics and fulfillment markets, introduced TrackXact, a technology that provides real-time receipts, inventory, and shipment information. The system integrates handheld bar code scanners with ShipXact's DC systems. These systems are interconnected with services provided by FedEx, UPS, and other delivery systems. To support merchants, ShipXact maintains a complete data center and 225,000-square-foot warehouse in the Atlanta area. An enterprise system provides the technology infrastructure to support Web-based ordering, warehousing, inventory management, and package tracking information.

EProcurement program fosters collaboration with suppliers. SupplyWorks, Inc., unveiled its CounterPart partner program, designed to bring high-quality eProcurement solutions to SupplyWorks customers. This program is part of SupplyWorks' Total Supply Management (TSM) solution, meant to enable a company to manage its supplier relationships collaboratively. CounterPart is designed around four types of partner relationships: consulting, implementation, and integration resources to customers; manufacturing goods suppliers; technology solutions for OEM applications; and strategic sourcing, content management, and payment processing. For more information, contact SupplyWorks at 781-301-7000 or www.supplyworks.com.

Are you looking to hire a forklift operator? An order picker? Well, a new benchmarking resource from the WERC is available. *Warehousing Salaries and Wages* closely explores the compensation levels for seven key industry positions: director of logistics, general manager, operations manager, customer service manager, warehouse supervisor, forklift operator, and order picker.

To obtain a copy of the book, contact the WERC at 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; www.werc.org.

Global e-commerce will crush today's supply chains. According to two recent reports from Forrester Research, Inc., the high variability in global demand will force both manufacturers and shippers to harness the Internet and create an information pipeline, weeding out today's weak supply chain links. Forrester believes that companies will thrive in the Internet economy by participating in e-business networks, structures of interdependent players cooperating in real time over the Net. The first step for manufacturers will be to build manufacturing networks, rather than focusing on supply chains. "Global supply chains are further hampered by today's logistics processes, which barely support the task at hand, preventing shippers from handling many more customers," says Stacie McCullough Kilgore, senior analyst at Forrester. Contact: 617-613-6025.

Council of Logistics Management (CLM) case studies now available online. The CLM sponsored four logistics case studies this year and is making them available exclusively online. Simply download any of the 14 logistics case studies sponsored by CLM since 1996 by logging onto the CLM Web site (www.clm1.org), click on Research, link to Case Studies and then a title, and follow download instructions.

Business-to-business (B2B) exchanges are not so important to the logistics community. According to Zona Research, Inc.'s, recent report, *Virtual Logistics: Exchange Services and Fulfillment in Electronic Supply Chain Management (eSCM)*, enterprises are focused on cost savings rather than linking to B2B exchanges. Other significant findings in the report include the following: 66% of companies state that increasing customer satisfaction is the primary reason to implement eSCM; 15% say that linking to B2B exchanges was a reason for implementing eSCM; 60% say that recapturing their eSCM investment would take at least two years, with 20% saying they would never recapture the investment. The report is available for \$895 for a single user, \$1,395 for a multiuser edition, and \$1,895 for enterprise-wide distribution. Call Paul Kendrick at 877-999-ZONA (9662) or visit www.zonaresearch.com.

New logistics guide grades Web sites. *Who's Who In Logistics Web Sites? Armstrong's Guide to Internet Transportation and Supply Chain Management Solutions*

covers individual Web sites in depth and grades them on an A through F scale. Over 130 companies are profiled. According to Evan Armstrong, vice president of Armstrong & Associates, Inc., the A sites will stay in the race because they have good business models with experienced logisticians behind them, while the other sites lack substance. Contact: 800-525-3915 or 608-873-8929; fax, 608-873-5509; armstrong@3plogistics.com.

International company formed to fight cargo crime. Two leading security groups, RiskWatch Inc. of Annapolis, Maryland, and FreightWatch Intl. Ltd. of Dublin, Ireland, have joined to stem the tide of billions of dollars in lost cargo. The new company, Global Supply Chain Security Assurance Joint Venture, will develop technology to fight cargo criminals. The new company will be headquartered in the United States and will have offices in Europe and Asia. The group will manage a high-tech command center linked to the international supply chain made up of freight handling and forwarding companies and their suppliers. The Venture will support international standards in the cargo industry. For more information, visit www.riskwatch.com or www.freightwatch.ie.

10 ways to reduce transportation costs. Consulting firm Herbert W. Davis (www.hwdc.com) recommends the following as successful ways to cut freight costs: (1) conduct annual rate negotiations with carriers using benchmarking, volume, and leverage; (2) monitor compliance using preferred carrier routing guides and follow up on exceptions; (3) study backorders for improvement opportunities in economic shipment sizes; (4) monitor and control error and damage rates, including return freight; (5) analyze shipping network every one to two years to keep it optimum for current business; (6) monitor and control inventory deployment to minimize out-of-area shipping; (7) reduce excess inventory that causes the use of outside storage with extra transportation; (8) reexamine and update the rules for mode selection, as well as carrier selection; (9) plan to combine orders where advantageous truckload rates can be used; (10) use your database of freight bills to create a top-level overview of transportation and look for changes.

Looking to improve customer relations with retailers? The National Vendor Compliance Association may be the answer. Its mission is to assist in understanding vendor compliance requirements and related issues by identifying best practices to avoid customer deductions, charge-backs, or expense offsets. It will focus on the effect that the aforementioned issues have on the en-

tire revenue cycle; in doing so, it will streamline the order-to-cash cycle. Committees already established are an EDI committee, returns committee, shortage committee, shipping committee, and survey committee. For more information, call 914-684-0086.

Supply chains are risky business. At a recent Risk and Insurance Management Society, Inc. (RIMS), annual conference, Ellen Pfeiffer, business risk manager for Palo Alto, California-based Hewlett-Packard Company, identified the risks associated with supply chain management. One is maintaining the supply and continuous availability of products and the possible domino effect if one link fails. Overseas units and suppliers pose another threat, as they are subject to political, credit, and foreign exchange risks. Other risks include technology, such as the Internet; increased global competition, which gives competitors access to a company's products worldwide; and the convergence of risks into one key resource, again the Internet.

Network optimization via secure Internet portals. Global Logistics Technologies, Inc. (G-Log; Shelton, Conn.), a provider of Internet-based logistics systems, and New Meadows Venture Partners, a high-tech venture capital fund, have formed SupplyLinks, Inc. The new company is an Internet-based B2B global supply chain network that links customers to multiple transportation modes and service providers. Its mission is to enable manufacturers, retailers, and distributors to manage their supply chain processes by optimizing transportation routing, fulfillment, and landed cost of finished goods, parts, and components. Contact: 877 G0-2-GLOG or 203-225-0335; www.glog.com.

Web procurement provides one-to-one networking capabilities. According to Zona Research, Inc., of Redwood City, California (650-298-4000), Web procurement solutions that provide one-to-one networking capabilities can benefit users by providing long-term relationships that streamline the e-procurement process. In a one-to-one model, a company is allowed greater freedom to focus its energies on core business processes. This is beneficial to small firms that may not generate sufficient e-procurement volume to justify a many-to-many marketplace, and to large enterprises to help develop favored customer status with suppliers and negotiate volume discounts.

New committee boosts supply chain efficiency. Retail Council of Canada (RCC) has formed a committee whose goal is to improve the efficiency of

Canada's B2B retail supply chain. Founding member organizations include Canadian Tire Corp., Ltd., Hudson's Bay Company, Sears Canada Inc., and Wal-Mart Canada Inc. "Through this initiative we have the opportunity to improve on the efficiencies of the supply chain for both retailers and suppliers, thereby building a stronger, more competitive industry that can participate effectively in the global supply chain," says Michael Eubanks, RCC's vice president of information technology and e-commerce. Contact: 416-922-0553 or 888-373-8245; www.retailcouncil.org.

Companies join to address timely order fulfillment. CyberSource Corp. and OrderTrust, Inc., have aligned to integrate and offer OrderTrust's order management services and the CyberSource Internet Commerce Suite. Together, the companies will address the growing needs that online businesses have for timely order fulfillment and better information about real-time product availability and tracking. To facilitate ease of use, CyberSource will offer the order management system through its existing interface. Contact: 650-965-6501 at CyberSource or 781-238-5895 at OrderTrust.

Alliance will make merchandise returns easier for consumers. Newgistics Inc., R. R. Donnelley Logistics Services, and USF Processors have formed a strategic alliance that creates a returns management network. Through a service called ReturnValet, the companies offer direct-to-consumer merchants a more customer-friendly and cost-effective way of handling product returns. The service enables consumers to receive instant credit on returned goods as well as face-to-face customer service from local storefronts. This high-touch capability enables catalogers and e-tailers to offer customers a more positive returns experience. Contact: Newgistics Inc., 512-225-6003; R. R. Donnelley, 630-322-6692; USF, 630-919-4968.

The next wave of B2B commerce. High-tech market research firm Cahners In-Stat Group (Scottsdale, Ariz.) believes that virtual supply chain integration (V-SCI) represents the next wave of evolution for B2B e-commerce. The growth and success of e-marketplaces are laying the foundation for businesses to move Internet-enabled supply chains in-house. V-SCI networks will create previously unattainable levels of dynamic communication and interaction among supply chain participants, says Kirsten Cloninger, industry analyst for In-Stat's Internet Commerce Infrastructure Service. She believes that online supply chain participants will access V-SCI networks through wireless technologies such as mobile phones, laptops, and desktop

units. The report, *Virtual Supply Chain Integration: The Future of Participation in Online Supply Chains* (#EC0002MS), is \$2,995 and is available by calling 617-630-2139 or visiting www.instat.com.

Alliance focuses on global transportation management. IBM has formed a strategic alliance with Mincom of Brisbane, Australia, to deliver next-generation enterprise asset management solutions to large- and mid-sized companies in the global transportation industry. These solutions help track, allocate, and deploy all assets, from machine parts to technicians. As part of the relationship, IBM will develop a service delivery practice for Mincom's Ellipse Enterprise Asset management application. Additionally, IBM will be a partner in Mincom's Transportation Competency Center in Denver. Contact: IBM, 212-745-6508; Mincom, +61-7-3303-3418.

E-logistics comes to Latin America. Fiera.com, Inc., the Spanish-, Portuguese-, and English-language e-commerce site for Latin American and U.S. Hispanic communities, has created eLogistics Management, LLC (eLM), a subsidiary company focused on serving the logistics needs of third parties throughout Latin America. Its logistics services include distribution and brokerage, pick and pack, bundling and light assembly, invoicing, payment processing, customer service, order management, and more. The core competencies will focus on small, time-critical deliveries, integrated Web-based systems, and manufacturer relationships. For additional information, contact Fiera.com at 305-398-5250.

CEOs target customer service as a top priority. In a recent survey, 67% of CEOs in third-party logistics cited customer service improvements as the top challenge. The survey, conducted by Tompkins Associates (Raleigh, N.C.; 919-876-3667), also points out that enhancing supply chain visibility, improving operational efficiency, and employing e-commerce solutions were identified as the next highest priorities. Responding to competitive influences was selected by 41% of respondents. Reducing costs and improving overall performance measures were low on the list.

Portal dishes out supply chain information. BetterManagement.com, a performance-management Internet portal, launched the Supply Chain Authority (www.SupplyChainAuthority.com), an information site that gathers, filters, and delivers information relevant to supply chain topics to help managers save time and expense. White papers, case studies, and articles are

complemented by archived presentations, live Web seminars, and more. Contact BetterManagement.com at 503-617-7137.

Merger procures transportation needs for shippers. Logistics.com, Inc., and QuoteShip.com have joined forces to offer a comprehensive Web-based transportation company serving shippers, carriers, and third-party logistics providers over land, air, and ocean. Operating under Logistics.com, the new company is already working with leading logistics pros such as Colgate-Palmolive. "Given the international scope of our business, this new entity could play a large role in solving our global transportation challenges," says James P. Davis, director of U.S. customer service and logistics for Colgate-Palmolive.

New Internet application for interenterprise collaboration. Optum has launched a new application for visibility, inventory, and collaboration, called TradeStream. Companies can aggregate fulfillment information across the enterprise and across suppliers, distributors, and customers and can leverage this information to slash supply chain inventory levels up to one-third and move toward 100% fulfillment of customer orders, the company claims. TradeStream is designed for e-commerce and multiple sales channel environments that have time-sensitive and price-sensitive distribution models. Contact Optum: 617-450-4300.

New company makes its first supply chain introduction. WorldChain Inc., a software start-up that focuses on the execution side of supply chain management, launched its first offering: An Internet application that lets small- and mid-size companies manage most elements of their supply chains, including warehouses and transportation. According to WorldChain's Chief Technology Officer, Reynaldo Gil, the software lets a buyer place orders with other suppliers to deal with product shortages. Contact WorldChain: 408-245-2400.

Speech solution complements picking solution. SyVox Corp., a leading provider of speech recognition-based applications, announced that Warehouse Equipment, Inc. (WEI), will resell the SyVox RxP suite of speech-based applications. WEI will add the solution to its current product line of pick-to-light solutions, offering customers a system that is easy and economical to install. WEI believes that it is now one of the few warehouse equipment companies to offer both speech-directed picking and pick-to-light products. Contact: WEI, 847-595-9400 or www.weinet.com; SyVox, 303-938-1110.

Vendor and information technology (IT) consultant align to offer advanced logistics system. Global Logistics Technologies, Inc. (G-Log), a provider of Internet-based logistics systems, and Gap Gemini Ernst & Young, have formed a strategic alliance to market and implement G-Log's GC3 e-Logistics software. This alliance will enable G-Log to extend rapidly its e-Logistics software globally by incorporating Cap Gemini Ernst & Young's global logistics and transportation domain knowledge and methodologies with G-Log's logistics software solution. Contact: G-Log, 212-391-4866; Cap Gemini Ernst & Young, 212-773-8338.

Solution addresses online returns processing. E-genco, a reverse logistics provider, and Electron Economy have partnered to create an end-to-end returns processing solution for retailers and consumer-direct sellers. The new solution will handle all facets of returns process management, from transportation to financial settlement to customer interaction—all online. According to industry indicators, by 2003 2.8 million residential parcels will be shipped annually; of these, over 10% will be returned. This, say the companies, makes their solution invaluable to online retailers. Contact: e-genco, 412-820-3752; Electron Economy, 408-597-3363.

Schneider makes bold move with logistics company. Schneider National of Green Bay, Wisconsin, announced plans to spin off its logistics business as a separate company and to seek outside capital for Schneider Logistics. This will enable Schneider Logistics to accelerate its investments in logistics technology, products, and services and to develop its role as a supply chain integrator, the company claims. Contact: 920-592-3292 or 612-893-7140.

Online source for flatbed shipping industry is now available. Pittsburgh Logistics Systems, Inc., and eflatbed.com announced that eflatbed.com, an online source dedicated to the flatbed shipping industry, will focus on electronic transportation commerce. Eflatbed.com will handle back-office activities, including setting up pickup and delivery times and managing carrier payment and shipper invoicing. Carrier subscription fees are \$24.95. Contact: 412-928-2788.

Web-based software manages online returns. ReturnCentral.com (Pittsburgh, Pa.) has launched the first suite of Web-based software designed to help businesses control their online product returns. The virtual Returns Desk allows any company to simplify their returns, the company claims. "The supply chains that are efficient in delivering products to market at Web speed

typically do not work well when they need to shift into reverse to handle returns,” says David N. Hommrich, CEO and founder of ReturnCentral.com. “The efficient movement of goods through the reverse supply chain is dependent on the availability of accurate and timely information.” Using the Virtual Returns Desk, customers can make arrangements for returns via the site where the merchandise was purchased. The software alerts the shipper, prints the return mailing labels, and tracks the orders through each state of the returns process.

New book from Tompkins goes beyond supply chain management. Tompkins Press has released *No Boundaries: Moving Beyond Supply Chain Management*. The book introduces the concept of Supply Chain Synthesis, in which all the partners in a synthesized supply chain gain greater cash flow and increase output while reducing inventories, explains author James A. Tompkins, president of Tompkins Associates. The book is available for \$24.95 U.S., \$34.95 Canada, and £15.95 U.K. To order, contact 800-789-1257 or sales@tompkinsinc.com.

SCM suite for global transportation and logistics. NeoModal.com, a global application service provider of B2B transportation and logistics solutions, introduces NeoSolutions, a suite of Internet-based supply chain management applications that provide supply chain visibility and end-to-end connectivity between shippers, carriers, and transportation intermediaries. NeoSolutions is comprised of five software applications: NeoContract, a service contract management application; NeoCargo, for cargo management; NeoStatus, for tracking; NeoMarket, for providing a venue for the purchase or sale of space or equipment; and NeoYield, for forecasting and profitability measurement. Pricing is based on subscription and transaction fees. Contact: 831-440-2401.

Leading logistics software team launches new venture. A new Internet-based shipping service called Centricity, Inc., is developing a number of Internet products for shipping and fulfillment. The new venture, based in Atlanta, comes in the wake of the purchase of CAPS Logistics by the Baan Company. Some of those CAPS employees are the founders of Centricity. “The Internet should be synonymous with speed, scalability, reliability, and security, and that is exactly what we are developing in our transportation information service infrastructure,” says Manuel Pachano, executive vice president of technology at Centricity. For more information, contact 770-226-8889 or www.centricity.com.

Logistics exchange formed by world-class organizations. The Pillsbury Company, Land O'Lakes, Graphic Packing Corp., and Fort James Corp. have formed an alliance to create an Internet-based freight and logistics exchange. The exchange will encompass truck transportation by the partner companies in North America and will allow the manufacturers and their freight carriers to increase truck utilization rates, lower administrative costs, and improve customer service. Participating manufacturers and carriers will use the exchange to match product shipments and destinations with available trucks, which will reduce empty back-haul mileage. Contact: General Mills, 763-764-6364; Pillsbury, 612-330-7390; Land O'Lakes, 651-481-2123; Graphic Packaging, 720-497-4728; or Fort James Corp., 847-317-5280.

Truck industry portal addresses problems of poor communications. Transit Group, Inc. (Atlanta, Ga.; 770-444-0240) has launched a B2B Internet portal to serve the trucking industry (transitgroup.com) by linking agents, trucking companies, and shippers. The company claims that this portal will address the common problems of poor communications and lack of load visibility that presently characterize the trucking industry. Philip A. Belyew, president and CEO of Transit Group, believes that the portal will allow participants to know more readily the supply and demand conditions of the marketplace, thereby creating a more efficient flow of freight to final destinations.

Collaborative planning, forecasting, and replenishment (CPFR) rapidly becomes standard for B2B supply chain collaboration. Industry Directions (Cambridge, Mass.), a manufacturing and supply chain industry analyst and consulting firm, and Syncra Systems, Inc., have announced the results of a comprehensive study of CPFR practices. The study reveals that a majority of companies are planning or have begun deploying CPFR activities that enable them to streamline supply chains, increase sales, and improve service levels. The study surveyed logistics providers, manufacturers, retailers, and distributors in all industries and found that two-thirds of survey participants are currently involved in CPFR and that nearly a quarter are conducting pilot projects implementing CPFR-based software or standards. For more information, contact 508-362-3480 or 617-218-4316.

Ocean e-marketplaces offer advanced functionality. Tradiant (Alameda, Calif.; 510-747-3218) has introduced advanced capabilities at its OpenOcean marketplace that enable shippers and carriers to manage a greater volume of online transactions at www.tradiant.com. The e-marketplace now includes new carrier capabilities for managing work across multiple trade lanes,

advanced search features for segmenting the freight market, functionality to highlight a carrier's unique service features, and expanded personalization features to give each user the ability to customize market views.

Online community aids shippers in modal management. The nPassage (www.nPassage.com) online transportation execution community offers shippers and consignees a new way to manage all modes of transportation. The transaction-based service allows shippers to book, document, and track a delivery, providing all the information they need to lower costs, speed up inventory turnaround, and shorten order-to-cash cycles. NPassage simply requires a two-hour training session to use Internet access. It can be easily integrated with in-house systems and business processes.

Consolidated Freightways (CF) and Customs partner to ease in-bond clearance. Consolidated Freightways is the first motor carrier to partner with U.S. Customs to automate in-bond freight customs clearance. The current paper-intensive system can be time-consuming, and cargo is often delayed for weeks. Automating the network allows CF and Customs to share in-bond clearance documents electronically. For more information, contact 650-566-6133.

Internet exchange aims to bring shipping industry back together. OMI Corp. has created SeaLogistics.com, a neutral electronic exchange for the shipping industry. It aims to correct the growing fragmentation of charters, ship owners, and sources of information, which has led to inefficiencies and expense. According to developers, SeaLogistics will help match cargo and vessels through broader access to ship owners and more details about cargo availability. The service will initially focus on the shipment of crude oil and petroleum products. Contact OMI: 203-602-6767.

Bulk materials management finds its place on the Web. Optimum Logistics Ltd. has announced plans for the first Internet-based, open logistics system for bulk materials. The first offering will be TransLink, an online logistics system that electronically arranges and monitors all stages of the supply chain. TransLink will be offered initially to chemical supply chains, but future target industries include forest products, steel, gas products, and agribulk. Contact: 212-704-8253 or 212-704-8274.

Motor, air, and rail carriers to be linked via new exchange. E-Trans Logistics, a subsidiary of Universal Media Holdings, and Velocity Intellectual Properties

have agreed to develop American Freight Exchange (AFE), a national freight network. AFE will link small local carriers into a seamless real-time shipping network. AFE will have the ability to match local trucking carriers with national air and rail affiliates, forging a large shipping fleet with national coverage. Contact: 908-351-7746.

Two new online marketplaces facilitate buying and selling transportation services. I2 Technologies, Inc., announced FreightMatrix, a logistics industry marketplace that integrates logistics planning, commerce, and execution. FreightMatrix will offer shippers, carriers, and logistics providers the needed services to buy and sell transportation more efficiently, plan their cargo requirements, and execute shipment delivery. Ryder System, Inc., plans to serve as the third-party logistics provider, and Central Transportation Intl. plans to serve as the less-than-truckload (LTL) motor carrier. FreightMatrix service offerings are expected to be available in the second quarter of 2000. Call 469-357-3027 or visit www.i2.com.

Managers can browse third-party logistics providers (3PL) offerings without long-term commitment. Clicklogistics.com is providing Internet buyers and sellers access to logistics management solutions. This site allows shippers to try 3PL services without making a long-term commitment, says the company's COO. Users can access one service, such as rate quotation or order status, on a transactional basis. More comprehensive services, such as international shipping, will soon be added through partnerships.

New Canadian service speeds up shipments from the states. U.S. shippers looking for a fast and easy way to ship to Canada can now take advantage of a new service called Pre-Arrival Review System (PARS) through the Toronto-based ExpressLINK PARS Center. With PARS, a shipper can forward its freight documentation to ExpressFAX by 2:00 p.m., their local time, on the day of pickup. PARS will process the document and check for accuracy. Contact: 800-541-1670. Viking Freight Inc. is using PARS to ensure that shippers receive expedited clearance. Viking has also expanded its service to Canada to include through-rate quotes and through-tracing via the Internet. Once a rate has been obtained online (www.vikingfreight.com), the shipper fills out a downloaded Vik-Quick Pass. This one-page document combines bill of lading and the required Customs Clearance Document needed to clear goods through Canadian customs. The pickup order is also placed online, and the shipment is traceable.

Price quotes are added to Roadway Web site. Roadway Express, Inc., is expanding its interactive Web site to offer rate quotes using customer-specific pricing information. After entering origin and destination zip code, class of freight, and weight, a rate quote is generated. Pricing for expanded service options, such as single shipment and notification before delivery, are also available. The service is available to customers who sign up for myroadway.com, an area of Roadway's Web site that provides customers with access to shipping information. Call 330-643-6608 or visit myroadway.com.

Net-based collaboration solution focuses on customer perspective. Logility Voyager XES is the second collaborative commerce solution from Logility. XES has been designed as an Internet supply chain execution application that provides customer-facing views into the supply chain for collaboration between customers, suppliers, and transportation providers. Load tendering, real-time order tracing and tracking, freight order entry, and order payment inquiry are features of XES. Call 404-264-5275 or visit www.logility.com for more information.

Software providers aim to address e-fulfillment problems with new solution. Inter-World Corp. (212-301-2375) and the Descartes Systems Group, Inc. (800-419-8495), will join forces to deliver an e-commerce solution to help manage selling and fulfillment processes via the Internet. This includes support for online trading environments throughout the requisition-order-fulfillment-payment cycle, such as merchandising, order management, order visibility, and delivery optimization software. The solution is aimed at online retailers, brick-and-mortar retailers, distributors selling direct or to resellers, and manufacturers selling over the Internet.

New logistics group forms but continues to focus on professional development. Georgia Freight Bureau (GFB) and the American Society of Transportation and Logistics (AST&L) have joined to create the Logistics Foundation of America (LFA), a nonprofit entity that will deliver continuing education and professional development programs leading to certification in the field of transportation and logistics. For further information, call John Youngbeck at 404-524-7777 or visit www.astl.org.

Schneider teams up with online company to make its mark in B2B community. IMark.com, a global marketplace for buying and selling used equipment online, and Schneider Logistics have formed an alliance in which Schneider's

B2B e-commerce logistics services will be used by iMark.com's community of used manufacturing equipment buyers and sellers. The Schneider Logistics iMark.com transportation link will allow purchasers to arrange for shipping service after purchasing an item through iMark.com's site. Once a shipment request is made, Schneider's system will provide rates for multiple shipment options based on desired transit times and shipment characteristics. As soon as a shipment is underway, iMark.com customers can track their shipments; when the shipments are complete, Schneider will handle freight bill payment. For more information visit www.iMark.com or www.schneiderlogistics.com or call iMark.com at 800-939-3261.

New software helps managers juggle high-volume shipments. HK Systems has released Auto/ExpressShip Version 7.3, a key module of its SCM/Enterprise Transportation Management suite. It addresses the business needs of shippers expediting high quantities of parcels and shipments within time-sensitive delivery windows. Carrier selection, shipment routing, freight rating, and consolidation capabilities are offered in real time. Auto/ExpressShip supports the creation of electronic and paper-shipping documents including bills of lading, customer manifests, and carrier compliant manifests. The generation of export documents allows exporters and importers to make declarations for shipments through accredited forwarders and customs brokers. For more information, call 800-HKSYSTEMS or visit www.hksystems.com.

Internet connection to Customs saves time and money. *Information Week* reported that the EnableNet service from CommerceQuest will let businesses connect directly to U.S. Customs using the Internet. Businesses will also be able to transfer information automatically from legacy applications directly to U.S Customs without reentering data. Importers, exporters, freight carriers, customs brokers, and logistics providers can process automated data associated with the clearance of cargo. Pricing is based per transaction.

Logistics service is now available for shippers to communicate with carriers via EDI over the Net. QRS Corp. has made its LMS 4.1 Web-based logistics management service available. It performs load tendering, updates load status, warns of potential service failures, and features timeliness reports, which measure the time duration between an actual event and the time the event was reported. This report gives shippers statistics indicating how fast and accurate their carriers are in completing shipments and processing EDI

documents. With QRS LMS, shippers connect instantly with carriers over the Internet. Call 510-215-3958 for more details.

Internet exchange brings supply chain partners closer together. Rightfreight.com has formed a strategic partnership with the National Transportation Exchange, Inc., to electronically match shippers and carriers for more efficient, point-to-point ground transportation. Both companies operate online member-based trading exchanges for shippers, carriers, and third-party intermediaries. Using the Internet, the exchanges are designed to link all trading partners seamlessly in a supply chain. Visit www.nte.net or www.rightfreight.com for additional information.

Integrated solution is ideal for transportation management. LIS and Paragon Software Systems have developed a tightly integrated interface between the LIS Dispatcher-CS and the Paragon vehicle routing and scheduling system. The interface will allow DC managers instant access to Paragon's transport management capabilities. Companies with multiple warehouses can centrally plan routes for all vehicles. Contact LIS at www.liswms.com and Paragon at 44 01306 732600.

Yellow expands expedited offerings. Yellow Freight System will offer expedited service to and from all major metros throughout North America. Key to this is an expanded complement of sleeper team drivers and redesigning operations in certain cities to enable more metro-to-metro dispatching. Yellow is also offering two-day Standard Ground service on 40% of the regular metro routes in its network; three-day Standard Ground service is offered on an additional 30% of routes. Yellow will introduce four-day east coast to west coast, an expedited ground service called Exact Express. Contact 913-696-6184 for more information.

Web-based engine enables more efficient order fulfillment. SynQuest, Inc., has announced an order promising engine that directly ties an Internet order process to a company's supply chain plan to make profitable fulfillment decisions based on the availability and cost of manufacturing, distribution, transportation capacity, and materials. The order promising engine allows manufacturers to commit to an order while an e-business customer is online with its order request. The engine allows customers, dealers, and internal customer service representatives—at the time of ordering—to see the ship and deliv-

ery dates of each component of the order. The engine is designed to find the lowest total delivered cost of products across the supply chain to fulfill orders while meeting planned delivery dates. Finally, manufacturers can configure the Web presentation to individual customers, providing different order options, such as allowing back orders or splitting order shipments. For more information, call 800-844-3228 or visit www.synquest.com.

Looking for a new job? Check out this site. JobsInLogistics.com, an online job search and recruiting company, has launched a national online recruiting Web site for the logistics profession. The site allows employers/recruiters to post job openings and enables job seekers to find opportunities. Executive-level positions and associate positions are listed. Call 305-940-9234.

Online source for flatbed shipping industry is now available. Pittsburgh Logistics Systems, Inc., and eflatbed.com announced that eflatbed.com, an online source dedicated to the flatbed shipping industry, will focus on electronic transportation commerce. Eflatbed.com will handle back-office activities, including setting up pickup and delivery times and managing carrier payment and shipper invoicing. Carrier subscription fees are \$24.95. Contact: 412-928-2788.

Automated freight matching without human intervention. Instant Notification is new technology developed by the Internet Truckstop (www.truckstop.com), which offers information on loads and trucks within three minutes of being posted. This upgrade to Truckstop's original load matching service allows the dispatcher to match loads to trucks, eliminating the hunting process. Dispatchers can calculate trip mileage, fuel usage, and fuel tax online. In addition, broker credit checks can be done instantly.

Program eases delivery duties paid (DDP) shipping business. Emery Worldwide has launched a customs brokerage program that will assist manufacturers who now must assume duty costs and customs compliance for international shipments as part of doing business with their customers. Emery developed this Non-Resident Importer of Record Program in response to a rapid migration from the traditional term of sale "free on board" (FOB) to "delivery duties paid" (DDP). DDP is an internationally recognized term of sale used to define cost responsibilities and transfer the risk of goods shipped in international trade. "More and more of our customers are doing business DDP;"

says Steve Cortelli, Emery's senior director of customs brokers, "and are finding themselves immersed in customs compliance issues and need to know the ropes." For more information, visit www.emeryworld.com.

Push technology delivers customized freight searches. Landstar System Inc. has introduced an online freight information service that enables users to pre-program alerts that bring them results of customized searches. EFr8.com uses push technology to provide specific online searches for available freight or trucks; it then delivers the information to users via phone, fax, e-mail, or pager e-mail. The secured site allows users to manage their own account information with individual log-in IDs and passwords and provides the software for automated mass downloading of freight information. Visit www.landstar.com.

Finding the right path to supply chain management. A recent article in *Information Strategy: The Executive's Journal* describes the challenges and alternative paths that a company might adopt in deciding its approach to supply chain management. These alternatives include functional, procurement, logistics and transportation, effectiveness, information, progress, business process reengineering, and strategic. The article takes the position that the strategic view will bring the greatest benefits. The article, titled "A Primer on Supply-Chain Management," is part of a forthcoming book, *Handbook of Supply Chain Management*, published by St. Lucie Press. For more information or for copies of the article, contact the author: Jim Ayers, CGR Management Consultants; 310-822-6720; jimayers@cgrmc.com.

Intermodal shipments now manageable online. Cysive, Inc., and Hub Group, Inc., have launched an e-business system called the Vendor Interface, which manages the drayage portion of intermodal freight shipments. The Interface is designed to eliminate redundancy, improve operational efficiency, and enable order processing around the clock. The benefits to shippers are significant, allowing for increased information visibility throughout the supply chain and satellite-like communications and tracking. Carriers can process completed orders faster, resulting in more timely payments. Information can be found at www.cysive.com or www.hubgroup.com.

Vendors team up to offer electronic order fulfillment solution. CommercialWare, Inc., and Manhattan Associates have partnered to provide an e-fulfillment solution targeted at retailers, e-tailers, and direct marketers. With the inte-

gration of CommercialWare's Mozart and Manhattan's PkMS warehouse management system, customers can leverage order management, fulfillment, warehousing, transportation management, and customer service capabilities across multiple customer channels—Web, phone, fax, mail, or kiosk. Contact: 770-955-7070 or www.manh.com.

Corporate merger expands logistics services for participants. Pacer International, Inc., a North American freight transportation and logistics services provider, has expanded its transloading, local trucking, warehousing, and other logistics operations, as well as its intermodal marketing activities, through a merger with Los Angeles-based Conex Global Logistics Services, Inc. Pacer says that the merger is designed to improve the service, efficiency, and scope of its logistics and intermodal brokerage operations by enhancing its full-service capabilities and adding new locations in Mexico and Canada, as well as in Europe and the Caribbean. Contact: 904-613-0870.

New Internet supply chain solution debuts. E-Sync Networks, Inc., has released its TotalChain end-to-end Web supply chain solution. TotalChain will enable companies to collaborate over the Internet with their business partners, suppliers, service providers, manufacturers, distributors, and customers by facilitating the secure exchange of information among disparate systems. The company distinguishes itself from similar offerings because of its ability to combine browser, e-mail, or fax user interface, Java-based Web server, client/server authentication, and online billing/transaction tracking. More information can be found at www.e-syncnet.com.

Online auction can reduce freight costs by 5% through the elimination of mistakes. TradingDynInc., a digital marketplace for the trucking industry, is expected to bring B2B auctions to the truckload and LTL industries. Utilizing this transportation portal, shippers and carriers will be able to connect online to negotiate the transfer of goods. The companies claim that the online auction will alleviate billing mistakes and eliminate the expense of outsourcing to a freight broker. Visit www.carrierpoint.com.

Publication explores ins and outs of exporting and importing logistics. A tutorial titled *Exporting and Importing: Negotiating Global Markings*, by Amy Zuckerman and David Biederman, is a valuable new resource for international logistics managers' libraries. The tutorial walks you through the process of exporting and importing and explains key issues and requirements. Actual

customs forms and pro forma materials are included, along with Web sites and government agency contacts. To order, call 800-262-9699; cost: \$59.95.

Directory lets exporters directly reach potential customers in China. The American Export Register/China is the first of its kind of directory designed for Chinese buyers to learn about your company and its export products. When you advertise your export goods in the directory, your product and pricing information is translated into Chinese for you. The American Export Register/China is distributed in cooperation with the Chinese government agency that oversees purchases of foreign goods and services and is distributed directly to a list of customers representing over 90% of Chinese import-buying power. To find out how to advertise in the directory, contact 212-629-1181; fax, 212-629-1140; info@aernet.com.

Airlines on the Web (AOW) provides links to 50 air cargo carriers. The AOW site provides links to more than 500 commercial airlines and over 50 cargo carriers. To reach the site, first go to the site of Dolphin Marine International (www.dmintl.com) and click on the following icons one after another: best trade sites world class, gold tiger awards, World Class Supersite, trade on cargo. In addition to an alphabetical listing of all the air cargo carriers, there are links to related sites, such as the Air Cargo Management Group, a subscription service, and Cargo Connect, a free cargo tracking service.

ComPair Global Schedules now available on the Internet. The interactive, global version of ComPair Schedules, based on a format developed by *American Shipper* magazine, has recently become available to exporters, logistics managers, non-vessel-operating common carriers (NVOCCs), ports, and shipping lines at www.compairdata.com. The database includes complete schedule information on all trade routes to and from North America, as well as on two trade routes between Europe, the Mediterranean, and the Far East. Additional data, functionality, trade route, and feeder schedules are being added daily during the current beta-testing period. ComPair data provide a complete analytical picture of all carrier and port options in a given trade route and show which lines are sharing the same ships in a given service. Hyperlinks enable export pros to deal directly and privately with carriers.

International Distribution Software product is bilingual in English/Spanish. 3RDWAVE Import/Export and Distribution software from Blinco Systems

(www.blinco.com) promises to increase order-handling capacity and order turnaround time dramatically without additional overhead. The software manages multiple quotes, coordination of multiple purchase orders from multiple vendors, order consolidation, preparation of export documentation in English and Spanish, and shipment tracking to final destination. 3RD-WAVE is a turnkey application that provides full visibility of goods in the supply pipeline and end-to-end cost accounting and materials tracking. For more information, contact Ned Blinick, 416-510-8800, ext. 234; nedblin@blinco.com; or D'Anne Hotchkiss, 319-393-8786; ellsworthk@jmbest.net.

Tektronix logistics manager uses third-party providers to gather benchmarking data. “When I need assistance, I often go back to my third party providers to help me get benchmark data,” reveals Lorraine Leshner, logistics commodity manager at Tektronix, Inc. (Beaverton, Ore.; lorraine.lesher@tek.com). “We outsource within the logistics organization such functions as interplant fleet movement, receiving, freight payment, claims, and all transportation movement. All these different providers are really an extension of our logistics organization, so it’s important to go and talk with them first when about to benchmark,” she explained at a recent *Proven Performance Metrics in Logistics* conference (sponsored by the Institute for International Research; New York). “If you have your business partner working with you to help you evaluate your organization, you’ll be a lot more successful in ensuring what areas you want to address and change.”

Advanced planning and scheduling systems can help reduce inventory. Inventory reduction has long been the classic justification for a new planning system, including MRP, ERP, and now Advanced Planning and Scheduling (APS), argues John Bermudez, group director of supply chain management at AMR Research, Inc. (Boston; jbermudez@admfg.com). Although no specific function in APS reduces inventory, he explains in *The Report on Supply Chain Management* (“Supply Chain Planning: Where Do You Start?”), it can help (1) reduce inventory carried to cover long-term planned horizons and planning cycle periods; (2) reduce just-in-case inventory with more precise, synchronized material planning; (3) shorten manufacturing cycle time by synchronizing material arrivals with resource availability; (4) improve inventory deployment throughout the supply chain; and (5) more accurately match safety stock to customer service level requirements.

Creating "tight" pallet specifications to deter product theft. Bruce Cutler, director of logistics operations at Compaq Computer Corporation (Houston; 281-514-1453), recommends developing a series of pallet specifications to avoid product damage and theft while maintaining pallet integrity and facilitating flow through the channel. "Our complete pallet specifications serve multiple purposes," he explained at a Proven Performance Metrics in Logistics conference. The detailed specs: (1) Ease receipt at the customer site through dimensional control; (2) deter theft by specifying proper wrapping and banding procedures to make carton removal difficult; and (3) avoid product/package damage through the establishment of stacking standards.

Develop your own WMS troubleshooting guide. "A warehouse management system troubleshooting guide explains the possible cause, simple diagnostic tests, and recommended solutions," explains Catherine Cooper of the Progress Group (Albuquerque, N.M.). "It provides quick reference to common problems with bar code scanners, terminals, software, and other elements of the system." Many WMS implementations do not have one because implementation teams generally do not have the time or resources to create them, she explains in *IIR Solutions*. However, she recommends, "The daunting task is accomplished by designating a spiral notebook as the troubleshooting guide at the beginning of the project. Team members should then be encouraged to record, in simple language, frequently encountered problems and how they were resolved." The guide then exists as a living document, being updated on an ongoing basis.

Shipping company offers customized Web pages. APL has introduced HomePort, a customizable Web page that enables APL customers to oversee the information and transactions critical to container management and logistics. Available to APL clients through the company's web site (www.apl.com), HomePort allows customers to tailor the content and layout of their page to satisfy their specific business objectives. The site also streamlines logistics management by centralizing the resources integral to tracking and managing container distribution—shipment summaries, bookings, bills of lading, schedules, and vessel tracking. APL recently completed beta testing HomePort with Boeing, Cargill, and Sony, and the company claims that the clients saw an immediate difference in their ability to retrieve information and conduct transactions.

Is your supply chain world class? Accenture (formerly Andersen Consulting) has unveiled a diagnostic tool called the Supply Chain Value Assessment,

which uses the Internet to clarify options and decisions about procurement, manufacturing, product development, and distribution that can adversely impact a company's bottom line if not managed proactively. The tool allows clients to use a Web-enabled self-assessment tool that is analyzed and returned in less than 72 hours and later links that information with the results gathered by Accenture. According to Accenture, Supply Chain Value Assessment will help companies quickly weigh the costs and benefits of crucial supply chain issues, from transportation outsourcing to purchasing IT systems. For information, contact John Patterson at 212-614-4769.

Guidelines establish safer use of pallets and containers. The National Wooden Pallet and Container Association (NWPCA; Arlington, Va.; 703-527-7667) has developed national guidelines for pallet and container owners to help them protect their assets and reduce the loss of proprietary pallets and containers. The guidelines are designed to help users get their pallets and containers back for reuse, which lowers costs. The guidelines suggest that owners have these four components in place, register them with NWPCA, and actively use them: (1) notification—the owner should inform customers and handlers of the ownership and that the owner intends to retrieve the pallets and prohibit unauthorized use; (2) distinctive markings—the owner should clearly identify its ownership on the pallet in distinctive markings; (3) tracking—the owner should have a system in place to keep track of each pallet; and (4) retrieval—the owner should have a system in place to gather pallets and containers that go astray. The NWPCA is finalizing a national registry database where pallet and container owners will be able to register their proprietary pallet and container claims.

Catalog of publications is available from the WERC. The WERC has published *Essential Resources for Warehouse Management*, a listing of the organization's educational publications and research reports. Topics such as warehouse costs, bar code systems, and salaries and wages are included in the catalog. The publications catalog can be obtained through WERC, 1100 Jorie Blvd., Suite 170, Oak Brook, IL 60523-4413; 630-990-0001.

Transportation firm updates its Internet service for customers. Yellow Freight System has improved the services it offers over the Internet. Customers will now be able to set up their own secure Web page on Yellow's site. With access to this page, customers can trace their shipments, retrieve or fill out shipping documentation, and arrange pickups. Another feature allows

shippers using the Yellow Freight Truckload or Heavyload services to check rates (www.yellowfreight.com).

CLM makes it easier to find a job. Logistics managers looking for new positions should consider the CLM's Employment Clearinghouse service. If you are a CLM member, send two unfolded copies of your resumes—on white paper stock that will copy well and that is not more than two pages in length—to the Council's executive office: 2805 Butterfield Road, Suite 200, Oak Brook, IL 60523. You may include a cover letter and specify any companies to which the resume should not be sent. If you use the clearinghouse service, you are required to let the CLM office know before the end of each month whether to keep the resume in the "active" file.

Common thread among U.S. and European logisticians. A survey conducted by European Logistics and Supply Chain Management (ELSCM) reveals that European logistics managers are facing very similar issues to their American counterparts. According to the survey, logisticians across Europe indicate that EDI, e-commerce, supply chain management, planning and forecasting methods, and modeling and simulation are among the technologies that they expect will lead them into the next millennium. For more information, contact ELSCM at +44 171 691 3001 or write to ELSCM, WBR Ltd., Chancery House, 53-64 Chancery Lane, London WC2A 1QX.

How to survive a merger or acquisition. If your company is among thousands of others that have undergone a merger or acquisition, chances are that the supply chain was impacted. The spring 1999 issue of *Supply Chain Management Review* details four steps that help to overcome the impact of a merger or acquisition and get your supply chain to the level of integration you are seeking. Basically, it all boils down to setting up teams to oversee the integration, setting a strategic framework, testing alternatives and choosing a strategy, and bringing people and resources together to make the change happen.

Supply chains lag in importance among manufacturing community. Although 91% of North American manufacturers view supply chain management as critical or very important, only 2% of those surveyed ranked their supply chains as world class, according to a report from Deloitte Consulting (New York). Despite their continued investments and increased emphasis on supply chain management, manufacturers are not satisfied with the performance of their supply chain. In fact, almost three-fourths of respondents rate

their supply chain performance as only average or below average. The gap stems from the slow adoption of a supply chain strategy. Nearly 50% of the companies said that they do not have a formal plan in place to address the issue. Many have also launched isolated supply chain initiatives that prohibit them from reaching world-class performance levels.

Small firms get an electronic helping hand with their build-to-order (BTO) efforts. Targeting the weakest links in the supply chain, a consortium headed by Electronic Data Systems Corp. (EDS; Plano, Texas) is developing a Web-enabled system to bolster BTO efforts. The idea is to help small companies that are unable to support expensive electronic links to their partners strengthen their supply chain ties and improve their BTO strategy. EDS will integrate a customer's enterprise resource planning system with an advanced planning and scheduling system from Paragon Management Systems Inc. of Los Angeles.

WERC tracks facility trends. The WERC (630-990-0001) reports on the activities of warehousing executives in the past year. Some of the key messages: the trend toward fewer, but larger facilities; a shift away from the use of third-party warehouses; and the fact that company growth is the reason why many respondents change or alter distribution networks.

New approach to supply chain management and the desire for near-perfect deliveries. SynQuest Inc. (Atlanta, Ga.; 770-447-8667) announced its support for Optum Software's (Costa Mesa, Calif.; www.optum.com) Action Optimization initiative, a new approach to supply chain management that enables companies to anticipate and respond to customer delivery expectations the first time, every time. The combined SynQuest and Optum capabilities enable companies to manage the customer order life cycle.

Baan offers Web-based supply chain solution. Baan Company announced its Baan E-Enterprise suite of Web-enabled enterprise software applications that facilitate business along the entire value chain. With general availability expected this month, the new application allows greater access to information. Three modules comprise the solution: Baan E-Sales, Baan E-Collaboration, and Baan E-Procurement. Sample pricing for E-Sales and E-Collaboration is \$25,000 per server for up to 25 concurrent users. E-Procurement is available on a per user basis at \$1,000 per seat. For more information, contact press@baan.com.

The results are in from Distribution/Computer Expo West. A Dun & Bradstreet analysis of Distribution/Computer West attendees shows that 73% have job functions in the areas of distribution, transportation, warehousing, and logistics. Some 20% work for companies with annual budgets for logistics software and systems of over \$250,000. In addition, while only 18% say that have the power to authorize the purchase of such systems for their firms, a whopping 74% say that their recommendations directly influence the purchase of systems and services.

New partnership announced at Food Marketing Institute annual conference. Efficient market services (ems) and Syncra Software have formed a strategic partnership enabling ems to market and sell Syncra Ct, a software product that delivers Internet-based supply chain collaboration. Ems will comarket Syncra Ct as an integrated part of PromoCast, the forecasting component of its StoreView system, which provides store-specific consumer demand information on a real-time basis. The combination of Syncra Ct and PromoCast will provide information for more efficient supply chain collaboration, the companies claim. For more information, contact Syncra Software, Inc., at 617-218-4316 or efficient market services, Inc., at 847-205-7800.

Guaranteed assurance on freight deliveries. Yellow Freight System, Inc. (Overland Park, Kan.; 913-345-3000), is introducing Definite Delivery, a guaranteed service with proactive customer service features. Available nationally, Definite Delivery provides customers with guaranteed assurance that their standard shipments will be delivered on or before the committed service date. Constant monitoring technology allows Yellow to monitor every movement of each shipment, while proactive notification is enforced should a delivery commitment be missed.

Report from National Association of Wholesale-Distributors (NAW) explores potential of electronic commerce. Practical continuous replenishment programs and truly interactive Web commerce will combine to shock the entire distribution channel into creating a new business model. That's the message from *Electronic Commerce for Distribution Channels*, a report commissioned by the Distribution Research and Education Foundation. It contains case studies, interviews, and a clear explanation of why EDI-based continuous replenishment programs have failed but are now poised to deliver breakthroughs in lower costs and added value. It probes the future of interactive Web commerce and how organizations will invent new channel roles that

go far beyond a simple Web catalog that enables online orders. Prices: \$88 for NAW direct members; \$110 for members of NAW member associations; \$126 for nonmembers; \$5.50 shipping and handling. For information, contact National Association of Wholesaler-Distributors, 1725 K St., NW, Department T, Washington, DC 20006; 202-872-0885; fax, 202-785-0586; epubs@nawd.org.

The seven steps toward strategic supply chain management. Peter E. O'Reilly, CPM, assistant vice president of MetLife (New York, 212-578-2470), spells out his formula for attaining strategic supply chain management: (1) Invite suppliers to participate in focus group sessions on supply chain management for customers; (2) conduct workshops for suppliers to explain to customers new products and services or new ways of using existing products and services more effectively; (3) work with suppliers and customers to install electronic commerce systems; (4) allow customers to participate in supplier performance evaluations; (5) encourage suppliers to recommend best practices to supply chain management; (6) integrate suppliers and customers into the SCM strategic planning process; and (7) develop pilot programs to introduce suppliers' new concepts to customers at an earlier stage than normal.

Software promises zero inventory and 100% visibility. Industri-Matematik Intl. Corp. has launched Vivaldi, a suite of global fulfillment and customer service software for e-commerce. The company has targeted Vivaldi specifically for complex pull-driven supply chains and the rigorous demands for customer responsiveness found in the e-commerce economy. Greater coordination between trading partners is expected to increase speed in the supply chain by enabling 100% real-time visibility of inventory availability, pricing, fulfillment costs, and preferences on the basis of individual order lines, products, and customers. For more information, contact Industri-Matematik at 609-797-3200.

Customs revamps its Web site. The U.S. Customs Service has upgraded its Web site in a format that the agency says is easier to use. For shippers, this means quicker access to Customs headquarters rulings and tariff regulations. The site, www.customs.gov, also offers search capabilities.

Pallet guidelines prevent improper loading and handling. The National Wooden Pallet and Container Association (NWPCA) has produced a training video called "Pallets Move the World . . . With Your Help," which explains and

demonstrates proper pallet handling techniques. Three main points are highlighted: (1) Use only “safe” pallets—pallets designed to carry the weight of your specific unit load properly and safely; (2) coupled with proper design, quality construction and repair standards will prevent problems; and (3) do not build or repair your own pallets. A copy of the video may be ordered from NWPCA’s website (www.nwpc.com) or by calling 703-527-7667.

Rate-based transportation system has been enhanced. CT Logistics in Cleveland has released version 4.5 of its FreightRater freight billing and audit software, including Y2K compliance. The software has been designed for shippers and consignees in manufacturing, distribution, and retailing environments. Screens throughout the system have been redesigned for easier flow of improved information and tracking. Entry and update screens have also been enhanced. For more information, contact CT Logistics, 12487 Plaza Drive, Cleveland, OH 44130; 216-267-2000; www.freitrater.com.

Supply chain catalog features a collection of new reports. Whether you are trying to set up an efficient supply chain, develop a successful e-business strategy, or break into new markets, a series of reports from Financial Times Retail and Consumer’s Supply Chain Excellence Catalogue will be worth a second glance. Reports include Supply Chain Challenges of Electronic Shopping, E-Business in the Supply Chain, Pan-European Logistics, Supply Chain Logistics in Central and Eastern Europe, Supply Chain Management in China, and Logistics Trends in European Consumer Goods. Contact: +44 (0) 171 896 2325; www.ftretail.com.

Satellite tracking system improves control over trailer assets. QUALCOMM Inc. and ORBCOMM Global, LP, have agreed to offer a satellite-based trailer tracking system, developed by Vantage Tracking Solutions, a business unit of ORBCOMM. With this sales arrangement, QUALCOMM will market and deliver the trailer-tracking product. To date, Schneider has selected the solution to improve significantly the productivity and efficiency of its trailer assets. Additional information can be obtained by visiting the ORBCOMM Web site: www.qualcomm.com.

The future of logistics companies lies in four areas. According to information from Mercer Management Consulting, more than 1,000 companies in North America consider themselves logistics providers, yet fewer than 1% can offer complete logistics services. The future of the logistics industry be-

longs to companies that can integrate four aspects of logistics services: traditional services, including cargo consolidation and carrier management; information technology, including tracking and tracking of goods in transit; supply chain consulting, including advising users on the benefits of supply chain management; and product configuration, which helps clients customize products. Mercer's conclusions were based on interviews with 18 leading service providers.

Online benchmarking of supply chain management now available. Pittiglio Rabin Todd & McGrath (www.prtm.com) has formed a new subsidiary, the Performance Measurement Group, LLC (www.prtm.com/pmg). It offers an online benchmarking subscription series to measure companies' performance in two core business processes: supply chain management and product development. Participants receive confidential, customized benchmarking analysis online, 24 hours a day, seven days a week. The Supply Chain Management Benchmarking Series is mapped to the Supply-Chain Operations Reference model (SCOR) and is accepting subscribers. For information, contact Keith Belton, CEO, The Performance Measurement Group, 1050 Winter Street, Waltham, MA 02451; 781-647-2800; kbelton@prtm.com.

Optimize delivery routes for inventory replenishment. CAPS Logistics, Inc., a Baan Company (Atlanta, Ga.; 770-437-7319), has released RoutePro Replenisher to help companies manage their customers' inventory and use private or dedicated fleets to create optimized routes that use resources efficiently, cut transportation costs, and improve customer service. RoutePro handles both planning and operational decisions in the course of determining when and how to make the next delivery to customers. It will create groups of customers that should be replenished together, given their location and rate of usage. Vendors can then create the best set of routes for a particular day, given fluctuations in demand and inventory status of customers.

Carrier bid analysis may have just gotten a little easier. CAPS Logistics, Inc., a Baan Company, has released BidPro for carrier bid optimization and analysis. Shippers can use the software to organize their transportation requirements, evaluate alternative bids, and then select those bids that meet their requirements with the least cost. The product enables logistics professionals to create transportation plans that efficiently use resources, cut costs, and

improve customer service, the company claims. For more information, contact CAPS Logistics at 770-437-7319.

RPS introduces shipping management software for small and large shippers. RPS (www.shiprps.com), a subsidiary of FDX Corp., has launched two new technology products: Multiship, a hardware and software package for larger shippers, and Quickship, a software package for smaller shippers. Both applications are designed to automate shipping management, and both allow EDI with RPS—and in Multiship's case, with other carriers as well. Other features include an address database, processing and rating of packages, printing of addresses and bar code labels, package tracing, and reports. Rates are updated via download or disk.

Internet definitions to add to your logistics vocabulary. Kevin Q. Sullivan, vice president of Digital Commerce, Ltd. (Holland, Mich.; 616-394-9900), suggests adding two terms to your list of buzzwords: Web EDI, the transmission of a message, via e-mail, to an EDI-capable Web site at which the message is reformatted to an EDI standard and transmitted to the destination; and Internet Logistics, which is the application of Internet technologies to enable the logistics process.

Agricultural shippers associations on the Web. Logistics and shipping professionals dealing with agricultural-related international shipments now have a valuable resource in a new U.S. Department of Agriculture Web site (www.ams.usda.gov/tmd/shipping), which lists shippers associations that handle agricultural shipments. The site explains what a shippers association is and the role of these organizations in the changing ocean shipping market.

Price catalog available from Worldtariff. San Francisco-based Worldtariff (415-391-7501; fax, 415-391-7537) provides worldwide duty and tax information in its catalog. Customs duty and tax information, including Harmonized System classification number, import duty, selected preference duties for origin preference countries, excise taxes, and turnover taxes are among the contents of the catalog. Organized by industry sector, a 12-month subscription with free periodic updates is available online at www.worldtariff.com, on CD-ROM, in a loose-leaf binder, or via database.

A checklist for evaluating third-party providers. Ron Mazurek, corporate manager of distribution at PBB Global Logistics (Ontario, 800-537-3694 or

905-664-8440), recommends selecting a third-party logistics company based on whether the firm has integrated global business services, full EDI and leading-edge technology solution, a proven track record in supply chains, knowledge of future trends, customized solutions for vendor compliance, personalized customer service, access to professional resources, its own delivery vehicles, a commitment to quality and ISO 9002 standards, and a commitment to your bottom-line success.

Self-study course in warehousing available as desk reference. *How to Plan and Manage Warehouse Operations* covers all aspects of warehousing, from initial space planning and personnel requirements to the details of the day-to-day operation. Step-by-step guidance, forms, charts, checklists, and tables are said to maximize the logistics value of your operation. Price is \$159. Call 800-262-9699 for more information.

Airborne focuses on business to residential services. In a move to provide businesses an economical way to ship products to residential markets, Airborne Express announced plans for testing Airborne@Home, a new deferred delivery service that will enable businesses to ship to residences without sacrificing economy or service. Through a partnership with the U.S. Postal Service (USPS), Airborne began testing the service last month. Airborne will transport the shipments using a truck hub network to one of more than 24,000 Destination Delivery Units (DDUs), operated by the USPS, within two days. The USPS will deliver the shipments the next day. Airborne says that the result will be a reduction in transit times by up to 60% over alternative services. For more information, contact 206-298-3185.

Outsourced supply chain applications begin to take flight among vendors. Logility Inc. (Atlanta, Ga.; 800-762-5207) provides hosting and management services for its suite of Internet supply chain applications. Customers who sign on for the new service will be able to use a browser to access applications residing on Logility servers to forecast demand, plan inventory replenishment, and collaborate with trading partners.

Two new products help shippers take advantage of the Web. Celarix Inc., a start-up technology company in Boston, has launched two products designed to help shippers take advantage of the World Wide Web for tracking and sourcing goods. ISuite gathers information from a shipper's suppliers, forwarders, and carriers and puts it into a customized page on the Internet that can be

accessed privately by the shipper. The other product, Global Logistics Exchange, is designed as an open-market forum that allows users to negotiate logistics products and services. For more information, visit www.celarix.com.

Six steps of a successful third-party provider selection. According to Charles Watts of John Carroll University (Cleveland), speaking at a Congress for Progress (Mid-Atlantic Chapters of APICS), success is improved by (1) getting a third-party provider's assistance in developing requirements; (2) keeping the request for proposal open for general improvements, but not how you want these areas addressed; (3) making sure you have narrowed the list to two to three providers by the RFP stage; (4) making sure the RFP includes current conditions and an indication of how things will change in the future; (5) giving the provider plenty of time to respond to the proposal (a minimum of two weeks); and (6) finding out who the provider's project leader will be during start-up and ongoing operation.

Manhattan Associates and UPS form alliance. The logistics arm of United Parcel Service (UPS) and Manhattan Associates Inc. (Atlanta, Ga.) have formed a strategic alliance. UPS Logistics Group will now include PkMS, Manhattan's supply chain execution software. The companies say that they will jointly develop special systems and capabilities and create information system templates that will allow customers to integrate different kinds of software without rekeying information. For more information, contact Manhattan Associates at 770-955-5533.

Latest edition of Logistics Who's Who available. *Who's Who in Logistics? Armstrong's Guide to Third Party Logistics Services Providers* contains in-depth analysis of 113 major logistics companies, including international freight forwarders and software vendors. It shows what services are provided for third-party logistics customers and features Armstrong's highly successful outsourcing blueprint. Price: \$245, plus \$9.50 shipping and handling. For information: Richard Armstrong, Armstrong & Associates, Inc., 321 South Forrest Street, Stoughton, WI 53589; 800-525-3915; fax, 608-873-5509; Dick@3Llogistics.com.

Filing with Customs just got a little easier. Flagship Customs Services Inc. (Silver Spring, Md.) is the largest of several software vendors certified to act as a service provider for the Census Bureau. The company built a Web-based

system that channels Automated Export System filings from shippers, forwarders, and carriers directly into U.S. Customs' computer system. The service saves individual companies the time and expense of setting up their own dedicated link to the Customs' mainframe. The new system will allow firms to file shipper export declarations directly to the government free of charge. For information, call 301-562-7790.

CPFR checklist now on your browser. You can now use the CPFR checklist on your Web browser. The checklist, which helps you rank the CPFR requirements according to your needs and then score the products based on their ability to meet your chosen requirements, can be downloaded from www.syncra.com/products/checklist.html.

Logistics Management Center offers curriculum leading to logistics certification. The Center provides principle-based practical education in logistics and supply chain management. Upon completing nine courses, the participant will become a Certified Logistics Management Professional (CLMP). Among the courses, offered twice a year, are logistics and supply chain strategy; logistics performance, cost, and value measures; inventory planning and management; third-party logistics; and logistics and warehouse management systems. Edward H. Frazelle serves as the Center's executive director. Contact: Wendy Sager, LMC Conference Manager, Logistics Management Center, 1100 Superior Avenue, Cleveland, OH 44114; 216-931-9556; fax, 216-931-9795; www.logisticsedu.com.

Company name change reflects evolution in end-to-end solutions. Haushahn Systems and Engineers changed to Provia Software (877-776-8421; www.proviasoftware.com) as a result of its desire to offer an end-to-end, order-to-delivery supply chain package. The company is confident that it will better market its product and its ability to execute supply chain strategies for the logistics industry.

Transportation services available online. Prophecy Transportation Software, Inc., of Bloomfield, Connecticut, is offering eProphecy.com, a free way to access online services for the transportation community on the Internet. Among the services offered are load matching, driver recruitment, weather and road conditions, online directories of trucking and shipping companies, and software guides, as well as access to services such as permitting, insurance, repair facilities, truck and part sales and leasing, accounting services,

and legal and financial resources. For more information, visit www.e prophesy.com or call 800-776-6706.

Web site accelerates export application process. Workers filing for export licenses can now do it electronically, for free, through a Commerce Department Web site called Snap (www.snapbxa.com). According to the company, Snap (Simplified Network Application Process) is supposed to cut an average of 10 to 15 days off the licensing process. While Snap is not the only program for electronic export license applications, it is the only free one. Apply for Snap through the Commerce Department: 800-333-7864.

Roadway expands two-day service offering. Roadway Express, Inc., has expanded its two-day transportation capabilities to include service between the Cincinnati and Baltimore/Washington, D.C., areas. This new offering is available roundtrip between Cincinnati, Dayton, Richmond, Ind., Madison, Ind., Lexington, Florence, Ky., and Baltimore, Hagerstown, Md., Laurel, Md., Salisbury, Md., Newark, Del., Dover, Del., Alexandria, Va., Harrisonburg, Va., and Charlottesville, Va. Contact Roadway for more information: 330-643-6608.

HK solution offers mass personalization in distribution. HK Systems of Milwaukee is now enabling distributors to set standards for customer service with SCM/Enterprise Distribution 7.1. The new features enable a distributor's sales and customer service personnel to differentiate themselves from competitors through personalized interactions. SCM/Enterprise Distribution 7.1 includes personalized customer pricing management, complex contractual relationship management, sourcing rules, and more. It can manage customer profile data, track customer contacts, and handle special order provisions. Contact HK Systems: 414-860-6715.

CF puts a guarantee on delivery times. Consolidated Freightways (CF) has added a guaranteed service that assures freight delivery within a half-day window. Customers booking CF SureTime choose morning or afternoon delivery preferences; morning freight arrives by noon and afternoon deliveries arrive by 5 P.M., or invoices arrive with a zero balance. CF SureTime is available throughout the carrier's North American transportation network. A surcharge for SureTime averages about 25% higher than CF's regular standard service. Call 650-566-6133 for more information.

Get your freight there up to four days faster. USFreightways has launched USF Expedited Service, which enables customers to ship coast to coast three to four days faster than current industry standards, the company claims. Service will be met or the shipment is free. According to Bob Fasso, president of USFreightways' Regional Carrier Group, "We will exclusively use sleeper teams to provide the line-haul linkage between the east and west coasts. Our service will be as fast as two business days, allowing customers to ship on Friday and be guaranteed delivery on Tuesday." For more information, contact 847-692-0223.

Shipping activity reports possible with new software package. RPS, Inc., has introduced software that produces detailed reports from a shipper's weekly invoice. Using a Windows-based operating system, InvoicePLUS installs on any personal computer. Customers can sort invoice reports using more than 20 search fields, from zip code to purchase order number. The solution also allows shippers to create customized reports. Call RPS for more information: 412-747-4214.

Studies unveil potential of supply chain management and ERP markets. The latest report from AMR Research Inc. of Boston (617-574-5217) shows that the supply chain management market is predicted to have a 48% compound annual growth rate in the next five years, with revenue reaching \$18.6 billion by 2003. The supply chain management market is expected to evolve as leading ERP vendors extend offerings in this area. The growth will be fueled also by companies seeking a higher return on their ERP investment by adding more robust, real-time, supply chain decision-making tools. This explains why many companies investing in ERP systems to date have failed to achieve their business goals, according to a report from the Concours Group of Kingwood, Texas. The integration shortfalls relate to a lack of managerial, organizational, and technical cohesiveness. Call the Concours Group at 281-359-3464 or e-mail Concours@ConcoursGroup.com for its report, *Project ESII: Capitalizing on Enterprise Systems and Infrastructure*.

Liquidate excess inventories and get a tax break. Donating unsold export inventory from international deals that went sour can free up storage space and even get you a tax writeoff. The National Association for the Exchange of Industrial Resources (NAEIR), which represents 6,000 schools and other nonprofit groups nationwide, can bring a better tax deduction than

traditional liquidation. Contact NAEIR at 800-289-4551 or www.freegoods.com. You might also consider Gifts in Kind International at 703-836-2121 or www.giftsinkind.org.

Try this freight claim processing software free. EZ-Claim 2000 from TranSolutions (www.transolutionsinc.com) offers a quick and easy way to enter and retrieve data, assign claim numbers, keep track of overdue claims, and generate detailed management reports on carrier performance. EZ-Claim 2000 is designed to run on Windows 95, 98, NT, and 2000 and operates on stand-alone or network PCs. A free evaluation copy is available by fax (480-473-2454) or e-mail (transolinc@aol.com).

New trucking services offered by Roadrunner. Intrenet, Inc.'s, Roadrunner Trucking, Inc., based in Albuquerque, New Mexico, has launched Roadrunner Trucking Specialized Division. The new division provides flatbed specialty services that include extendable trailers and drop/double-drop trailers. Six new terminals are located in Oklahoma City, Cedar Hill, Texas, Wichita Falls, Texas, Blytheville, Arkansas, Lone Star, Texas, and Houston. Contact Roadrunner Trucking, Inc., at 505-833-2200.

Two software developers tackle supply chain on the Web. Aspect Development, Inc., of Mountain View, California, has introduced a series of Internet business initiatives for inbound supply chain management. The Web-based eXplore solutions enable savings by internally bridging product development, sourcing, procurement, and operations with external suppliers and contract manufacturers. Contact Aspect Development at 303-402-2970 or www.asectweb.com. On a similar note, FutureNext, an e-supply chain consulting firm in McLean, Virginia, unveiled a solution suite that uses Web technology to improve supply chains for midmarket manufacturers, distributors, and retailers. For more information, contact 703-248-7211 or www.futurenext.com.

SAP recognizes importance of transportation with new functionality. SAP AG has developed Transportation Planning and Vehicle Scheduling functionality within the SAP Advanced Planner and Optimizer. SAP believes that transportation is key to successful supply chain management and that the new features will enable transportation planners to optimize freight consolidation and mode and carrier selection and to reduce logistics costs. Users will be able to consider simultaneously various transportation constraints to opti-

mize and plan transportation, such as inbound, outbound, intracompany, and intercompany, through their own or independent carriers. Contact SAP America for more information: 610-661-3299.

Integration solution eases interface between ERP and e-commerce. Ironside Technologies Inc.'s e-commerce solutions, designed for leading ERP suites, ensure that implementation is rapid and that integration is seamless, resulting in a full deployment in less than 30 days. For companies with proprietary ERP systems, Ironside says that full functionality is possible in 60 to 90 days. The solution is geared specifically for the manufacturing and wholesale markets. For additional information, contact 800-495-IRON or www.ironside.com.

The International Air Cargo Association (TIACA) considers the logistics of air cargo. TIACA has established a new committee, the Technology Committee, to assess global technical trends and developments in logistics affecting the air cargo community. The committee will look into the principal technical logistic criteria involving equipment, processes, and communication and will report its findings about trends and developments to members. Some of the technical investigations that the committee will conduct may include information such as bar coding and its applications in logistics; mechanics of the logistics flow, including intermodal applications; and aircraft, including all-cargo conversions of passenger aircraft. Contact: 305-443-9696 or www.tiaca.org to learn more about the investigation or to become a member of TIACA.

Addition of air cargo services enhances ABF time-definite capabilities. ABF Freight Systems, Inc., has expanded its TimeKeeper service with the addition of air cargo capabilities. With this enhancement, TimeKeeper has changed its name to TimeKeeper Air. It offers premium service for emergency and time-critical shipments moving throughout the United States, Canada, and Puerto Rico. Through strategic air partnerships, TimeKeeper Air provides next-day, second-day, third-day, and other service options—all with a complete customer satisfaction guarantee. ABF has been piloting TimeKeeper Air at 15 customer service centers for several months. Service and rate quotations are available at 800-874-2061 or www.abfs.com. Long-term service and pricing agreements are available.

Midwest shippers get expanded service. American Freightways Corp. has started serving direct all points in North Dakota and South Dakota,

increasing its scheduled coverage to 32 states. The company will open six additional customer centers to provide North and South Dakota shippers intrastate, regional, and interregional service. Shippers are being offered three levels of service: American Flyer, American Flyer Guaranteed, and American Expediter. Call 870-741-9000 or www.arfw.com for more information about the various services.

Customs and Census publish final rules for Automated Export System (AES). U.S. Customs and the Bureau of the Census have announced the final rules for the AES. To download or review a copy of the rules, visit www.access.gpo.gov/su_docs/aces/aces140.html. The regulations define the export requirements, options, and procedures for AES. Under the new rules, shipping professionals will have four options for filing export declarations: (1) File all export declarations on paper prior to export; (2) file all shipment data prior to export through AES; (3) require that some data be filed prior to export, with the full information to be filed five days after export; and (4) file all export data 10 days after export for approved exports. Forwarders may file under this option for approved shippers if they have the power of attorney.

Ground and intermodal transportation separate for added benefits. J. B. Hunt Transport Services, Inc., has created a separate intermodal segment, which will result in separating van truckload business into two distinct units. The company believes that separating truck from intermodal business will enable the firm to improve the truck operating ratio to acceptable industry standards. Benefits of this move include lower maintenance costs and the ability to pay drivers more money, thus impacting driver recruitment and retention. For more information, contact 501-820-8110.

Freight forwarder tackles international logistics. GeoLogistics Americas, Inc., plans on devoting its personnel, technology, and material resources to the logistics and transportation needs of the international marketplace. The company will be offering additional global products and services, including a multimodal system that will ensure end-to-end management of the supply chain. "Cooperation with our overseas colleagues is very close at every stage of the logistics process to ensure cargo being delivered precisely within predesignated time frames," says Malcolm Heath, president of GeoLogistics. In addition, a global IT system will offer visibility of the supply chain cycle, from pickup to delivery. Contact GeoLogistics Americas, Inc., at 310-216-0900.

First-ever supply chain award is created. The Anderson School at UCLA, in conjunction with Hewlett-Packard Company, announced the creation of the UCLA Award for Excellence in Supply Chain Management. The national award will recognize innovation and effectiveness in supply chain management. For more information, contact the Anderson School at UCLA: 310-206-8197.

Collaboration just got easier for SAP users. VIT, a leading provider of e-supply chain performance measurement applications, has developed SeeChain NOW!, a quick-start program for SAP customers with complex global supply chains. By combining SAP data with information from planning engines and legacy applications, the program allows manufacturers to see and collaborate across the total supply chain so that they can proactively measure, monitor, and exceed performance objectives. SeeChain NOW! Includes one SeeChain supply chain performance measurement application for up to 50 users, five days of training, up to four weeks of consulting services, and a series of reports. XML-driven reports allow users to generate reports and graphs in Microsoft Excel, using a standard Web browser. VIT says that the entire program can be in production in 90 days. Contact VIT: 650-213-1882.

Shippers' transportation needs addressed with new GATX division. GATX Corp. has formed GATX Integrated Solutions Group, a combination of operating companies that will share resources and expertise to create supply chain and logistics solutions focused on optimizing customers' transportation and distribution systems worldwide. The group will encompass the operations of GATX Terminals Corp., GATX Logistics, Inc., GATX Liquid Logistics, Inc., its subsidiary GATX Inventory Monitoring Services, and the Rail Logistics business of General American Transportation Corp. For more information, contact 800-758-5804 or www.gatx.com.

Enhanced Web site hopes to become leading logistics resource. McHugh Software International has unveiled a new Web site, www.mchugh.com, designed to serve as an information resource for the logistics community. Visitors are able to steer a course through the company's product and service offerings, including its warehouse, labor, and transportation management systems. Information compiled by the CLM and the WERC is available on the site, including the cost of logistics operations and the role that logistics plays in the overall business process.

Railroad equipment expected to compete with over-the-road (OTR) service. Canadian National (CN) has launched a state-of-the-art truck/train freight service between Toronto and Montreal with the new dual-mode RoadRailer Equipment. The 53-foot trailers feature air ride, 110-inch interior height, more than 4,000 cubic feet of capacity, and maximum payload of 70,000 pounds. "CN is eager to build its freight business in short- and medium-length corridors, and RoadRailer is just the tool we need," says William K. Berry, vice president of intermodal for CN. "It enables railroads to compete with over-the-road transport in corridors of 250 miles or longer." CN spent \$13 million to acquire 200 RoadRailer Mark V trailers and 130 RoadRailer railroad bogies for the five-day-a-week, door-to-door service. Trains departing Montreal and Toronto at 9 P.M. will arrive at 5 A.M. the next morning. Contact: 650-579-6605.

Four tips for supply chain success. Foundation Technology Services, a supply chain services firm, has compiled war stories from several organizations to offer the following recommendations for enhancing supply chain plans: Brutally assess your corporate strengths and weaknesses to plan an attack; think about your suppliers; and negotiate a shared plan for success with trading partners. Foundation Technology offers a free workshop on Capitalized Supply Chain Strategies to introduce companies to the concept. Contact: www.ftsglobal.com.

Logistics tips are found in warehousing handbook. *The Warehouse Management Handbook* is available from Tompkins Associates Inc. Information includes warehouse control and management systems, personnel planning, third-party warehousing, transportation modes, dock planning, inventory control, and technology solutions. Call 800-789-1257 to order the book for \$69.95, and Tompkins will cover the \$5.00 shipping and handling charges.

Supply chain collaboration is focus of National Transportation Exchange's (NTE) new Internet solution. The NTE will work with SAP AG to deliver a seamless transportation execution process to improve logistics management and supply chain agility for the mySAP.com marketplace. MySAP.com provides a collaborative business environment of solutions on demand. This enables all companies to engage their employees, customers, and trading partners in the logistics management process by capitalizing on the Internet-based economy. The value of the offering is to visualize the entire supply chain

while inventory is in motion, ensuring compliance of negotiated terms. Information can be found at www.nte.net.

Software to improve supplier selection. American Software now offers a Supplier Performance data mart, which provides a complete supply chain business solution. It gives organizations comprehensive enterprise information and analysis capabilities to gain perspective and make better decisions, the company claims. This is the third in a series of Intelliprise intelligence tools from American Software. The Channel Performance data mart delivers information regarding a company's sales channel, including customer satisfaction, customer relationships, and marketing territories. The Inventory Performance data mart addresses financial inventory valuations as well as turn levels. Contact: American Software, 404-264-5619 or www.amssoftware.com.

Consulting services focus on supply chain management. Edison Group, Inc., has expanded its supply chain practice to help logistics clients better utilize technology and collaboration to extend the reach of their supply chains. According to the company, the Supply Chain Management solutions enable clients to address unique, fast-changing customer requirements by leveraging all available supply chain resources. Contact: 972-931-9292; fax, 972-931-9329; www.edisongroup.com/supplychain or www.edisongroup.com.

New company name signifies unity in logistics. Processors Unlimited, a logistics subsidiary of USFreightways Corp. has consolidated its companies under one name, USF Processors. The new name better positions the company to capture a cross-industry customer base, it claims. "Our new capabilities in forward logistics and transportation have expanded our service offerings to the extent that USF Processors more accurately communicates who we are and what we can accomplish for our customers," says Kevin Sheehan, president and CEO of USF Processors. For more information, contact 800-634-0370; www.usfprocessors.com or www.usfreightways.com.

EDI market will mature within five years. The Internet will take the EDI market in a new direction. Despite revenue growth of almost 18%, the market is rapidly reaching full maturity and is on the brink of transformation, according to data from the International Data Corporation's report, *Reinventing EDI: Electronic Data Interchange Services Market Review and Forecast*. According to IDC, revenues for EDI network services will increase to almost

\$2.3 billion by 2003. Internet EDI's share of transaction EDI revenues will jump to 41% during this same time frame. To view the report's table of contents, visit www.idc.com and search for 20036. To order the report, call 800-343-4952 ext. 4774 or e-mail Sue Beauregard at sbeauregard@idc.com.

New Internet browser brings supply chain partners together online. Eventus Logistics (www.eventuslog.com), a provider of enterprise demand planning and forecasting solutions, has launched Demand Partner, a browser based on collaborative planning solutions that connect organizations with their business partners via the Internet. Demand Partner leverages e-Business technologies and makes it simple for companies to work with their trading partners to improve demand and supply visibility and communication. A built-in approval mechanism, user-versioning, and data security provide a secure Internet collaborative system. Changes are simulated automatically by recalculating on-line data, and users have the flexibility to choose whether to publish their data to the collective demand plan. Demand Partner can be used with popular Internet browsers without the need for any software installation by end users.

Firms join to create automated distribution system. SAP and FDX Corp. are teaming up to offer a supply chain logistics suite that will automate the movement of goods from a company's suppliers to its customers' doorsteps. The package includes SAP's Advanced Planner and Optimizer and Business Information Warehouse for coordinating the flow of material coming from suppliers and FDX's logistics systems to track and execute the distribution of goods to customers. For more information, contact www.sap.com.

Two industry leaders combine expertise for one supply chain solution. Oracle Corp. of Redwood Shores, California, and UPS of America Inc., Atlanta, will team up to create an integrated shipping management system to improve supply chain and fulfillment visibility. The agreement brings together UPS's Online Tools, which are Web-based transportation and logistics applications, and Oracle's e-business-ready applications suite. The goal is to combine the enterprise resource planning functions and shipping solutions into one system, allowing for better information exchange. For more information, contact www.oracle.com.

New family of seals debuts at American Society of Industrial Security show. A new range of electronic seals, developed by Hi-G-Tek of Israel, is designed

specifically for secured cargo. A passive seal provides verification details from up to four inches away. The Active Seal is reusable and enables remote reading of recorded data from up to two feet. Users are given instant sealing details of every opening and closing of the seal. Up to 100 events can be displayed at once on the reader's screen. Once applied, the seal cannot be replicated. Upon activation, the data are logged, and a unique stamp code is established for the seal. The Star Seal allows simultaneous reading of sealing data of several seals from up to 65 feet away, and the Hi-G-Track is an electronic security patrol and delivery control system. Using radio frequency identification (RFID) technology and electronic tags, the system allows personnel to log electronically the goods in the care and track their delivery along selected routes. Contact: 800-348-4777; electronics@tydenbrammall.com; www.tydenbrammall.com.

Pharmaceutical shipping just got a little safer. KLM Cargo and TCP/Reliable Inc. have developed a door-to-door conditioning product for shipping pharmaceuticals. The Nightingale service ensures a climate-controlled shipping environment, resulting in fewer shipment losses for customers. One of the benefits of Nightingale is the elimination of dry ice, which can present hazards during shipping. For more information, contact TCP at 732-346-9200 or KLM at 312-649-4545.

Logistics software guide makes selection more organized. *Who's Who in Logistics Software? Armstrong's Guide to Supply Chain Management Systems* is a helpful, organized guide to the leading logistics software companies and their supply chain management capabilities. Published by Armstrong & Associates Inc. (800-525-3915), the guide features company background and financial information, software prices, implementation and platform requirements, functionality, update specifications, and case studies.

Emery expands international service for express deliveries. Emery Worldwide (Redwood City, Calif.) has expanded its guaranteed Gold Priority Express service to include Hong Kong, Taiwan, Thailand, and Korea to the 48 contiguous United States, Puerto Rico, Canada, and major points in Mexico. The service offers a 100% money-back guarantee for on-time delivery, with no size or weight limitations on shipments. The company also announced Gold Priority Express Plus, with service from Japan and Korea to Los Angeles, Ontario, and San Diego. This service is available for shipments picked up in the morning in Japan and Korea and scheduled for delivery by

midnight of the same calendar day. Visit www.emeryworld.com for more information.

Track inventory and labor across the street or across the country. Made2Manage Systems, Inc., and the SMS Group have joined to develop Radio Frequency Bar Code Advantage, which provides real-time mobile data collection for inventory and labor tracking across plants or across the country. The solution works with either LAN or WAN networks in a Windows NT solution. It can deliver real-time updates to the Made2Manage software system for receiving, inventory, shipping, and labor transactions. Visit www.made2manage.com for more information.

New ocean service puts decisions in shippers' hands. BAX Global, Inc., is expanding its ocean-forwarding product, BAX Global Lines. This includes more global shipping options—including direct sailings to major ports in the world—that allow shippers to specify the most appropriate mode for the transit time/price that their shipments require. Freight is collected by BAX and is shipped to a BAX office at the destination point, where it is unloaded and delivered to the customer by BAX. Call 800-758-5804 or www.baxglobal.com.

Midmarket distributors are targeted with supply chain solution. Symix Systems, Inc., has launched SyteDistribution, a fully integrated supply chain management suite for midmarket distributors and manufacturers. The solution is meant to help these firms build and manage supply chain relationships to meet customers' demands for on-time delivery and personalized products and services. SyteDistribution uses industry-standard operating platforms and includes sales order management/forecasting, inventory management, distribution planning, warehouse management, and business intelligence. For more information, contact 614-523-7344.

Canadian National boasts performance record; good news to shippers. Canadian National has reduced transit times and improved on-time delivery of carload freight since implementing a new service plan one year ago. This is good news for railroad shippers, says the company. The performance record shows an 81% on-time performance for carload traffic at a dock-to-dock level and a 96% on-time performance for deliveries within 24 hours; time that freight cars spend in key terminals was reduced by 18% to 21 hours. In addition, the company has reduced transit times for carload traffic by 24 hours and

achieved a 33% increase in gross tons miles per available horsepower (how efficiently a railroad uses its locomotive fleet). Contact: 416-217-6390 or www.cn.ca.

Quick-implementation ERP solution for midsized companies. TBB Global Logistics has reached an agreement with Technology Group Intl. Ltd. of Toledo, Ohio, to market an ERP system. The Enterprise 21 software offers distribution, manufacturing, and accounting solutions to improve customer service, the company claims. Enterprise 21 can be installed on a range of computers and networks, can be implemented in six to nine months, and is designed for midsized companies. For more information, contact 410-235-5661.

Carriers and shippers are brought together online. Logistics.com, Inc., is a new company that is integrating its suite of optimization-based decision support systems with the new Internet-based Digital Transportation Marketplace. The company expects to bring carriers and shippers together in an independent communications and trading environment. Carriers can interface directly with the DTM to maximize yields, decrease deadhead miles, bring drivers home, and increase revenue per mile. Shippers benefit from the auction solution, OptiBid, designed to optimize annual contract bidding. By integrating the shipper and carrier systems into the DTM, Logistics.com is enabling real-time transportation buys and helping customers manage supply chains in a one-stop solution, the company claims. For more information, visit www.logistics.com.

A new portal meets specific needs of supply chains. Agile Software Corp. has launched a new business portal aimed at meeting the specialized requirements of a dispersed supply chain. MyAgile.com is free to customers and their supply chain partners whether or not they have purchased Agile products. According to industry experts, as business becomes increasingly reliant on collaborative processes, portals become more important by allowing supply chains to form virtual communities, which meet individual and partners' objectives. For more information, call 408-975-3900 or visit Agile at www.agilesoft.com.

Seamless intermodal service throughout most of North America. Canadian National Railway Company (CN) and Clarke Inc. launched a third-party logistics joint venture offering shippers seamless rail and OTR freight

transportation and logistics services throughout North America. The venture allows CN to offer shippers one-stop shopping for freight shipments to and from points in Canada, the contiguous 48 United States, and Mexico that extend beyond its rail network. Visit www.cn.ca for Canadian National and www.clarkeinc.com for Clarke Inc.

Two industry leaders hope to offer single distribution/material handling solution. PricewaterhouseCoopers (www.pwcglobal.com) and HK Systems, Inc. (800-HKSYSTEMS or www.hksystems.com), have formed a strategic alliance to provide a distribution software and automated material handling system solution. PricewaterhouseCoopers will provide presales assistance, strategic planning, implementation, project management, and systems integration services in support of HK's Supply Chain Management/Enterprise Distribution solution. The companies claim that the solution offers clients a single solution tuned to the specific needs of their distribution operations.

Internet shipping system for B2B and business-to-consumer (B2C) transactions. TanData Corp. has signed an agreement with EVCOR systems that allows EVCOR to resell TanData's ChainLink Application suite, which is based on the company's transportation management technology. The Internet-enabled shipping solution streamlines the shipping process for B2B and B2C operations. ChainLink includes multicarrier shipping applications and makes shipping data available early in the order fulfillment process to meet delivery commitments. Contact: 800-TANDATA; info@tandata.com.

Speedy delivery service has expanded its destination reach. Emery Worldwide has expanded its guaranteed Gold Priority Express service for shipments from Shanghai to the 48 contiguous United States, plus Puerto Rico, Canada, and major points in Mexico. The service offers a 100% money-back guarantee for on-time delivery, with no size or weight limitations on shipments. Service provides door-to-door and door-to-broker delivery within two business days to current A.M. and P.M. points. Visit the Emery Web site at www.emeryworld.com.

Multiple processes between trading partners can be carried out over the Net. Braun Consulting, Inc., has formed an alliance with Paragon Management Systems, Inc., that enables Braun to offer Web-based supply chain capabilities in the form of Paragon's iCollaboration solution. iCollaboration allows companies to coordinate multiple business processes and proactively plan among

customers and trading partners across the entire supply chain. Braun claims that the solution can be deployed in as little as three months. For more information, visit Braun's Web site: www.braunconsult.com.

Cargo management is streamlined with calendar interface. ABF Freight Systems, Inc., has released several e-commerce tools, including Shipment Planner, which offers shipment management and tracking via a calendar interface. The solution allows in-transit shipments to be rerouted via ABF's Internet site at www.abfs.com. Shipments appear on the calendar by pickup date, due/delivery date, or appointment date, as selected by the customer. Customers can choose the types of shipment and shipment information to be displayed. Cargo claims filing via the site and e-mail invoicing have also been added to the e-commerce offerings.

Vendor claims software will lower logistics costs. Alternative Distribution Systems, Inc. (Homewood, Ill.; 708-799-4990), has developed a Logistics Management System computer application. The LMS is designed to provide inventory data management, order processing, and commodity tracking for products from point of production through delivery. The LMS is a stand-alone system that interfaces with ERP systems to receive and process information sent by EDI. The company claims that users will realize dollar savings by controlling postproduction costs of bringing the product to market, including control through warehouses and during transit.

PART II
INVENTORY MANAGEMENT

TEAMFLY

Chapter II-1
Inventory Reduction Strategies
Insights from the Pros

**APICS FORUMS: POTENT STRATEGIES FOR
INVENTORY REDUCTION**

Inventory management remains the critical concern of organizations as they plan their e-business futures. Excess inventory, inventory record accuracy, and inventory velocity are still at the fore when discussing e-solution implementations and technology developments. This has been evident at recent American Production and Inventory Control Society (APICS) Annual International Conferences (www.apics.org), where leading authorities and practitioners address the inventory issue squarely.

Corporate executives keep pushing the inventory reduction hot button. A plurality (26%) of *Inventory Reduction Report* reader survey respondents say that inventory reduction is the major concern of their superiors. Although top management sets reduction goals and objectives, however, it has no clue how it is to be done. According to James M. Masters of MIT (Cambridge, Mass.; masters@mit.edu), who spoke at a recent APICS forum, managements typically respond that “we’re going to hire real good people and they’ll figure out how to do it.”

Similarly, Masters and Bernard J. La Londe of Ohio State (Columbus; lalonde.3@osu.edu) surveyed members of the Council of Logistics Management (CLM). The respondents listed inventory reduction as a top priority. In fact, their goal is to double inventory turns. “We’re not talking about working around the edges, cleaning up a few minor areas,” Masters observes. “How can you cut your inventory in half without cutting yourself off at the knees?”

The Hottest Ideas

Sessions that drew the largest crowds at recent APICS annual conferences provide several inventory reduction insights for inventory managers to consider.

Inventory tracking will be the critical success factor for cybereconomy companies. Gerald L. Kilty, CPIM, CIRM, president and founder of Quality Management Solutions, Inc. (Clearwater, Fla.), notes that “corporate intranets are being created, providing instant information dissemination and new ways of internal collaboration for both the managers and employees.” He also notes that companies are “wiring’ themselves to their customers and suppliers, creating alliances within the supply chain never before imagined.” What this means is that inventory is now “visible” to customers, suppliers, and employees alike. Therefore, Kilty expresses, “If your inventories are going to be visible to your customers and your suppliers, for the walls of the supply chain to tumble, accuracy is at the core.”

Many enterprise resource planning (ERP) and manufacturing resource planning (MRP) systems have not been “overwhelmingly successful” due to data integrity, he observes. “Therefore, it seems to me, the necessity to focus on this subject is now even more important than ever,” he advises. Accordingly, he recommends implementing cycle counting procedures.

“I believe that there are three levels of cycle counting,” he offers. Level one can be described as “count and adjust.” Many companies, he observes, “never are able to proceed past this level.” The issue with cycle counting with many companies is that they are stretching out the process of an annual physical inventory to be a continuous year-round event, and therefore are missing the concept of cycle counting—that is, the element of investigating the cause of an inventory record error at the time of cycle counting and correcting the cause at that time, reducing the reasons why a record is wrong.

Level two exists when investigative cause-and-effect activity pursues root causes of why inventory records are wrong. Kilty refers to this as a “quick fix” program. The key to this approach is to select a manageable sample to count and periodically (weekly) to count the same sample until it is 100% correct.

Level three of cycle counting is the process of maintaining inventory accuracy over a sustained period of time. “It assumes the level of accuracy is already at 98%,” he states. The most popular method of maintaining a high

level of inventory accuracy is to establish a daily count frequency that allows for counting A items 12 times a year, B items 4 times, and C items twice a year.

Apply the postponement principal to finished goods inventories. Speaking at an earlier APICS forum, Kilty points out that “finished goods inventory levels throughout the supply chain can be reduced, leading to lower working capital, storage, and obsolescence costs by performing postmanufacturing operations at the distribution centers.”

This method (delayed manufacturing and deferred packaging) is used to postpone the conversion of components into finished stock keeping units (SKUs). Postmanufacturing services are particularly applicable to products that are modular in nature and can be assembled into a large number of different finished-product SKUs from a relatively small number of component SKUs.

Other factors that determine stability of delayed manufacturing include customer lead time requirements, the ability to forecast demand accurately, and order fulfillment lead time. “This decision also has implications on the distribution network design for different SKUs, and will also reduce total supply chain costs,” Kilty declares.

Synchronizing supply chain operations may mean small investments in inventory. William T. Walker, CFPIM, CIRM, power products supply chain manager at Agilent Technologies, the Hewlett-Packard spin-off (Rockaway, N.J.), maintains that synchronized operations maximize both throughput and profits. However, he also notes that synchronized operations are “counter-intuitive because they depend on both excess capacity at every node and an agreement by every trading partner to operate under a new set of rules.”

Under synchronized operations, there will be some inventory at every node of the supply chain and some inventory within every pipeline. When customer demand is light, node inventory will be large, and pipeline inventory will be small. Conversely, when customer demand is heavy, node inventory will be small, and pipeline inventory will be large. “In fact, the sum of the total inventory in equivalent SKU units of all node inventory plus all the connecting pipeline inventory will be constant,” says Walker. “If it is at all possible to eliminate some nodes in the current supply chain, then do this optimization before starting synchronized operations. This is because the total supply chain inventory investment is driven mostly by the number of nodes,” he explains.

Before synchronized operations can begin, enough inventory must be put in place at each node to support one synchronization at maximum throughput. “A synchronization cycle is the time between the broadcast of one demand signal from the system constraint until the next, which typically is one day,” Walker details. From then on each node must manage its inventory on a first-in, first-out basis to ensure stock rotation.

Inventory Quality Ratio is a straightforward technique for identifying and reducing excess inventories. “The Inventory Quality Ratio [IQR] is both an analytical technique for managing inventory dollars and a useful method of measuring inventory performance,” explains Gary Gossard, president of IQR International, Inc. (San Juan Capistrano, Calif.; 949-487-5400).

The IQR logic divides inventory into three groups: items with future requirements, items with no future requirements but with recent past usage, and items with neither. The items in these groups are then stratified into typical ABC-type classifications using future dollar requirements, past dollar usage, or current dollar balances. A target inventory level or rule is then set for each item based on its classification. The balance on hand of each item is compared to the rule, and the dollars of each item are categorized as either active, excess, slow-moving, or no-moving.

The IQR process shows inventories by individual planner codes and by purchased versus manufactured items. Other inventory analyses include breakouts by product line, stock type, buyer, vendor, commodity, account number, ABC classification, storeroom, and plant location. In fact, planners can drill down on any cell and see all the items that make up those inventory dollars, and all the detailed information about a given part number.

The potential for savings is great. According to Gossard, surveys of several hundred companies find that slow-moving or no-moving inventories account for about 10% of the dollars and that excess inventory typically accounts for 30% to 50% of total inventory dollars.

Identify and control inventory drivers to gain control. George J. Miller, CFPIM, president of PROACTION Management Consultants (Oak Park, Calif.; 818-706-2200; Gproaction@aol.com), argues, “Inventory drivers are items that tend to make inventory go up or down. Identify them, and you will have some clue of why inventory changes. Understand them, and you begin to gain control,” he asserts. Key drivers include the following:

- *Number of SKUs.* For example, the more SKUs in a product, the harder it is to bring matched sets of parts together at the same time. The rea-

son, according to Miller, is that there are “multiple items, with multiple vendors, kept and routed through multiple places or paths, with more opportunity for delays, defects, and the like, meaning more inventory will be needed.”

- *Carrying cost.* This refers to the cost of owning inventory. This cost should be calculated using the cost of money, taxes, insurance, manpower, energy, space, equipment, and transportation. In addition, Miller advises including obsolescence (the risk of inventory never being used, or needing rework to make it usable, needs to be factored into the cost of owning inventory), and shrinkage (a portion of inventory that becomes unavailable to the owner due to loss, damage, theft, or spoilage). Other cost factors that should be included are record-keeping systems (software, procedures, equipment, and paper used to track and control inventory) and physical inventories and reconciliations (which must be conducted to ensure that inventories are properly accounted for and maintained).

- *Supply variation.* This refers to the reliability of the supplier to deliver the desired units in the needed quantity, at the right time, and at an acceptable quality level. “If this can’t be done reliably, companies tend to carry buffer/safety stock to make up for the deficiencies in the supply system,” Miller reports.

- *Logistics constraints/transportation costs.* Especially in the international arena, logistics constraints must be built into the pipeline portion of the inventory model. Attempts at shortening the pipeline often result in higher transportation costs, which can end up being directly costed to inventory.

Eliminate the root causes of excess inventory. Dave Garwood, president of R.D. Garwood, Inc. (Marietta, Ga.; 770-952-2976; www.RDGarwood.com), emphasized that five action steps can “eliminate the root causes of excess inventory and also can lead to improving customer service while reducing inventory.” Garwood’s program includes the following:

- *Implement an effective sales and operations planning process.* “Carefully integrate marketing, sales, distribution, new product launches, manufacturing, and financial plans,” he asserts. “Done right, this can be accomplished in six months or less.”

- *Link the master schedules and distribution demands to the supply plans generated from the S&OP process.* This means summarizing the master schedules by time period (usually monthly) and comparing the total to the supply plan for each family.

- *Enforce nonnegotiable principles for scheduling.* Among the several principles in this action (credible schedules, due date = need date, demonstrated capacity = required capacity, and align customer delivery and manufacturing schedules), Garwood emphasizes having only one schedule. “Confusion reigns when the suppliers and the plant floor try to react to a multitude of schedules, including hot lists, super hot lists, must-have lists, and the like,” he insists. Another element he mentions is to manage both supply and demand. “We have historically expected supply to be managed,” he notes. “Demand has been another story. We accepted surprises in the difference between forecast and actual demand. Avoiding shortages demands that both supply and demand be managed,” Garwood insists.

- *Minimize the size of planning parameters.* Drive lead times, especially supplier lead times, to just a few days. “This means a much more effective job of supplier capacity management, and eliminating the EOQ [economic order quantity] mindset,” says Garwood. “Drive lot sizes to make or buy only as required each week or day, and implement a process of making bills of material changes only after discussion and approval by all functional areas.”

- *Make or buy as much as possible after receiving the customer order.* The goal is zero finished goods inventory. Any finished goods inventory represents a problem not yet solved, Garwood maintains.

Take a big bite out of safety stock. “Like most firms with high service levels, we kept a lot of safety stock,” acknowledged Donna Aubuchon, materials manager, and Mac Borgendale, CFPIM, master scheduling specialist, Milgo Solutions, Inc. (Sunrise, Fla.). With 20,000 active parts, “it was hard to manage safety stock.”

They launched a four-prong program that enabled them to reduce their safety stock levels. The first was the management directive to reduce inventory. “This led to an immediate review and an immediate common sense reduction that averaged 50%,” they explained. “With management willing to accept longer lead times on large orders, the safety factor went down, allowing reductions in safety stock.”

In addition, as manufacturing lead times went down and factory on-time deliveries went up, the standard deviation of demand during lead time went down. After one year, two major reviews of safety stock, and weekly reviews of purchase signals, safety stock is down about 90%—representing an investment of \$2 million.

Increase fill rates with lower inventory. One area of particular challenge at BellSouth Telecommunications involves the management of plug-ins, the specialized circuit boards that can reach up to \$100,000 in cost. The average plug costs \$350, and BellSouth has tens of millions installed in its infrastructure and buys millions more each year.

The company's plug supply chain is designed to meet consumer's needs quickly. PDCs are warehouses that stock plugs to replenish the field quickly and provide plugs for short lead time demand.

A first step was to reprofile the PDCs as they served demand within five working days. Any order due in one week or less was shipped from the closest PDC. Any plugs not available at the PDC were shipped from central stock. The original PDC stocking levels were set to 15 days stock on hand (DSOH) for all items. With a three-day replenishment time from central stock, this means that 12 days of safety stock were planned for each item.

The first reprofile of PDCs changed from a straight 15 DSOH for all items to a statistically based unit fill target of 99%. "Demand, demand variability, replenishment cycle and time, and supply variability were parameters of the new statistically set levels," explains Chuck LaMacchia, supply chain integration practice, the Progress Group. Also, only demand with a lead time of three days or less was served from the PDC.

Because central stock had the ability to reach all locations within three working days, filling four- and five-day lead time orders was not necessary. "Actually, the PDCs could serve two days or less lead time demand, but an extra day was provided for the field's comfort," he notes.

Supply chain used the plug-in component database to set and manage central stock inventory levels. Although it was developed 25 years ago, LaMacchia maintains that it has a sophisticated inventory management module. The database recommended purchases based on statistically set inventory levels to achieve management-specified service levels. In an effort to increase service without increasing inventory, the factors that affect inventory also were analyzed.

For example, one inventory parameter studied was order cycle. Most plugs were ordered on a monthly basis from suppliers. An ABC analysis was done on the volume. The 200 A items were less than 10% of all the purchased items. These would now be ordered weekly. The 400+ B items would be ordered biweekly. All other items would be ordered as needed.

Reduce internal lead time to lower inventory. The Frame Plant of Henredon Furniture Industries moved from a functional layout to a cellular layout arranged

by families of parts or product types. “Once the plant is redesigned using a cellular layout, your lead times drop,” observes J. Michael Lemon, CFPIM, former plant manager of Henredon Furniture Industries. Presently he is vice president of materials management at Lexington Furniture Industries.

“This happens because we eliminate numerous moves and queue times associated with interdepartmental transfers of material,” he explains. This, in turn, allows the cells to take a smaller portion of available space than was previously used. In the smaller area, work in process should also drop, he claims, citing the Henredon test case. “Component lead time prior to cellular manufacturing was reported as 40 days from raw material introduction to component part inventory,” Lemon explains.

In the test case, for example, lead times were dropped immediately to 30 days, then to 25, 20, 15, and finally 13 within a 12-month period. The result was a reduction in work-in-process (WIP) levels of 67%. An electronic kanban system was used for replacement of component part inventory.

Combined vendor-managed inventory (VMI) and supplier scheduling reduces inventory in the supply chain. Werthan Packaging (Nashville) took the bold step of combining two unique applications—supplier scheduling and vendor manager inventory—into one process. By integrating VMI through its ERP system with supplier scheduling, Werthan was able to maximize communication, minimize lead times, reduce inventory, and improve the quality of work life.

A demand planner was hired, and the VMI process was begun with Werthan’s second largest customer. The new ERP system played an indispensable part by providing information about demand patterns with the customer that previously had not been known.

Master production schedules were created that provided products on a predictable basis, and customer service improved to new levels with this customer. “This allowed us to exchange information for inventory,” the Werthan team (Donald P. Belmont, CPIM, president and COO; James G. Hutzel, CPIM, director of production and inventory control; and Mark K. Nichols, demand management representative) reported at APICS.

The move to supplier scheduling and the final linking “was a natural next step, moving to a supplier scheduling process with our suppliers similar to the VMI process we shared with our key customers,” maintain Belmont, Hutzel, and Nichols. “Once we had a stable, level-loaded master production schedule and had cleaned up the shop orders and other parts of our database, we were able to start this process,” they said.

“The only effective way to reduce lead time is through supplier scheduling,” they insist. “We have to get projected paper requirements to our suppliers in order to get into their schedule and MRP so we do not have to wait the entire five to six weeks.” Werthan arranged to buy capacity in the schedule and not part numbers until the demand time fence was reached.

Move from make-to-order to assemble-to-order. “Manufacturers achieve impressive gains when they changed from traditional work-order-based planning and control methods to true repetitive,” explains Gary A. Langenwaller, CFPIM, CIRM, president of Manufacturing Consulting Partners International, Inc. (Boston). According to a recent APICS repetitive SIG survey, WIP inventory was down 60%, and finished goods inventory fell by 36%. Repetitive, he defines, “assumes that jobs will be intentionally grouped by processing characteristics, to create logical, if not physical, production lines.”

An example from a plastic OEM part manufacturer was cited. They are implementing assemble-to-order to reduce lead time and inventory. They are standardizing their components to facilitate this change. The manufacturer reduced lot sizes from full pallet to the actual quantity ordered by the customer, and it is moving toward rate-based scheduling.

When the OEM part manufacturer first started back flushing, inventory accuracy decreased. However, it is now higher than before, and inventory transactions are significantly reduced. Point-of-use storage has also helped increase inventory accuracy. In addition, WIP inventory is down 50% to date.

Use a supply replenishment contract to optimize inventory. Tyco International (Clark, N.J.) established an advanced supplier partnership practice that led to the implementation of a rate-based replenishment process. Blair R. Williams, CPIM, director, offers, “We entered into a contract to ensure competitive pricing and optimized inventory, while providing suppliers with long-term commitment, supply visibility, and ease of operation.”

At Tyco, the delivery of product is based on the actual rate of consumption of the factory and not on some forecast, he explains. This is achieved by setting a maximum and minimum stock level and communicating the weekly inventory on-hand to the supplier.

“The suppliers are at liberty to deliver at their convenience, provided the on-hand stock level is maintained between max and min,” Williams details. The advantages of this method are the following:

- Inventory has been reduced. The inventory level is kept between the max and min, and this is about three weeks. Further, there is no need to increase buffer stock as consumption increases because the supplier is aware of demand increases well in advance.
- The danger of obsolescence is minimized.

Lessen reliance on MRP and use kanban to reduce inventory. “If you really want to reduce raw material inventories, try learning to live without MRP, or at least become less dependent on it,” challenges Michael C. Moody, CPIM, CPM, purchasing and materials manager, Hennessey Industries (Nashville).

He still uses MRP to provide a “vision” of needs to their suppliers; however, they are implementing kanban across all production lines. “In true demand flow manufacturing environments, you need to implement pull systems to better manage the flow of materials into your manufacturing areas,” he offers. Customers do not always order in equal “buckets,” as MRP schedules reflect.

This is why supplier relationships and kanban are so important, he explains. “By supplier relationships, I am speaking of lead time reductions, which reduces the amount of material you need to stock at your plant,” Moody states. Concurrently, establish kanban to release materials to the factory. “Kanban and point-of-use storage will help you eliminate wasteful, unnecessary inventory from the plant.”

Moody reports that inventories are down 44% from where they were in 1995, and they were anticipated to be at 50% by year-end 1998.

HOW TO USE CONSTRAINT-BASED MANUFACTURING RESOURCE PLANNING TO ATTACK INVENTORY CARRYING COSTS

In all lot sizing methods there is a tradeoff between setup and inventory carrying costs. However, recent applications of constrained-based MRP (CMRP) reveals it to be a practical method to determine the optimal lot size based on capacity restraints. In turn, it can help reduce carrying costs and may just be the next generation of material planning systems. Indeed, Edmund W. Schuster, CPIM, CIRM, manager of logistics planning, Welch's Inc. (Concord, Mass.), was able to cut Welch's carrying costs by \$150,000 using this technique (see sidebar).

Raw Materials Management at Welch's with CMRP Reduces Inventory Carrying Costs in First Year of Operation

Every year, farmers deliver over 250,000 tons of grapes to Welch's for pressing into juice. Welch's then stores the grape juice in large refrigerated tanks for year-round use in producing jams, jellies, concentrate, and bottled juice.

During the year, Welch's makes decisions on how to best use the grape crop. It has a refined cost accounting system that calculates requirements for Concord and Niagara grape juice by month, in tons. The system also accounts for the recovery loss and cost of converting the Concord and Niagara grapes into finished product.

Integrated MRP system calculates time-phased requirements for all components needed to manufacture. The new MRP system takes advantage of relational database information technology and operates in real time rather than batch mode. The minicomputer-based cost accounting and MRP systems also allow for extraction of data to computer spreadsheets.

Yet both these systems have two major drawbacks: They assume infinite capacity and do not consider operational constraints in MRP calculations, and they do not provide optimal cost solutions for blending juices.

"The Welch's MRP system uses regenerative MRP logic," Schuster offers. "For even minor changes to BOMs, a complete run of the MRP system becomes necessary to obtain new net requirements for Concord and Niagara." The system takes about six hours per run. "This virtually eliminates the ability to interactively find nonoptimal solutions using the Welch's MRP system," he explains.

The approach: developing a third model. "To improve the cost accounting and MRP systems, we developed a third model that works independently but draws data from the cost accounting system," Schuster defines the solution. "The cost accounting and MRP systems calculate requirements for grape juice correctly, but each lacked the ability to determine optimal cost recipes and interplant transfer schedules based on operational constraints experienced by each plant."

By employing a third model, the existing cost accounting information acts as a database and provides information on grape juice demand. The third model then calculates optimal recipes and interplant transfer schedules based on operational constraints and cost.

When the calculation is complete, optimal recipes serve as feedback and are input to both the cost accounting and MRP systems. "The next output of both these systems will reflect an optimal cost plan and set of recipes that meets operational constraints," Schuster describes.

"We began operation of the third model, and during its first year of operation, the third model saved Welch's between \$130,000 and \$170,000 in reduced inventory carrying cost," he declares.

Issues behind CMRP. Current research focuses on development of CMRP for the process industries. According to Stuart J. Allen of Penn State Erie, the Behrend College, where the research is being spearheaded, “An increasing number of process-oriented firms report problems with traditional, infinite-capacity MRP in planning the purchase and conversion of raw materials in support of production plans.”

For today’s process-oriented organization, the ultimate source of the dependent demand is a master production schedule (MPS) for end items. “Often, the MPS becomes disrupted if lower-level raw material or WIP is not available at the proper time,” Schuster explains. “This causes elevated cost and poor customer service.”

CMRP’s emerging critical role in the supply chain. For raw materials, a typical capacity constraint may involve the ability of a supplier to provide a manufacturing plant at a specified rate. For an internal manufacturing process, the capacity restraint might involve the sequence of lower-level, raw material processing involving critical machinery.

“With each case, an extreme disturbance to the MPS can occur if dependent demand lot sizing calculations assume infinite capacity,” Allen told a recent APICS International Conference. “CMRP serves an important role in the supply chain by reducing the potential for disruption to the MPS.”

Concerns may stall widespread implementation. Both Schuster and Allen acknowledge that CMRP raises some important issues concerning practical implementation:

- *Multilevel versus single level.* For process-oriented firms that have deep bills of material (BOMs), CMRP must optimize cost while meeting capacity restraints across all levels of the BOM. “This offers a very complex problem with few, if any, practical solutions,” explains Allen. Optimization of cost while meeting capacity constraints becomes a much more tractable problem when considering only a single level of the BOM. “However, this could lead to local optimal solutions in cases where a deep BOM exists,” he notes.

- *Large-scale CMRP versus small-scale CMRP.* Proposed large-scale systems for CMRP usually include massive use of mathematical programming along with special techniques to gain a solution in a reasonable amount of time. This approach requires a great deal of knowledge to make CMRP

work. The alternative “involves selective, small-scale application of mathematical programming and heuristics to existing, infinite capacity MRP systems.” This choice has the advantage of reduced cost of implementation and decreased complexity.

- *WIP lot sizing versus raw material lot sizing.* Some researchers think WIP and raw materials require different lot sizing methods to deal with divergent internal and external environments experienced by process-oriented firms. However, practitioners commonly use a single lot sizing method for WIP and raw materials. “This may lead to inappropriate lot sizing solutions,” warns Allen.
- *Multiplant versus single plant.* Many process-oriented companies have a network of manufacturing plants that depend on each other for raw materials and MRP. This increases the complexity of CMRP and raises the question of a “third model” approach to guide transfers of critical WIP and raw materials between plants based on capacity constraints and need.

The case for implementation. Despite these serious questions about the viability of CMRP in practice, Allen still advocates it as an emerging planning method. He reasons, “Common observation shows that dependent demand lot sizing with capacity restraints takes on great importance in process industries. One need only work a short time in a fluid processing plant to know that free tank space forms an important constraint when deciding what lot size to produce.”

The second argument he makes is the importance of an integrated supply chain with electronic links spanning customer to suppliers of basic raw materials. “It becomes important to consider finite capacity at each link of the supply chain,” Allen explains. “Since MRP serves as an important business function of process-oriented firms, it must include capacity constraints to promote a smooth flow of materials.”

Consumer goods sector of process industry can surmount these major implementation issues. Allen believes that the flat BOM structure, typical of the consumer goods sector of the process industries, allows a greater chance of overcoming the four critical issues of CMRP implementation. He itemizes the following reasons for his thinking:

- With flat BOM structures, consumer goods firms can apply single-level CMRP with reduced chances of finding local optimal solutions.

- Consumer goods companies can modify existing, infinite capacity MRP systems by the strategic use of heuristics to optimize cost while meeting capacity restraints, eliminating the need to employ large-scale CMRP.
- Because of flat BOMs, consumer goods organizations have fewer levels that require critical lot sizing decisions. Lot sizing can become more specific rather than using a single lot sizing method for both WIP and raw material purchasing.
- Flat BOMs simplify material flows coordination in multiplant situations and allow for specialized solutions unique to multiplant CMRP situations.

“With a little motivation, process-oriented firms can mold selective aspects of CMRP into a practical tool for dependent demand lot sizing,” Allen emphasizes.

KANBANS, DONE RIGHT, REDUCE RAW MATERIAL AND WIP INVENTORIES UP TO 70%

As inventory managers know, kanbans work well in an environment where there are high product volumes and low product variety. However, at least one leading expert believes that kanbans work equally as well in high-mix/low-volume environments. “It is critical, however, that the correct kanban technique is used for a given environment,” cautions William M. Boyst Jr., CFPIM, former director of materials at Nortel’s Digital Switching Division (Research Triangle Park; Raleigh, N.C.).

When to use which kanban technique. The *product-dependent* kanban is the technique of choice for a high-volume/low-mix environment, according to Boyst, currently a consultant with the Oliver Wight organization. “Product-dependent kanbans provide a visible signal of what to do and when to do it,” he explained at a recent Annual APICS International Conference.

When a kanban becomes empty, you simply replace what was there with another just like it. The advantage to this technique is that it is easy to explain and understand. The disadvantage of this technique, he notes, is that it requires some of every item at each workstation. “More inventory and more floor space is required,” Boyst explains.

The *product independent* kanban is the technique of choice for low-

volume/high-mix environments. Product independent kanbans provide a visible signal of when it is time to do something, but they do not communicate what to do.

The “what-to-do” must be communicated independently of the kanban signal by an external method, for example, by an MRP II dispatch list, a final assembly schedule, or a customer order. The technique works like this: Whenever a customer pulls material from your kanban, you, in turn, pull material into your workstation. The process continues until the kanban at the starting workstation is pulled. The empty kanban at the starting workstation is the signal to begin production of the next item using one of the “signals” previously listed.

The advantage of this technique is that it does not require some of each item at each workstation. The disadvantage is that it is more difficult to explain and to understand than the product dependent kanban.

Kanban planning in hybrid and repetitive manufacturing environments. Kirt B. Behera, CFPIM, president of Behera & Associates, explains, “In the repetitive environment all parts are treated as kanban parts. In the hybrid environment the component parts and intermediate-level subassemblies are identified by the planning system as either kanban or unique items.”

All kanban items are planned and stocked at the consuming work cell using a two-bin system, he detailed at the APICS conference. All unique items are stocked in the stores and kitted when required for work orders.

The kanban execution and inventory control system consists of the release of line schedules in the repetitive environment and of work orders in the hybrid environment. The unique work orders for customer orders in the hybrid environment are processed in a method similar to that for traditional work orders. Except, Behera points out, only the unique components are kitted and transferred from stores to line inventory, where they are consumed as an operation is completed.

A kanban work order is initiated on the shop floor when a using cell consumes repetitive subassemblies from a bin. The kanban work order quantities are usually based on small lot production.

The supplying cell manufactures the small-lot work orders and replenishes the kanban bin in the using cell. As lower-level kanban parts are consumed, they are replenished from the stores or the suppliers based on the just-in-time (JIT) pull system.

The repetitive environment uses the same pull system except that it does not use any work orders. With this approach the multilevel BOMs are

replaced by fewer level bills. The multilevel stocking, kitting, and issuing activities are eliminated for the repetitive assemblies, while these activities are limited only to the unique assemblies and components, he says.

The control systems consist of multistore inventory control, stores and kanban cycle counts, customer order tracking, and work cell input and output production tracking. They also include production completions reporting integrated with back-flush system and performance measurement systems. "The repetitive environment uses a wall-to-wall inventory or a two-stores inventory system, while the hybrid environment uses a multistores inventory system," says Behera.

Kanban is not a substitute for planning. "The kanban is a way to execute the plan," Boyst insists. "You can reasonably expect to implement kanban replenishment [see sidebar] in a small pilot area of your plant in 120 days and be able to see tangible, bottom-line results."

For kanban replenishment of purchased items, he suggests developing a way to communicate projected requirements for those items out beyond the supplier's cumulative lead time. This may be done via kanban cards, containers, an electronic signal (EBON), a fax message (FAXBON), or telephone call (TELBON).

Prior to attempting the implementation of kanban replenishment for a manufactured item, he suggests developing a plan of how much material is needed and when it is needed, and to ensure that both the capacity and the component materials will be available when required.

"Regardless of the replenishment technique selected, it is critical that a visual display is maintained at the using location to show that the supplier has been notified of the need," Boyst declares. Similarly, a visual display "must be maintained at the producing location to show that the replenishment need has been received from the using location."

CROSS DOCKING COMES OF AGE AS A WORKING INVENTORY REDUCTION TOOL

Typically thought of as an inventory management tool for warehousing, cross docking (see sidebars) now stands on the brink of greater acceptance as an efficient and effective tool to manage inventory of the shop floor.

"In conventional warehousing, there are four steps: receiving, storing, picking, and shipping," explains Burton A. Schaffer, regional general

10-Step Kanban Replenishment Implementation Methodology

Step 1: Have an on-site assessment made. Understand the kanban replenishment process and the application to your particular environment. Identify the pilot area and select the pilot implementation team. Develop a preliminary list of paybacks.

Step 2: Obtain the necessary implementation materials. These would include

- Materials for education and training
- Layouts of the pilot area
- Planning data for the pilot parts
 - Average use
 - Setup times
 - Lot sizes
 - Labor standards

Step 3: Educate the implementation team.

Step 4: Develop a detailed implementation plan—who will do what and when it will be done. This is a lengthy step. It is important to make deliberate haste here, but do take the time to do it correctly.

- Create a process flow chart.
- Determine the material flow for the selected area.
- Select the kanban system to control production.
- Select the kanban system to control replenishment.
- Establish kanban quantities and process balances.
- Identify material for point-of-use storage.
- Choose performance measures.
- Establish performance objectives:
 - Lead times
 - Inventory
 - Space
 - Shortages
- Define rules for sharing common equipment.
- Review maintenance schedules.
- Develop interfaces to existing systems.

(continued)

- Define the points of material deduction.
- Define procedures for handling engineering changes.
- Define labor collection procedures.
- Design the kanban cards (signaling system).
- Produce/procure the kanban cards.
- Define the procedure to bleed off excess inventories.

Step 5: Begin bleeding off excess inventories.

Step 6: Implement kanban controls for all material and production processes in the pilot area.

Step 7: Begin to reduce selectively the number of kanbans. Also begin to

- Monitor and display performance measures
- Conduct daily production meetings in the pilot area

Step 8: Educate the pilot implementation team, and selected others, in the total quality control problem-solving process called PDCA (Plan-Do-Check-Action).

Step 9: Implement the PDCA problem-solving process.

Step 10: Evaluate the results of the implementation. Begin to make plans to migrate the kanban process to the next pilot area.

Source: William M. Boyst Jr., CFPIM.

manager at Tompkins Associates Inc. (Allentown, Pa.; bschaffer@tompkinsinc.com). “Cross docking, effectively, is just receive and ship,” he declared at a recent Distribution/Computer Seminar East (C. S. Report, Inc.; Uwchland, Pa.; 610-458-6410). “It eliminates storing and picking,” he points out. “Storage in a warehouse is a major consumer of space and equipment, probably the two most difficult things to get more of.” Also, there is the elimination of labor, which typically can account for up to 80% of cost in a warehouse.

Cross docking can dramatically improve inventory turns by synchronizing supply with demand. The chief benefits of cross docking are an increase in inventory turns and a reduction in inventory carrying costs. Other benefits include increased responsiveness and greater space availability in the warehouse.

However, all inventory does not qualify for consideration. John White, senior manager at Accenture (formerly Andersen Consulting; Atlanta, Ga.)

defines a “good” candidate for cross docking as one with a short replenishment lead time, fairly heavy demand, and relatively predictable volume and flows.

“Don’t take a product that meets just one of these criteria and say it is a good candidate,” he warns in *WERCsheet* (Warehousing Education and Research Council; Oak Brook, Ill.; www.werc.org). For example, if a product is heavily demanded over the course of the year but is received in huge quantities once or twice a year, it would not be a good candidate.

Additionally, Schaffer points out that there are increased costs to cross docking and that they must be recognized and evaluated to make sure that the tradeoff favors moving to cross docking. Among the costs he includes are

- Receiving and shipping labor, equipment, and space requirements
- Clerical and supervisory labor
- Systems hardware and software
- Additional supply chain costs

Successful cross docking requires absolute confidence in the quality and availability of product. “If I can’t count on my supplier to deliver the right product, be on time, or give me salable product, then I don’t cross-dock,” emphasizes White. “I have to trust that the product coming into my warehouse is one that is suitable to go out,” he declares.

While agreeing with White’s assessment, Schaffer warns, “Cross docking is real-time, and you don’t have an opportunity to go back and fix it. You have no time to check the quality or quantity of the product.” In all likelihood you will audit the process and provide feedback to the supplier, “but you can’t start opening boxes, checking and making changes on a routine basis,” he stresses.

However, Schaffer suggest several procedures that can help build this confidence level. Among them he includes the following:

- Before pilot testing cross docking, it is necessary to (1) set specifications and parameters, including the auditing plan; (2) communicate specifications to all parties, both internal and external; (3) review, revise, and agree to all specifications; (4) conduct a test program; and (5) make appropriate changes.
- Develop a formal supplier and carrier certification program.

- Certify all supplier and carriers.
- After implementing cross docking, (1) begin audit of all parameters, including quantity, quality, and on-time performance; (2) provide a formal tracking program; and (3) feedback performance to suppliers and carriers. Also, (4) make supplier and carrier performance a major component in all discussions; (5) change performance criteria as appropriate; and (6) add additional suppliers and carriers only after they are certified.

It is critical to get all members of the supply chain involved before instituting cross-docking procedures. “Cross docking, by definition, involves other members of the supply chain,” Schaffer comments. “If you want your cross-docking initiative to work, you’ll have to treat them as key members, and not the enemy.”

This advice is not new. In effect, you must sit down with each of your supply chain partners and identify the changes necessary for cross docking to become a reality. You also have to identify any increased costs and work to minimize total supply chain costs. He explains, “There’s a real need at this point to sit down and say, ‘What is it going to cost you, cost me; what is our alternative, and what is the best balance?’”

There might have to be some modification of the existing agreement. “You might have to pay your suppliers or carriers more,” he declares. “I’m not advocating throwing away money, but if I go to a supplier and say, ‘You need to do this,’ and it costs my supplier more to do it, then don’t I have a need to pay for that?”

In fact, the supplier might well come back and offer alternatives that negate the cost increase, or even reduce the overall cost.

WERC STUDY DEFINES KEY FACTORS THAT IMPROVE INVENTORY TURNS

Imagine a 65% increase in inventory turns over a five-year period. That’s what a recent study titled *Warehouse Inventory Turnover: Trends, Change Drivers, Measures, Using the Data* anticipates. The study, conducted by the Warehousing Research Center of Miami Ohio University for the Warehousing Education and Research Council, paints a picture of the many challenges that a typical warehouse confronts but overcomes to increase inventory turn performance.

Cross Docking on the Shop Floor a Reality, Too

“We often think of cross docking as being restricted to a DC [distribution center] or warehousing operation, but we also can apply it to manufacturing,” insists Burton A. Schaffer, regional general manager at Tompkins Associates Inc. (Allentown, PA.; bschaffer@tompkinsinc.com). Cross docking in manufacturing can provide some major advantages, but it takes some very careful planning, he warns. The advantages include

- Reduced finished goods inventory
- Increased response
- Reduced storage space and equipment
- Reduced handling

However, there are major challenges to confront, he concedes. They include the following:

- Inability to hold product for quality control (QC) testing and approval. However, this can be overcome by (1) addressing production methods in order to build rather than inspect quality and (2) having a foolproof and tested method for recalling defective product (which should be an infrequent occurrence).
- Reduced ability to level the peak loads on operations with limited capacity. This may require the addition of some equipment or capacity.
- Product may have to age before shipping. Therefore, for cross docking to happen, the process may have to be modified to eliminate the aging step.
- Production may be scheduled to minimize cleanup between different products. Here, cross docking may force a production plan that requires more cleaning instead.

Inventory turnover is changing, and organizations have significantly improved inventory turnover, from 8.0 turns to an expected 13.2 times per year. “The magnitude of improvement in inventory velocity is striking,” the report concludes. On average, firms in the study report that inventory turns, already increased by 30%, will improve by another 27% within the year.

Factors that will have the greatest influence on achieving greater inventory turns. The element receiving the highest percentage of response from the WERC

The Different Varieties of Cross Docking

In its most generic sense, cross docking is a strategy in which product is received from the supplier into a warehouse and then moves across the dock directly to outbound loading for transportation to the customer or outlet, explains John White, senior manager at Accenture (formerly Andersen Consulting; Atlanta, Ga.). The product does not go into traditional reserve or pick slot storage.

However, while the definition might sound simple, the concepts become more complex in practice, he explains in *WERCSheet* (Warehousing Education and Research Council; Oak Brook, Ill.; www.werc.com). He outlines the different types of cross docking as

- *Continuous movement.* Also known as unitized continuous movement, this is the most straightforward form in which a unit, typically a pallet, is picked off a truck and transported directly to an outbound truck. “The product literally never touches the floor,” he remarks.
- *Distributed case movement.* The goods come into the warehouse either on pallet or floor-loaded, but distribution is done at the case level. With this technique, some type of material handling system, such as a sorter or conveyor, supports the movement of a large number of cartons.
- *Consolidated movement.* This is considered a hybrid of the previous two. Typically, a pallet is brought in and a portion of it is needed immediately by the customer, whereas another portion is not. The warehouse operator removes those portions of the pallet to be put away. The rest is married with other inventory to be shipped. This technique also needs staging and synchronization of the picking and receiving processes.

members surveyed (16.2%) is “the use of better software and inventory management tools.” It appears that the largest group of respondents sees technology and information as the way to drive improvement in inventory turns (see Table II-1.1).

Improved forecasting, which ranked third, could logically be included in this category as well. “So there is a very strong emphasis on systems and software to further improve inventory turns,” reports the research team. However, it is interesting to note that improved forecasting, which is again important for future improvements in turns, was also mentioned as one of the top drivers of inventory turnover improvement.

In addition, efforts to reduce lead time were mentioned by a large num-

Table II-1.1 Factors That Will Drive Inventory Turns

<i>Factor</i>	<i>% of Respondents</i>
Improved systems, inventory management software, WMS	16.2
Reduced production/delivery lead time/JIT	15.0
Improved forecasting	10.7
Application of supply chain management principles	9.6
More attention to inventory management	6.6
Reduction in SKUs	5.1
Increased throughput	4.0
Elimination of dead inventory	4.0
Inventory costs	3.3
Utilization of cross docking	1.5

Source: Warehousing Education and Resource Council.

ber of respondents (15%) as a way to improve turns. Supply chain management principles were also one of the higher ranked factors (9.6%). Reducing SKUs, though important in this context, did not receive as many mentions as it did as a driver of past improvements in inventory turns.

Primary factors that put us where we are. Respondents were asked to indicate how selected factors that affect inventory turns had changed. Those factors might be useful as benchmarks for a company's warehousing operations.

For example, 70% of all firms in the study report that their warehouse space utilization has increased over the study's three-year period. If a particular firm's experience is just the opposite, this benchmark suggests that the firm may want to examine its stock location procedures and storage processes, as well as any other factors that influence space utilization.

It is also interesting to note that there has been an increased emphasis by top management to reduce inventories, as indicated by 74% of the respondents. Also, there have been similar requests by customers.

"Good sales forecasts are an important ingredient to effectively managing inventory, and it does not appear that improved sales forecasts are offering much help to the majority of firms," the study reports. Although 32% report that forecasts have improved, almost double that (62%) report that forecast accuracy is the same or worse than it was three years earlier.

Factors that are changing in a positive direction. Several elements provide warehouse management with support for improving inventory turns. They include the following:

- Electronic data interchange (EDI) utilization on customer orders is increasing (reported by 65% of the respondents).
- Supply chain coordination (61%) is improving.
- There is additional use of cross docking (48%).
- Order cycle times are being reduced by a significant number of firms (49% report that this indicator has been reduced since 1995).

Additionally, respondents were asked to indicate which factors had the greatest effect on changing finished goods inventory turnover (see Table II-1.2). “No one factor received an overwhelming number of responses, and just seven factors received the most number of mentions,” notes the study. The results suggest that the factors affecting inventory turns are diverse and that their impact varies greatly among firms.

The impact of top management intervention in inventory reduction. However, the clear leader in terms of frequency of mention is top management’s emphasis on reducing inventories. In fact, the importance of management priority to inventory reduction is shown when comparing firms whose turns decreased to those whose turns increased. For firms whose turns decreased, top management paid considerably less attention to inventory reduction than for firms whose turns increased during the period.

The complete research study, which includes detailed performance benchmarking information, is available for \$10 for WERC members and \$20 for nonmembers, plus \$4 shipping and handling. Contact: WERC, 1100 Jorie Boulevard, Suite 170, Oak Brook, IL 60523; 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; www.werc.org.

Table II-1.2 Most Significant Factors Affecting Turnover

<i>Factor</i>	<i>% of Respondents</i>
Top management’s emphasis on inventory reduction	19
Number of SKUs in the warehouse	10
Sales forecast accuracy	7
Use of sophisticated inventory management software	6
Coordination among supply chain members	6
Annual warehouse throughput	6
Use of MRP/DRP/ERP	4

Source: Warehousing Education and Resource Council.

TRY INVENTORY PROFILE ANALYSIS TO REDUCE FINISHED GOODS INVENTORY

A new technique in aggregate inventory management, inventory profile analysis (IPA), is helping to improve customer service (as measured by order fill rate) while reducing and balancing finished goods inventory. It was developed by Jim Robison, CFPIM, CIRM, materials manager at SOLA Optical USA (Petaluma, Calif.).

“Inventory profile analysis distinguishes between shortage and excess at the SKU level,” Robison explains. “IPA coverage, or shortage, is a good indicator of service level, and IPA excess can be used to identify waste and monitor inventory reduction programs.” Initial tests of IPA indicate that service level objectives can be sustained while reducing inventory up to 70%. After implementing IPA at SOLA, backorders were reduced by 90%.

Making the case for IPA. “Inventory is best measured as it relates to demand,” says Robison. Several ratios have been developed to aggregate inventory and compare it to current or expected demand; among them are turnover ratios and months on hand.

“We have seen that inventory turnover is a poor choice for internal analysis because it converts SKU data to cost data,” he argues. “Months on hand is an improvement because it uses units, but it still aggregates shortage and excess into a single value,” Robison explained at a recent Annual APICS International Conference.

Pyramid forecasting and its role in developing the IPA technique. With pyramid forecasting, historical data are captured at the SKU level, according to Robison. SKU ratios are noted, and the data are then aggregated by product family. Future demand is forecast by factoring in such items as planned promotions, competitive activity, and the product life cycle. The forecasted totals are then disaggregated back to the SKU level using the historical ratios. Inventory targets are determined by adding safety stock to the forecast demand. “The key point here is that inventory targets are established at the SKU level,” he emphasizes.

“We hypothesized that the relationship of the inventory to the SKU targets, rather than to the months-on-hand total, would be a better indication of the expected service level,” he explains. “We conducted a test, and the result was a new analytical technique, the inventory profile analysis.”

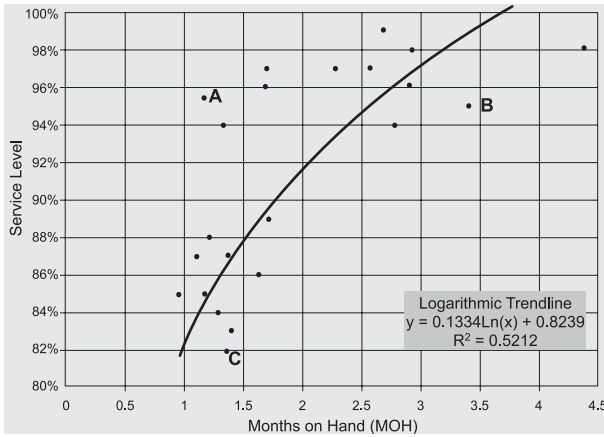


Figure II-1.1 MOH and Corresponding Service Levels

Source: Jim Robison, CFPIM, CIR.M.

Putting IPA to the test. To test the IPA concept, SOLA conducted a six-month-long parallel study of seven products, each consisting of several hundred SKUs. A 95% service level objective was used for the test. For the discussion, Robison looked at one product in detail and summarized all seven.

SOLA developed a MOH service level chart (see Figure II-1.1) with logarithmic trend line. The R^2 value (coefficient of determination that ranges between 0 and 1) is 0.52. The trend line (or the formula) tells us that it required about 2.5 MOH to achieve the desired service level objective.

Three weeks were selected for analysis. Weeks A and B both had high service levels, but week A did it with a lot less inventory. Week C had about the same inventory as week A but a much lower service level. Why was week A more efficient?

“MOH cannot tell us,” Robison notes. However, with some IPA charts, a more accurate picture evolves—for example, the IPA shortage chart (see Figure II-1.2). A linear trend line with R^2 of 0.67 is used (the best-fitting trend line will have the highest R^2 value). Weeks A and B, with their high service levels, both had high coverage (low shortage). Week C had low service coverage and low coverage (high shortage). “We were able to hit our 95% service level objective with about 93% coverage, or 7% shortage,” he explains.

An IPA excess chart, with a linear trend line with very high R^2 of 0.837, was another tool (see Figure II-1.3). Note weeks A and C, with low excess

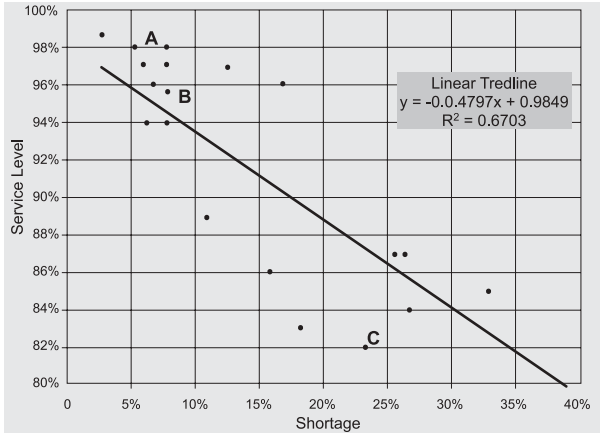


Figure II-1.2 IPA Shortage and Corresponding Service Levels

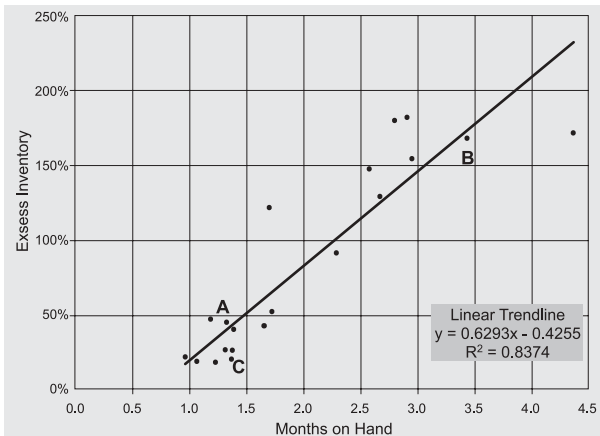


Figure II-1.3 MOH and Corresponding Excess Inventory

and low MOH, and week B, with high excess and high MOH. From this visual, a 2.5 MOH gave a 115% excess inventory. “We could have cut our total inventory in half and still met our service level objective,” Robison concludes.

The study, he declared, confirmed the hypothesis that the inventory profile analysis is a better indicator of service level than is a months on hand analysis. In addition, the study discovered a very high correlation of MOH to excess inventory.

How to implement IPA. You can implement IPA using Microsoft Excel, Robison reports. Excel will automatically calculate and plot trend lines in the charts. In addition, it can display the trend-line formula and the R^2 value.

Initial decisions include product hierarchy, data source, and reporting frequency. For forecasts, you need to include both the download date and the forecasted date. Include any other relevant information, such as the name of the person responsible for the product. Enter the downloaded actual and target quantities at the SKU level. For each SKU, calculate the coverage (shortage) and the excess. Sum the target, coverage, and excess quantities.

Coverage is the total coverage quantity divided by the total target quantity. Excess is the total excess quantity divided by the total target quantity. “You can use the Excel ChartWizard to create a combination chart showing coverage, target, and excess,” he describes. “Use a scatter (x,y) chart, with linear trend line, to compare coverage to service level.

FLOW-THROUGH INVENTORY WORKS IN WAREHOUSE, DISTRIBUTION, AND SHOP FLOOR

With the mounting pressure to reduce and accelerate inventory, manufacturers refuse to accept sluggish practices such as long production runs, inventory buffers, or high finished goods inventory. As a result, there is renewed interest in the flow-through concept for both manufacturing and distribution. The benefits attributed to flow include up to 90% reduction in inventory, 40% reduction in space requirements, at least an 80% reduction in manufacturing cycle time, and a decrease of 60% in quality costs.

Flow manufacturing and the importance of kanban. “Flow uses factory design as a foundation for linking manufacturing processes to timing of customer demand for products,” says Tom Grace, senior analyst at AMR Research (Boston; tgrace@amrresearch.com). “Flow emphasizes speed and customer focus issues such as product quality and configurability.”

A critical element of a flow system is the kanban replenishment module. According to Grace (*ERP and Flow: The Status Quo Meets Its Replacement*; AMR Research, Inc.; 617-542-6600), “Aggressive users of flow use kanban systems to determine optimal replenishment rates in the context of current demand as well as automating longstanding supplier relationships.” With siz-

ing calculations and analysis components, the module is distinct from the kanban function in most ERP systems. These “merely” automate the passing of predefined supplier signals based on inventory levels.

Implementing flow in an engineer-to-order environment and its impact on inventory. The flow manufacturing philosophy at Air Products and Chemical’s Semiconductor Equipment Center (SEMC; Allentown, Pa.) is designed to minimize WIP and inventory-driven computer transactions. Flow manufacturing uses raw inventory located in a stockroom, line kanban locations, and an intermediate location called raw and in-process inventory (RIP).

“Parts are ‘pulled’ to the line on demand,” explain Paul J. Pfeiffenberger, materials manager, and James M. Curran, plant manager. Demand is typically generated by an empty kanban container. The new pull manufacturing system at SEMC converted the shop floor from a system driven by output of a computer to one driven by visual signals. The MRP II terminals were removed from the shop floor, and the shop floor control module is no longer used.

“Jobs are sequenced into the production line at the beginning of the manufacturing process,” Pfeiffenberger and Curran told a recent APICS International Conference. “Employees pull or flow the work through the factory based on the in-process kanban [IPK] signal.” If a job is in the upstream IPK, the employee pulls that job into the workstation and performs the appropriate work. If the downstream IPK is full and a job is completed at the workstation, the employee moves to an open workstation. “There is no need to consult a computer to identify which job is next in line,” Pfeiffenberger and Curran explain.

Previously, routings had to be maintained in the MRP II system. “The new pull system does not rely on routings to define the operations needed to manufacture an end item,” they report. The process maps shows that virtually all of SEMC’s products consume the same processes. Therefore, it was decided that all SKUs would follow the same path when the production line was designed.

Flow manufacturing or a pull scheduling system at SEMC has enabled them to meet several goals. First, the manufacturing cycle time for an SKU has been reduced from 20+ days under the MRP II system to 10 days using the new pull system. The goal is seven days or less for an SKU.

The decrease in manufacturing cycle time has also reduced the level of WIP. It has been slashed by 55% since the implementation of pull

manufacturing. In fact, they also converted some of the savings in WIP to raw materials. This increases their ability to respond to customer requirements. To further improvements, SEMC is investigating software that integrates the pull system throughout the business process (see sidebar).

Adopting flow-through in distribution. Flow-through warehousing uses processes that reduce handling and storage requirements while improving customer service. “A flow-through distribution center incorporates certain aspects of traditional, cross-dock, and sort and stage operations to achieve maximum efficiency,” explain Dave Eystone and Mike Torch, senior vice presidents at Transtech Consulting, Inc. (Columbus, Ohio; 614-751-0575). Flow-through systems minimize handling; decrease storage costs; reduce shrinkage, damage, and obsolescence; and reduce inventory investment and carrying costs.

Effective flow-through begins with suppliers, Eystone and Torch asserted at the CLM Annual Conference. Assuming that most suppliers can provide the necessary documentation for flow-through operations, they review the impact on several of the processes:

- *Receiving and processing.* With the advanced scheduling information, you know when trucks will be arriving at your loading dock. Bar coding is critical to the smooth operation of the flow-through system. With advanced shipping notices and bar-code license plates on pallets and cartons, you are able to verify receipt of product and to verify that you have received the correct items.

- *Locating.* Whether you are storing items or immediately shipping them, the system will direct product to the appropriate place. Shipping consolidation and staging for cross-dock items and flow-through inventory allocations to customer orders are directed by the system.

- *Allocation.* With the quick response capabilities of a flow-through system, you can incorporate a pull methodology, with allocations based on up-to-the-minute parameters such as predetermined store models and product availability.

- *Putaway/sorting.* Radio frequency-directed (RF-directed) putaway based on product bar coding allows sorting of product for storage, customer order, or shipping staging instantaneously. Using RF putaway, you can accomplish three important tasks: item verification, count verification, and putaway location verification. This translates to greater inventory accuracy.

Insider Assessment of Status of Flow Software

The present flow manufacturing software market has three segments, according to AMR Research's senior analyst Tom Grace, author of *ERP and Flow: The Status Quo Meets Its Replacement*. He identifies them as

1. *Contenders*. Software providers in this classification have full product suites suitable for pilot tests, dedicated development/support, and active client implementations. Grace observes that the "missing" pieces are more active references and lower, more reasonable pilot pricing.

In assessing this group, Grace notes, "American Software and John Constanza Institute of Technology [JCIT] are positioned to duke it out for the pilot market. While JCIT remains the flow-specific consulting leader, American Software has a stronger reputation for reliable software." Oracle stands alone among the big ERP vendors in terms of demonstrated commitment. By summer, "graphical line design will be a bigger issue once JCIT and American Software prove their new products with this leading-edge feature in the field."

2. *Fence sitters*. This group consists of those in early stages of development or reselling and those with partial functionality and interested clients. However, this latter group has yet to commit to full development. Grace believes that the missing pieces for this group are implementation experience, live sites, and firm commitments. "Manufacturers recognize a percentage of flow manufacturing could be logically handled within their ERP system today. However, they need vendors to assist them with this 20% that makes flow implementation sustainable."

Cincom and JBA are more committed to flow at this stage. With customer direction, however, others will follow. "With SAP and J. D. Edwards, the inevitable lag between initial promises and viable product is the cause for alarm," he declares. "Companies with a need should not tolerate hang time—they should pilot with a contender instead."

3. *Benchwarmers*. These software providers are developing flow systems with a chance of being influential players. Here, the missing piece is a clear timeline for actual products. PeopleSoft is working with its manufacturing clients to develop flow functionality. Like Oracle, PeopleSoft is motivated to capture high-tech manufacturers using flow to deliver highly customized products.

Cell Fusion/RSI Group, a consulting and software house led by former SAP managers, is developing a flow product suite. They are working with a roster of current R/3 users. "With SAP's commitment to flow still up in the air, RSI's experience coupled with a well-designed application could strike an open opportunity," Grace asserts.

“Flow-through distribution and its subsets of cross-dock and sort and stage are going to become more prevalent,” Eyestone and Torch predict. “The incorporation of flow-through in distribution systems is likely to be the trend for the next decade.”

BARTER COMPANIES: A BETTER WAY TO REMOVE EXCESS INVENTORY

Are you currently sitting on top of excess or obsolete inventory? If you want to dispose of it without having to settle for distressed value, why not consider barter trade as an option? Barter trade (see sidebar) has evolved dramatically in the past decade. It is no longer restricted to the simple form of counter trade, in which exchanges of goods of equal value are negotiated between companies or through membership-based barter exchanges.

Take Care in Selecting the Barter Company

Barter is not the right answer for every company in every situation. In addition, not every barter company is equally reliable. To obtain advice on selecting the right barter company, consider the sources listed here.

Trade groups

- Corporate Barter Council, Inc., the industry group for corporate barter companies. Contact: 800-949-5531 or 212-949-1562; fax, 800-949-5532 or 212-949-0189.
- International Reciprocal Trade Association, the industry group for trade/barter exchanges. Contact: 312-461-0236; fax, 312-461-0474; irta@dgsys.com.

Corporate barter companies

- Atwood Richards, Inc.; 212-490-1414; fax, 212-455-1729; atwood@shani.net.
- Active Media International; 914-732-8600; fax, 914-735-6448.
- Tradewell Inc.; 212-888-8500; fax, 212-755-6312; Sales@tradewell.com.

Getting almost full price for the excess/obsolete inventory. As trade finance has become more of a buyers' market, a new generation of sophisticated corporate barter companies, with global networks of offices and contacts, has sprung up. These firms typically buy your surplus goods or services at the full distributor price in a "coin of the realm" currency called Financial Trade Credits, also known as trade dollars. The barter company then resells the goods through their global network, making their profit on the resale.

Swapping trade dollars for "other" goods and services. The trade dollars can be redeemed for a variety of goods and services. These can range from shipping, packaging, and freight-forwarding to long-distance phone calls, airline seats, and raw materials. The use of financial trade credits, moreover, is often not limited to the inventory of the corporate barter company being dealt with. Most barter companies now conclude trades with approved suppliers of the trade credit holder or develop new qualified sources of supply that will trade.

Barter trading a growth industry. This sophisticated form of bartering, often involving multiple players and a number of products in a single transaction, is growing dramatically. For instance, in North America alone it grew to \$8.2 billion as early as 1997. Fueled by the global financial crisis, bartering in Asia has expanded into a business earning more than \$69 billion a year.

Why you might consider trade bartering. In discussing the possibility of using this tool with your company's management, inventory managers should point out these advantages:

1. *Barter company is the buyer.* Unlike old-fashioned barter, the barter company does not attempt to find a buyer for excess/obsolete inventory. It is the buyer who will take title to the goods. However, a slight negative is that in 90% of cases, the goods or materials will remain on your premises until a final buyer is located.

2. *Liquidate excess/obsolete inventory at market value.* With barter trade you do not have to be concerned about distress value or closeout prices for your goods. The excess inventory from canceled orders is liquidated at market value. In this manner, cash tied up in excess/obsolete inventory can be freed for other operations.

3. *Avoid disruptions in the distribution channel.* In disposing of your inventory, barter companies agree to restrictions on distribution to avoid

dislocations to your organization's market channels. For example, you are guaranteed that your products will not be distributed in countries and areas where your company has other license or distribution agreements. As added protection, a "nondiversion" contract is signed by the end users, prohibiting them from reselling products.

4. *Barter company clients attract smaller firms.* In the past, barter company clients were typically larger organizations—those in the *Fortune* 1,500 to 2,000 range. Today, smaller to midsized companies are increasingly part of the market. For example, while \$50 million to \$100 million used to be the typical transaction size, barter companies are now handling transactions in the \$500,000 range.

5. *Barter companies provide a broad array of products and services.* In meeting with your company team, barter company representatives can discuss your firm's major areas of expenditures to supply trade credits in those areas, in order to offset costs. Additionally, because barter companies engage in multilateral trading, they can offer clients a broad array of products and services that cover most major corporate expenditure categories.

A REWARDING APPROACH FOR REDUCING EXCESS INVENTORY: DONATE IT

By Jack Zavada, director of communications, National Association for the Exchange of Industrial Resources, Galesburg, Illinois

No matter how sophisticated your inventory control software is, or how savvy your marketing may be, excess inventory is inevitable. Experience has taught us that problem products are one of the inescapable by-products of doing business. Typically, two traditional solutions to getting rid of excess inventory are selling that merchandise to a liquidator or sending it to a landfill. However, a third solution is available to inventory managers that can be more profitable to your organization's bottom line. In addition, it also avoids the many problems associated with liquidating or dumping.

The donation approach to removing excess and obsolete inventory. By donating excess inventory to charity, a business can qualify for a Federal income tax deduction. This is done under Section 170 (e)(3) of the U.S. Internal Revenue code.

Regular (C) corporations may deduct the cost of the product donated, plus half the difference between cost and fair market value. Deductions may be up to twice cost. And S corporations, partnerships, and sole proprietorships earn a straight cost deduction.

As an example, a tool wholesaler purchases a wrench from a manufacturer for \$10. In turn, the wholesaler sells it to a retailer for \$20. By donating overstocks of that wrench to charity, the wholesaler can earn a deduction of \$15 as a C corporation. The \$15 deduction is calculated by taking the cost (\$10) plus half the difference between the cost and fair market value (\$20).

Liquidating overstocks not as rewarding as donating it to charity. Liquidating excess units of that wrench often provides less than the wholesaler's cost of \$10. Sending them to landfill and writing them off as a loss will provide a deduction equal only to the \$10 cost. Therefore, for C corporations especially, donating is the better option.

One of the problems of liquidating excess inventory is that it can sometimes come back to compete against the donor company. For instance, the product can reappear in discount barns or other discount outlets. This occurrence may harm the donor's price structure. In addition, if the donor company serves a regional market, his customers, especially retailers, might be hurt by such discounting as well.

Dumping has its share of problems, too. First, there are landfill fees. Then there is the situation that these sites are quickly filling with trash—let alone perfectly useful products. Finally, and most important, the practice is wasteful.

Eligible types of merchandise that are prime candidates for donations. The most obvious are products that sell poorly. Although sales or marketing people may argue that some of these products are still attractive to customers, the inventory manager may have to take control by suggesting that donating them will allow the company to focus on selling better and more profitable goods. As an example, catalog businesses in particular are well aware of the need to weed out such slow movers and keep offering fresh, new products.

Returns are frequently overlooked. As long as the items are not damaged, they can often find a welcome home with a nonprofit organization. Donating returns avoids labor and costs involved in returning that merchandise to stock.

Packaging changes are also good candidates for donation. Whether it is a package redesign, or the expiration of a contest or rebate, donating that merchandise will keep it from confusing consumers and can avoid several market issues.

Canceled orders can be considered for donation. Again, donating avoids restock costs. And if the product was custom made, its salability in the general market may be doubtful.

Finally, discounted models, styles, and colors are prime donation candidates. An obvious example is computer software that is upgraded regularly. The publisher does not want the previous version on the open market competing with the new upgrade. Because of the high markup on software, the deduction can be quite attractive. Housewares and other products that rely heavily on trends are frequently donated, too.

Companies can choose to donate locally in order to generate goodwill in the community where they are located. When doing so, it may be necessary to have your accountant or tax adviser instruct the recipient organization about what information to furnish on the tax documentation.

An alternative is to use a free service, such as the nonprofit National Association for the Exchange of Industrial Resources (NAEIR). Founded in 1977, it collects donated products from businesses and redistributes them to 6,000 charities and schools throughout the United States. NAEIR does not charge donor companies for its placement service. For information, contact NAEIR, Corporate Relations, 315 South 48th Street, Suite 111, Tempe, AZ 85281; 800-289-4551; fax, 602-736-0417; donor@naeir.org; www.naeir.org.

OLD SPC CONCEPT FINDS NEW APPLICATION WITH INVENTORY MANAGEMENT

Statistical process control (SPC), a widely used quality measurement technique in the manufacturing sector, is finding new application as an inventory management tool. SPC is succeeding because inventory remains the major element of most companies' distribution costs.

The application of statistical process control to inventory management is new. The key objective of SPC inventory management is to use only historical inven-

tory and demand data to optimize replenishment ordering and inventory levels in the future. When calculating the replenishment orders, SPC takes into consideration not only deviations of expected customer demand of the next periods but also variations in lead time.

This technique promises to be a new approach for inventory management professionals to complete daily stock management, conclude Hans-Christian Pfohl (pfohl@bwl.tu-darmstadt.de), Oliver Cullmann, and Wolfgang Stolze, all of Darmstadt University of Technology (Darmstadt, Germany). They examined SPC for inventory management with actual inventory levels and quantities of backorder situations with the 3M Medical Products Group European Business Center and compared it with simulated situations. The focus of their study is on finished goods and in-transit inventory. The following sections come from their work, appearing in the *Journal of Business Logistics*, describing the application of SPC to inventory management.

SPC technique does not rely on demand forecast. It takes both variations in demand and lead time into consideration when calculating a replenishment order. SPC only monitors historically the control of the demand and inventory processes over time in control charts. In this manner, they note, it is possible to recognize nonconforming demand or inventory. This reduces the probability of either backorder or excess inventory situations. When a nonconforming output is detected, the special causes can be examined and eliminated to avoid further inventory shortages or unnecessary waste of capital to guarantee customer satisfaction.

How the SPC technique controls inventory. At the beginning, a database is filled with inventory and demand data. The demand gives information about the quantity of demand over a certain period. The inventory data is the inventory balance at the end of the period.

First, the system tests if the demand and inventory processes are in control or out of control. This indicates whether the system can handle the processes or whether there are statistical abnormalities in past demand and inventory curves that would make it difficult to make a safe reorder quantity decision using SPC.

If the processes are in control, the SPC decision approach can be applied. The support engine examines and interprets the demand and inventory processes. Based on defined rules, the SPC decision support system calculates

a replenishment order proposal from the information in the database. This order can be generated automatically. In this case, the system works without any need for any manual intervention by an inventory control specialist.

If the process is out of control, the SPC decision support system calculates a reorder proposal. However, due to the statistical abnormalities, the decision support system indicates a problem and warns the inventory controller that it cannot guarantee safe handling of the situation. In this case, the inventory controller is forced to check the replenishment order proposal.

If he or she does not agree with the systems information when examining the demand and inventory history, the order is adjusted manually. Finally, an adjusted order will be generated.

Calculating the efficiency evaluation of SPC. Because SPC is a new method to optimize efficiency of inventory management, the input factors are defined as all costs for the use of the method. Output performance can be identified as the improvement of replenishment decisions. Performance includes the dimensions of procurement costs, carrying costs, out-of-stock costs, and the service objective.

In contrast to other methods, the SPC inventory control system has two major advantages when looking for operating costs. First, the costs of collecting all data and information needed for the system to work may be very low. The SPC system needs only information about the demand and inventory history. Normally these data are available and easy to collect.

Second, a major advantage is the self-contained mode of operation of the SPC software. Based on its decision rules, the SPC decision support system can decide without intervention the replenishment order quantity as long as the demand and inventory processes are in control. In these cases, the system automatically generates orders without the intervention of an inventory control specialist.

“The SPC system’s ability to work independently increases the productivity of the inventory specialist, and the decrease in the number of individuals needed to control all products on stock decreases operating costs,” the research team concludes.

SPC inventory control system does decrease average levels of inventory. The SPC software is an instrument for inventory management that uses historical projection as its forecasting method. The accuracy that can be achieved for short

forecasted time periods is good. However, the authors observe that “as with other instruments that use historical projection, the SPC system is still weak in forecasting, signaling, and reacting to sudden rapid changes in demand that happen for the first time.” However, SPC rules concerning slow drifts in demand and inventory cause much faster and better reactions to these fundamental changes in the course of time, they agree.

Based on the authors’ initial work, SPC inventory control succeeds in decreasing the average level of inventory. In this simulation it ranged between 20% and 65%. This “dramatically” reduced inventory carrying costs, which consist of capital costs, storage space costs, inventory service costs, and inventory risk costs.

With the assumption that capital costs represent about 25% of the total logistics cost, the overall reduction through savings in capital costs could be significant. In their simulation it amounted to 16.25%.

But a word of warning. Despite these improvements, the simulations in this project show that inventory control with the SPC software still leads to more inventory shortages than does manual inventory control with conventional instruments. More backorder situations are the reason for an increase of backorder costs and lost sales costs.

“These backorder situations could be prevented if the SPC system would not react as aggressively to excess inventory,” Pfohl, Cullmann, and Stolze conclude. Although the inventory reduction would be less, the amount of inventory shortages would also be less, thus reducing the backorder costs and lost sales costs, they report.

SPC inventory control system leads to a positive impact on out-of-inventory costs. Because the inventory control specialist is released from a large part of the manual workload, he or she can now manage additional part numbers and deal with inventory problems such as stock shortages more “intensively and carefully.” In this way, inventory shortages might be eliminated much more quickly.

The research team is optimistic. “Since the SPC inventory management, decision support system produces inventory levels that are comparable or even better than those of conventional systems and simultaneously produces a reduced workload, further examination and testing under real conditions is encouraged,” they conclude.

**LOGISTICS MANAGERS DETAIL INVENTORY
CONTROL SUCCESS WITH AUTOMATIC
REPLENISHMENT PROGRAMS**

Shorter product development cycles, product proliferation, and global competition are making it more difficult to manage demand. Too often, product availability and order quantities fail to match up, resulting in excessive inventory, poor customer service, lost sales opportunities, and inefficient production scheduling. Thus, many firms are turning to automatic replenishment programs (ARPs) to better manage their inventory.

ARPs help establish an exchange relationship in which the seller replenishes or restocks inventory based on actual product use and stock level information provided by the buyer. The intent is to make inventory commitment more efficient. Continuous replenishment planning (CRP) and VMI are the more popular ARPs.

VMI Is Most Popular ARP

At the University of Oklahoma (www.ou.edu), researchers Patricia J. Daugherty, Siegfried Professor of Marketing; Matthew B. Myers, Assistant Professor of Marketing; and Chad W. Autry, doctoral student, have constructed a profile of ARPs in the logistics industry. As shown in Table II-1.3, the most common type of ARP is VMI, which nearly one-half of the respondents to the research study use. CRPs also receive a significant level of involvement: more than two-thirds of respondents.

Supplier-managed inventory, quick response, jointly managed inven-

**Table II-1.3 Involvement in Automatic
Replenishment Programs**

<i>Type of Program</i>	<i>Frequency</i>	<i>% of Respondents</i>
Vendor managed inventory	45	47.36
Continuous replenishment	36	37.89
Supplier-managed inventory	16	16.84
Quick response	12	12.63
Jointly managed inventory	10	10.53
Efficient consumer response	9	9.47
Distributor-managed inventory	4	4.21
Other	18	18.95

Source: Journal of Business Logistics.

tory, efficient consumer response, and distributor-managed inventory reflect a lower level of involvement. Slightly over a third of the respondents report involvement in more than one type of automatic replenishment.

Full ARP Implementation Yet to Come

Survey respondents were asked to indicate their firms' implementation status for each of 17 items (see Table II-1.4) on a seven-point scale. Automatic replenishment has been in use, on average, for only about four-and-a-half years, so it is not surprising that implementation is not complete at most companies.

Information Systems Capability Proves Strong

When asked to indicate their information systems' (IS) capabilities (see Table II-1.5), managers claim that their strength is in providing daily download of information (5.70). They are doing relatively well at getting daily access to information needed and are only slightly less capable in information accu-

**Table II-1.4 Automatic Replenishment Program Components:
Implementation Status**

<i>Component</i>	<i>Mean</i>	<i>Standard Deviation</i>
Electronic data interchange	5.47	1.74
Cross-functional teams	5.12	1.67
Automatic replenishment of basic goods	5.10	1.93
Bar coding on shipping container	5.05	1.90
Bar coding at retail level	5.04	2.16
Preseason planning with trading partners	4.84	1.72
Automatic forecasting for staple goods	4.83	1.79
Advance ship notices	4.49	2.19
Electronic payments	4.49	1.83
Joint planning of replenishment	4.38	1.60
Direct store delivery of products	4.30	2.11
Cross-docking operations	4.14	1.92
Joint forecasting	4.08	1.73
Point-of-sale scanners	4.04	2.50
Automatic forecasting for fashion	4.03	2.05
Activity-based costing	3.55	2.03
Vendor-marked merchandise	3.21	2.04

Note: 7-point scale: 1 = not implemented, 7 = fully implemented.

Source: *Journal of Business Logistics*.

**Table II-1.5 Automatic Replenishment Program
Information System Capabilities**

<i>Capability</i>	<i>Mean</i>	<i>Standard Deviation</i>
Daily download of information	5.70	1.40
Accuracy of information	5.33	1.34
Timeliness of information	5.16	1.29
Formatted to facilitate usage	5.07	1.31
Availability of information	5.01	1.50
Internal connectivity/compatibility	4.88	1.55
Formatted on exception basis	4.65	1.52
Real-time information	4.59	1.59
External connectivity/compatibility	4.58	1.53

Note: 7-point scale: 1 = not capable, 7 = highly capable.

Source: *Journal of Business Logistics*.

racy (5.33) and timeliness of information (5.16). The data indicate that providing customized information support to facilitate internal coordination across functional areas is the predominant goal.

Managers Claim ARP Success

Finally, respondents were asked to rate their ARPs' performance. ARPs are achieving some of managers' most basic program-related goals (see Table II-1.6). The programs are highly successful in improving customer service

**Table II-1.6 Effectiveness in Achieving Automatic
Replenishment-Related Goals**

<i>Goal</i>	<i>Mean</i>	<i>Standard Deviation</i>
Improved/increased customer service	5.47	1.31
Fewer stockouts	5.33	1.21
Improved reliability of deliveries	5.15	1.41
Faster inventory turns	4.94	1.47
Reduced inventory	4.77	1.64
Reduced over-stocks	4.79	1.54
Reduced returns and refusals	4.62	1.52
Reduced costs	4.50	1.46
Reduced handling	4.56	1.47
Reduced product damage	4.46	1.63
Reduction of discounting	3.96	1.60

Note: 7-point scale: 1 = not at all effective, 7 = extremely effective.

Source: *Journal of Business Logistics*.

levels (5.47), fewer stockouts (5.33), improved delivery reliability (5.15), and faster inventory turns (4.94).

Reducing the need to discount product (3.96) is the least successful area. ARPs attempt to match supply and demand, but mismatches occur even with careful planning. Thus, many managers mark down products rather than carrying them in inventory or returning them to vendors.

What You Should Know about ARPs

According to the authors, three essential facts about ARPs are the following:

1. *IS capabilities are positively influenced by ARP implementation.* The basic components of an ARP include decision support systems, product identification technology (bar coding), and EDI. Thus, firms with greater ARP involvement have more support data to guide decision making.

2. *ARP effectiveness is positively influenced by program implementation and IS capabilities.* Because inventory management is dependent on information, the ARP effectiveness is linked to IS capabilities. Timely, usable information is needed to support quick decisions associated with replenishment.

3. *ARP performance is positively influenced by ARP effectiveness.* ARPs can help you develop a satisfied customer base; customers can rely upon products to be in stock as needed. This addresses today's concern with faster deliveries in more tailored shipments.

Involvement in automatic replenishment is expected to yield a range of benefits, including increased sales per store due to more efficient stocking, more frequent deliveries, higher selling space productivity because of fewer stockouts, and less need for backroom storage space for safety stock. If not totally eliminated, safety stock can at least be dramatically reduced.

Chapter II-2

Inventory Reduction Strategies

IOMA Readers Report What Works

EXCLUSIVE SURVEY: ELEVEN “HOT” NEW TACTICS MANAGERS WILL USE TO PARE INVENTORY

Inventory reduction is so important that more than 85% of respondents to *Inventory Reduction Report's* series of manager surveys maintain that inventory reduction will be an important or very important aspect of their responsibilities during this new year. And their bosses demand it—inventory is among their chief concerns (see Table II-2.1). Ready to do battle to slice inventory to acceptable levels, these managers also provide some insight into the techniques and tactics on which they will focus. Respondents eagerly discussed the “hot” inventory reduction tools they will be applying this year.

Review ways to reduce inventory. “We plan to increase the communication of our ideas and plans with suppliers and all in-house departments involved,” an assistant inventory management supervisor at a manufacturer of food service equipment says. “With the help of various departments, our safety stocks will be reduced and managed better with the help of techniques such as cycle counting and by reviewing all available information in determining order quantities.”

She notes that there will be a greater emphasis on cycle counting. “We will be spending more time doing cycle counting, and increasing the quantity of the items being counted,” she explains. “We also plan to do it on a more continuous basis.”

Table II-2.1 What Are Your Boss's Greatest Concerns?

	All (%)	Up to 500 Employees (%)	Over 500 Employees (%)
Inventory/shipping accuracy	11.7	14.1	9.5
Controlling inventory levels	9.6	9.4	5.4
	Manufacturing (%)	Industrial Manufacturing (%)	Consumer Other (%)
Inventory/shipping accuracy	12.3	10.7	28.6
Controlling inventory levels	15.4	6.8	14.3

Create a build-to-order scenario. “Previous to last year we built to forecast,” maintains the director of total supply chain at a large diversified producer of household/consumer products. “That, quite frankly, always left us with high inventory and low customer delivery, as our forecast per item accuracy was only about 50%, while the family accuracy was higher, at about 90%.”

Since they do not think they could improve on their forecast accuracy, they are moving to a build-to-order philosophy. With the new build-to-order concept and the emphasis on delivery, they expect to reduce finished goods inventory by 30% and work in progress (WIP) by 15% during the first year.

Aggressively use inventory management techniques. The administrative director of materials management at a health care facility is focusing her efforts on reducing safety stock levels and reintroducing consignment programs. “My biggest challenge is safety stock reduction,” she acknowledges. “By closely tracking usage, we’ve made some progress.” However, emphasis is shifting to bring more analysis into the usage reports and determining the A, B, and C inventory levels. “We plan to boost our inventory turns to national benchmark levels,” she offers.

Share information with suppliers. “We will be making production plans available not only to our Tier 1 suppliers, but also to the Tier 2 suppliers for selected product lines,” says the director of purchasing at a large producer of ductile iron products. “Our target is to reduce lead time from 22 weeks to 6 weeks, which we estimate will reduce costs by some 25%.

“We’re also looking to reduce our overnight emergency orders and cut our customer backlog by some 30%,” he explains. “We’re going to do this in an environment in which we’re forecast to expand our sales 20% over last year.”

Determine carrying cost of inventory. “I’m on a crusade to convince operating managers they don’t need six months of safety stock,” claims the director of inventory management at a midsize producer of finishing products. “My primary tool will be the determination of the inventory carrying cost for this type of inventory, and others as well.”

The inventory carrying cost data will be distributed to all plants on a monthly basis, and its reduction will be used as part of each plant manager’s bonus plan. “We’ll also institute monthly meetings to promote open avenues to discuss ways to reduce the carrying costs,” he explains. The estimated savings goal for the first year is a “modest” \$180,000, which will build in ensuing years.

Expand number of kanban lines. The logistics manager at a manufacturer of gaming machines will be expanding the kanban lines to over 700 part numbers in 1,500 locations on the production floor. That covers eight production lines and five subassembly areas.

“My plan is to use the kanbans and integrate JIT [just-in-time] to reduce our inventory levels on hand,” he relates. A challenge he expects is to convince engineering, buyers, and production of the benefits of this concept.

“The problem with our buyers, for example, is that they are measured on cost savings based on cost of goods,” he explains. “So they routinely buy stock for up to three months of supply. The challenge will be to break them of this outdated buying practice.”

Introduce supplier-managed inventory. “We’re in the process of having our 38 key suppliers get to the point of managing about 60% of our raw materials and packaging supplies,” says the supply chain manager at a large manufacturer of diversified consumer/industrial products. “Our ultimate goal is to have the materials delivered no more than 24 hours prior to a production run.”

The supply chain manager has already seen a significant improvement in the quality and elimination of obsolete material. “Materials are no longer inventoried and stored, and the plan is to have them flow directly to work centers and to be consumed within 24 hours,” he explains.

Plan for more reviews and analyses. “We’re on a mission to remove some \$10 million in finished goods inventory, which represents about 25% for us,” notes the operations vice president at a major electronics company.

“We’ll be analyzing each line and reviewing safety stock levels for our stocked items,” he explains. “We’ll also be looking at creating some tools so the shop floor can see the orders and the delivery ship-on date.”

Orders are of three types, he notes. Customer orders are on items typically not stocked. Replenishment orders are shipped from the company’s distribution centers (DCs) when stock levels reach a specified minimum, and seasonal orders are those where there is not enough capacity during the busy season to satisfy demand.

The solution will be implemented in five manufacturing locations in North America, representing some 300 production lines.

Increase drop-shipping activity. “We have several large jobs that we are doing in Canada, Aruba, Costa Rica, and Puerto Rico, and they were ordering the equipment and having it sent here first,” explains the traffic manager at a small manufacturer of closed-circuit television (CCTV) equipment. “We’ve been able to reduce our WIP inventory by 60% by having the suppliers and contract manufacturers drop ship the equipment.”

Focus on reducing replenishment lead time. An internal consultant at a major producer of rubber products explains how he is working to reduce lead time by developing an inventory model based on lead-time performance. “It’s a reengineering effort, and we’re focusing on processes and systems that will ultimately reduce the replenishment lead time by 40% to 80%.”

The net impact will be to reduce inventory by 25% and improve fill rate by eight points.

Shift inventory to the supplier community. “We’ll be shifting more inventory to our suppliers,” declares a purchasing agent at a midsize processor of seafood. Part of the problem is that there is not enough warehouse space to store what is needed while managing freight costs properly. “We’ve accepted higher freight rates by ordering what we need instead of always getting full truck loads, as in the past,” he states.

However, high on the list is moving more inventory to the suppliers. “We’ve convinced our corrugated supplier to warehouse frequently used boxes,” he explains. “This action has cut our lead times from seven days to one day.” In another case, they helped a film supplier “arrange to warehouse film near our plant. We now work out of his warehouse, and the lead time is down to minutes,” the purchasing agent reports.

EXCLUSIVE SURVEY: SAFETY STOCK REDUCTION SOARS AS INVENTORY MANAGEMENT BEST PRACTICE

For many years, inventory managers have said that their top inventory-reduction best practice is the periodic review. Nothing else comes close: More than three in five respondents (61.1%) cite reviews as one of their top five practices. Equally impressive is that the periodic review has as strong a favor with inventory management professionals in small and midsize organizations as it does within larger organizations.

The runner-up (49.1%), as in previous years, is more tightly managing usage rates, lead times, and safety stocks. Driving this practice are respondents from small and midsize organizations with more than half (53.9%) citing the practice. It is also strong (41.5%) among those in larger organizations but lags its top selection by 20 percentage points.

Reducing safety stock, as a best practice, soars. Better accuracy, the application of technology, and increased collaboration with partners have enabled inventory managers to do a better job of reducing safety stock levels. As proof, this year's survey finds safety stock reduction among the top four, as it has been in recent years.

However, safety stock reduction achieved the largest increase from a year ago of any of the 20 practices listed in Table II-2.2. Reacting to their success in reducing safety stock, respondents listed the practice in increasing numbers, resulting in a nearly 21% gain.

Cycle counting remains firm as a top best practice. Without a doubt, cycle counting has come into its own as a major best practice among inventory management professionals. It is a viable technique that has, in many facilities, eliminated the annual physical because of its improvements in inventory record accuracy.

Cycle counting is in the third slot, repeating last year's performance. Cycle counting followed up its big leap in last year's survey, with a slight gain this year. Although 41.9% of the respondents rank cycle counting among the top best practices, it is clearly those in the small and midsize facilities who feel most strongly about it.

Managing inventory via the 80/20 rule gains in application, moves into top five. Rounding out the "fabulous five" inventory reduction best practices is the ABC approach, or Pareto's law. After a slight setback in last year's survey, it

Table II-2.2 Inventory Reduction Best Practices

	All Respondents (%)	Companies with <500 Employees (%)	Companies with >500 Employees (%)	All Respondents (%)	
		1 year ago	2 years ago	1 year ago	2 years ago
Periodically reviewed inventory to determine ways to reduce inventory	61.1	60.8	61.5	68.0	59.3
More tightly managed usage rates, lead times, and safety stocks	49.1	53.9	41.5	54.1	46.5
Introduced/enhanced cycle counting practice	41.9	49.0	30.8	41.4	32.7
Reduced safety stock levels	40.7	44.1	35.4	33.7	33.6
Used ABC approach (80/20 rule) to manage inventories	34.7	34.3	35.4	30.9	36.7
Shifted more inventory or inventory ownership to suppliers	32.3	28.4	38.5	33.1	31.4
Used appropriate subjective or quantitative approach to determine order quantities	25.7	28.4	21.5	29.8	32.7
Improved accuracy of sales forecasts	23.4	19.6	29.2	28.2	20.4
Modified/updated/added inventory-related hardware/software systems	19.8	17.6	23.1	18.2	19.0
Made production plans/schedules available to suppliers; applied demand chain management principle	19.8	18.6	21.5	18.8	24.8
Improved forecasts of A and B inventory items	19.8	22.5	15.4	18.2	19.9
Increased/expanded use of bar coding, RF, and automated ID systems	19.2	19.6	18.5	15.5	19.5
Adopted VMI, QR, EDI practices	18.6	12.7	27.7	15.5	19.5
Implemented use of MAP II system, ERP systems, inventory management software	18.0	16.7	20.0	26.0	11.9
Switched to JIT buying process	18.0	18.6	16.9	21.5	15.5
Benchmarked inventory turnover ratios to industry norms, world class performance	15.0	9.8	23.1	13.8	24.8
Used carrying cost of inventory to manage overall inventory levels	13.8	12.7	15.4	11.0	15.9
Reduced damage and/or theft of inventory	13.2	19.6	3.1	8.8	5.8
Switched to use of third party logistics/warehouses	10.8	12.7	7.7	7.7	11.9
Switched to using distributors for some goods	4.2	4.9	3.1	7.2	6.6

Source: *Inventory Reduction Report Reader Study.*

rebounded nicely this year. Significantly, those responding from small and midsize groups and larger facilities are applying it with equal vigor.

Technology-based practices advance, though moderately. First detected in last year's survey, greater application of technology-based practices continues this year. For example, increased use of bar coding, radio frequency (RF), and automated identification (ID) systems advanced almost four percentage points to 19.2%. Vendor managed inventory (VMI) practices advanced more than three percentage points, to 18.6%. In addition, adding inventory-related hardware and software was marked off by almost two in five (19.8%) of the respondents.

Last year's big performer (up 118.5%), implementing inventory management systems, fell a few points this time, but it is still significantly higher than it ever has been.

What the respondents are saying about their best practices. Besides citing their best practices, many respondents explained why they made their choice and how effective it has been.

- *Periodic reviews were conducted.* "The periodic review of inventory and applying reduction initiatives seems to reap the biggest benefits for us," maintains the manager of warehousing and distribution at a midsize facility of a major builder of mining equipment.

- *Usage was the focus.* "We adopted a more analytical approach to usage reports, and the application of A, B, C levels enabled us to increase turns and to achieve national benchmarks," remarks the director of materials management at a small producer of medical devices.

- *Intense cycle counting was initiated.* "We implemented an intense cycle counting program that improved our inventory variances by over 75%," reports an inventory manager at a midsize maker of disposable garments. "We are now able to reduce our quarterly inventories to semiannual inventories. We expect to reduce the frequency to an annual inventory."

- *Safety stock reviews are an essential regimen.* "I maintain that safety stock reviews are part of our preferred practices, whether we're using the 80/20 rule or applying VMI concepts," explains the purchasing director at a large builder of home improvement products. "By reviewing order patterns in conjunction with other inventory reduction practices, we have improved turns from four to seven in just six months."

- *Periodic reviews start the entire inventory reduction process.* A typical response this year reflects an important consideration: It often takes more than one activity to improve one's inventory reduction efforts.

A materials supervisor at a midsize manufacturer of food-service equipment said it best. "By reviewing ways to reduce inventory, the rest followed," he explains. "We increased communication of our ideas and plans with the vendors and all in-house departments involved. With the help of the various departments, safety stocks were reduced and managed better with the help of cycle counting and reviewing all available information in determining order quantities." Overall, WIP and finished goods inventories have fallen, and raw materials are "better controlled."

EXCLUSIVE SURVEY: THIRTEEN INVENTORY REDUCTION PROS REVEAL THEIR BEST PRACTICE SECRETS

"Aggressive" and "assertive" best describe the actions taken by inventory management personnel to further reduce inventories under their control and direction. Readers responding to our surveys suggest a myriad of practical ideas that can be applied elsewhere.

Getting aggressive. For example, the administrative director of materials management at a small producer of custom machined parts answered, "The aggressive use of inventory management techniques allowed for the reduction of safety stock levels and the reintroduction of consignment programs." In addition, the company also took a more analytical approach to usage reports and introduced an A, B, C inventory classification system, all of which enabled them to increase their turns by a factor of three and to achieve national benchmark levels.

Becoming assertive. The assistant supervisor of material management at a midsize maker of food-service equipment also launched a comprehensive program. "By reviewing ways to reduce inventory, the rest followed," he replied. "We increased communication and pushed forward with our ideas and plans with suppliers and all in-house departments involved with inventory. With the help of the various departments, safety stocks were reduced substantially and managed better with the help of a new cycle counting program and by reviewing all available information in determining order quantities."

Adding technology. A logistics manager at a small builder of wood products considers the new warehouse management system (WMS) as the key element. “We linked the WMS with the order entry system and RF scanning to update production and inventory tracking, from order entry to load sequencing cargo,” he states. The results to date indicate 5% faster dock times and a 3% boost in loading accuracy. Overall, he reports 30% lower inventory of raw materials, 10% less WIP, and 15% fewer finished goods in stock.

Switching to third party logistics. “Using their expertise and automated systems, we have better visibility of what we have where,” maintains the logistics manager at a small facility producing telephone equipment. They are also using the same provider to establish a distribution facility that will enable them to “order closer to the forecast, store sufficient equipment in a single location, and cut lead times. The nature of the business does not allow us to pursue a JIT approach,” he mentions.

Creating a logistics department. “By centralizing and consolidating outside carriers, we have saved several millions of dollars,” announces a logistics manager at a major producer of fluid systems components. “The creation of a corporate logistics department provided us with the opportunity to take control of our transportation requirements. Essentially, we substituted improved transportation for actual inventory,” he reports. Shorter transit times “have just about taken WIP inventory out of our system.”

Moving materials and controls to production. The material control manager at a midsize manufacturer of custom electronic control devices reveals that they have moved inventory control responsibility “to the production people who consume those components.”

In another move, they purchased an inventory storage carousel to store VMI securely on the production floor. “This created shorter lead times, smaller carrying costs, greater efficiency, and less material handling because we do not purchase or receive components until we start production,” he shares. “This was developed through a careful supplier partnership selection process,” he adds.

Implementing “forward” cycle counting. “Constantly changing production schedules and schedules not being far enough ahead caused constant shortages and production interruptions,” reports the warehouse/MRP manager at a small frozen food producer. To solve the problem, “we installed a for-

ward cycle count based on production schedules. We generated a report out of our new Fourth Shift MRP program that shows necessary supplies for production scheduled, which look out over a three-week period.”

Items needed for production are cycle counted three weeks ahead every time the schedule is updated, regardless of ABC classification. “We’ve now achieved better control over our inventory,” he reports.

Introducing kanban. A logistics manager at a midsize producer of automotive lighting systems implemented the kanban transfer of packaging material from dual suppliers. “This regulated the flow of packaging materials with actual production and our storage space allotment,” he notes. “We eliminated our stockpiled just-in-case inventories as suppliers now stock and maintain inventory at their cost. Under this arrangement, we’ve been able to reduce our carrying costs and significantly reduce the risk of line shutdowns and expedited freight costs due to stockouts,” he answered.

Reviewing inventory, particularly the slow movers. “We have put together a program where we periodically review inventory, focusing primarily on the slow-moving items,” maintains the director of DC replenishment at a large provider of automotive aftermarket products. “We identify the products and quantities to process for the return to suppliers, sell at clearance, salvage, or destroy.”

These efforts have resulted in a 30% reduction in excess inventory year-to-date. The process, as he describes, “entitles each analyst to have access to information on excess quantities and gives them the responsibility to coordinate disposition with suppliers, warehouses, and merchandising.”

Enhancing the cycle counting practice. “Throughout the year we make extensive use of control groups that focus on the items that seem to give us the most problems,” states an inventory control manager at a wholesale distributor of fine fragrances. “Based on their activity, and correcting the sources of problems they have found, we have been able to increase inventory accuracy from 94% to over 97%.”

Shifting inventory to the suppliers. A purchasing agent at a midsize processor of seafood cites two examples. “We convinced our corrugated supplier to warehouse frequently used boxes, which has cut lead time from seven days to just one day,” he explains.

In the other example, they helped the film supplier warehouse the film

near their plant. “We now work out of his warehouse with lead time in the minutes,” the purchasing agent relates. The company also orders what it needs instead of getting a full truckload of supplies.

“We have accepted higher freight rates in lieu of storing greater quantities of inventory. To date the savings in carrying cost far outweigh the higher freight rates we pay,” he explains.

Establishing A, B, C inventory classifications. “We’re in the process of classifying all of the inventory throughout our seven plants in the United States,” reports a division purchasing manager at a large producer of bronze memorials. “We’re establishing the maximum inventories allowed based on an A, B, C inventory segmentation and are monitoring buyers’ responses to these objectives.”

This was done on a monthly basis as well as year-to-date in the facilities where they have installed the system. Total inventory reduction during the last fiscal year was in excess of \$500,000.

Moving to synchronous flow manufacturing. The materials manager at a small manufacturer of flexible packaging explains that by adopting the flow concept, lead times have decreased significantly. “In a matter of three months we have reduced our finished goods inventory by 30% and WIP by 25%,” he explains.

However, he also reports difficulty in forecasting the need for raw materials, which has necessitated a 10% increase in inventory. The reason, he states, is that “customer lead times are now shorter than the raw material lead times.” He is in the process of resolving the problem by developing a historical raw material forecast and utilizing vendor consignment stock programs “to the fullest.”

EXCLUSIVE SURVEY: WHY PERIODIC INVENTORY REVIEWS CONTINUE TO GAIN FAVOR AS A PRACTICE

Used by more than three in five (61.1%) of our survey respondents, inventory review is the most universally practiced inventory management technique. What makes periodic inventory reviews so popular—and effective? In some cases, it is the pure simplicity of the installed process. For instance, at some facilities the review process is as simple as walking the facility and

visually checking the inventory, or color-coded tags. At the other extreme, teams led by upper management review reports and studies and determine actions to be taken to deplete slow-moving inventory.

Inventory management professionals continue to broaden the scope of reviews and integrate them for an even more sophisticated, innovative practice. In addition, periodic reviews work because of the constant focus they place on inventory. It's the awareness thing. For instance, a material control supervisor at a small producer of electrical grounding products says, "We focus our attention on high-cost items that have high days of inventory." The organization's planners continually review the days of inventory at the item level, focusing on high-cost items, and recommend methods for their reduction.

A transportation manager at a large producer of paper products reports, "We review inventory in relation to sales forecasts and have significantly reduced C, D, and E items that had accumulated over time."

Meanwhile, other survey respondents have provided more details on their individual programs for reviewing inventory and the benefits they receive. Their comments might spark a few ideas for you to consider and implement at your location.

Alert sales and planning staffs. "Our inventory review may be manual," says a global logistics manager at a large producer of computer chips, "but it has proven itself to be the most effective tool in keeping the available inventory in front of our sales and planning people." He notes that managing the expectations between sales and planning and their tendency to overstock had always been a "major headache." He adds, "Sales always forecast too optimistically, while planning always wants safety stock." Today, the review process is critical to the identification and formalization of the reduction opportunities available, he says.

"We hold monthly meetings with people from sales/marketing, production, purchasing, and other areas to review the current month's sales forecast," maintains the finance vice president at a small maker of navigational equipment. "From this the production plan is adjusted by item to achieve agreed-to safety levels for finished goods. This plan is then fed to the MRP system," she details.

Identify slow-moving stock. "We periodically review our inventory and focus on identifying slow-moving product and quantity," explains a DC replenishment director at a provider of aftermarket automotive parts. The

identified stock is then processed for return to vendors, offered for clearance, salvaged, or destroyed.

“Our system provides each of our inventory analysts with access to information on excess quantities,” he explains. “They then have the responsibility to coordinate its disposition with the vendors, warehouses, and merchandizing.” In its first year of operation, excess inventory was reduced by more than 30%.

The production and inventory control manager at a large maker of plastic containers shares, “We bring in our top guns biweekly to look at slow-moving and obsolete inventory.” The inventory management committee is chaired by the director of sales and includes the production and inventory control manager, customer service manager, and marketing director. After the review, the committee assigns “appropriate account executives to dispose of the inventory.” In the first year of existence, the team has disposed of \$1.5 million in inventory, which represents an inventory reduction of 15%.

Inventory reduction starts with the review process. “By reviewing ways to reduce inventory, the rest follows,” declares an assistant supervisor at a small manufacturer of food-service equipment. “The process gets all of our in-house departments involved, and we’ve been able to increase our internal communication of ideas and plans and to share them with our vendors.” For example, with improved forecast accuracy and better production scheduling, they have enjoyed a significant reduction in the safety stock of their finished goods inventory. “With the help of various departments, safety stocks were reduced and are now managed better with the application of cycle counting and reviewing all available information in determining order quantities,” he explains.

A new materials manager at a midsize producer of electrical distribution systems had to increase the awareness of inventory and what it costs within the organization. “There was little to no focus on inventory reduction with my predecessor,” he claims. “As part of my inventory awareness campaign, we began to perform periodic inventory reviews with material planners. They also have a key hand in determining the ways we reduce these inventory levels.”

Inventory sliced by half with no downtime due to shortages. “We have a well-planned, vigorous, site-by-site review of inventories to identify and dispose of excess based on usage rates,” maintains a materials leader at a large electric utility. Regional inventory has been pared 50%, without any adverse impact.

“Concurrently, we continuously review the 20% of items that make up 80% of activity to ensure we maintain the appropriate stocking levels,” he explains.

Eliminate the associated carrying cost of building excessive stocks. “We use the team approach to periodically review our inventory status and then meet to discuss ways of removing items from stock to eliminate carrying cost,” an inventory manager at a midsize maker of electrical safety equipment explains. “In our review, we take stock usage into consideration.”

Although he does not quantify any specific savings, he does allow that the “overall result is a lot more space, more accurate inventory control, and a significant reduction in carrying cost.”

The focus is on the A items. A processing administrator at a large heating, ventilating, and air conditioning metal former says, “We have undertaken a massive initiative to lower our inventory, which has the commitment and support of our top management.” The essential element of the initiative is a monthly review of A-class inventory items, measuring both inventory turns and days on hand.

The outgrowth is a “sit-down” with the supplier community to “have them understand our goals of inventory reduction, and how they can assist by reducing their lead times. Simultaneously, we’ve also cut down on our order quantities, while asking the suppliers to increase the number of deliveries,” he details. “The suppliers are all just about on board, and we’re just beginning to see progress.”

Look in all the right (high-dollar-value) places. A contracts administrator at a major health care provider reviewed inventory in departments with high-dollar equipment and supplies, such as the operating rooms, radiology, and labor and delivery. “We reviewed the most recent 18-month usage history on each item we identified and determined what the ‘pars’ should be,” he explains. This action reduced inventory investment by \$500,000 in the first nine months.

“To ensure that the departments do not stockpile equipment and supplies, we review the par levels semiannually,” he offers. “We also routinely review items that are requested for the store warehouse. Our goal is to keep the turn ratio at 14 for these items.” As part of the review process, they benchmark procedures at comparable hospitals. “We assign teams, review what supplies are used, and have further reduced our inventory status by changing several of our practices,” he notes.

Review process reduces inventory by 20%. “Our mantra is to reduce inventory levels while maintaining high customer service levels,” mentions a warehouse and distribution manager at a midsize facility producing mining equipment. “We do periodic reviews and have reduced inventory on the items having a low usage frequency. We also micromanage—by using the review process results—the top 100 parts having the most activity so we can achieve a 100% fill rate on these top-tier items.”

Reviews determine whether turns are achieving objectives. A plant manager at a small specialty chemical producer explains that the “inventory review process has been very successful for our company.” She mentions that the “nature of our business allows us to rework or ‘requalify’ material for another use or customer.” Additionally, she “totally scrutinizes our inventory turns to make sure the inventory doesn’t just sit here, and is being used in the most profitable ways.”

MRO inventory comes under scrutiny. “We consider an item that has not turned in two years to be obsolete, and we get it out of inventory,” a purchasing manager at a large meat processing facility explains. “We’ve introduced a review process that we conduct with our maintenance staff to determine whether a part or material is still a valid inventory item.”

In line with this, another consideration is the installation time of high carrying cost parts and equipment. “If the installation time is greater than 30 minutes, we make arrangements for the local vendor to stock the item rather than have it on our floor,” the purchasing manager states.

Complete review of all inventory at all locations. “The most successful inventory reduction idea we use is to review all planning levels at all locations,” shares the logistics vice president at a midsize maker of fasteners. “We reviewed all lead times from suppliers, all lead times between stocking locations, and changed the replenishment frequency for many locations.” The net result was lower planned minimum levels and lower actual inventories. “We took out \$5 million by doing this,” he exclaims.

Constant review of MRP parameters. A materials manager of a small producer of mechanical systems for the automotive industry notes, “We’re regularly reviewing the MRP planning parameters, such as safety stock, safety lead times, minimum buy/builds, and similar measures. We also include planning of OE service and aftermarket needs to minimize our obsolete inventory and to reduce our raw materials inventory,” he describes.

Third-party logistics provider is a believer in periodic reviews. “We’re always analyzing the inventory and placing it into A, B, C, and D categories based on sales and velocity,” explains the general manager of a midsize third-party provider facility. “Based on this analysis we determine the distribution strategies for each, such as direct ship, cross-docking A and B items, and warehousing appropriate quantities for those classified as B and C.”

Reviews conducted by family groups. “The most successful inventory reduction technique we instituted was to complete reviews of finished goods in which we grouped the SKUs by family.” That enabled a team from sales, marketing, and quality assurance to review the mix issues in greater detail, while the overall quantity issues were reviewed and acted upon by family.

Weekly review monitors inventory status. A materials manager at a midsize manufacturer of capital equipment for the semiconductor industry uses the weekly A, B, C report to monitor and analyze the inventory situation. “By downloading the report to Excel spreadsheets, we are able to use many sorts to identify problems and excess in the inventory. This enables purchasing to refocus its buying and planning effort.”

Using periodic reviews to establish flow manufacturing. A superintendent at a large manufacturer of office furniture constantly reviews inventory levels to determine project and manufacturing priority. “A review of the inventory profile enables me to determine which projects I will run that will yield manufacturing processes that are linked, and will give us one piece flow,” he details.

Putting inventory performance on display. “We put inventory ratios on a chart each week and display them prominently throughout the facility,” explains a materials manager at a midsize producer of sensors. “At our weekly department meetings we review all inventory categories and discuss the present and emerging situations in an effort to further reduce our inventory levels,” he explains. To date, they have reduced inventory by \$500,000, while enjoying increasing sales of almost \$1 million per month.

Weekly team meetings discuss one topic: how to reduce inventory. The manufacturing vice president at a small machine tool builder holds weekly inventory reduction meetings with his various teams. “At these sessions we review the receipts of all A items, those costing over \$500,” he explains. Further, they have installed software that identifies new obsolete items on a weekly basis.

Inventory reviews help to boost customer service and return on assets (ROA). “Inventory management, because it is such a key driver for both customer service and ROA, is receiving greater attention via frequent periodic reviews,” says the senior vice president of logistics at a major producer of electronic systems and assemblies. “Since we’ve instituted the review process, we’ve been able to reduce old, obsolete stocks, measure our vendors’ fill rates, and establish consignment inventory programs,” he adds.

Periodic reviews help reduce lead times. An inventory manager at a small maker of components for farming implements has in place a process that reviews “appropriate” levels of lead times. It also stratifies individual suppliers and parts within each supplier to locate where the inventory and safety stock is building. “The review process has enabled us to meet with the suppliers and cite potential lead-time reduction projects,” he states.

Inventory review lessens cash flow cycle time. The logistics optimization manager at a large chemicals facility credits their monthly review for reducing inventory levels between 25% to 40%. “The monthly metric review and business leader accountability for meeting the objective has had the impact of reducing our cash flow cycle time significantly,” he offers. “It also has had a dramatic impact on our bottom line.”

EXCLUSIVE SURVEY: FIFTEEN INVENTORY MANAGERS EXPLAIN WHY CYCLE COUNTING IS THAT GOOD

Cycle counting continues to be among the top inventory management practices. The increasing popularity and application of cycle counting is due to its potential for being the preeminent way to improve inventory record accuracy, while also becoming a highly effective inventory reduction tool. Our reader surveys find that more than two in five (41.9%) respondents cite cycle counting as one of their most successful techniques for controlling and reducing inventory (see Table II-2.2).

Snapshots of what inventory managers are saying. It is now solidly placed in the number three slot, behind periodic inventory reviews and managing usage rates, lead times, and safety stocks more tightly. Just four years earlier, fewer than 30% of respondents recognized cycle counting as a primary inventory

accuracy and reduction tool. Among the more common themes in the latest survey responses were the following:

- “Enhanced cycle counting practices have reduced our plus and minus inventory mistakes,” reports an inventory control manager at a midsize manufacturer of medical equipment. “We catch errors before they affect total inventory.”

- “Inventory accuracy was once a major problem for us,” offers a materials resource leader at a large builder of diesel engines. “Today we cycle count daily, and our material schedulers verify, at least once a week, our JIT inventory.”

- “Since introducing cycle counting just over a year ago, we have seen our service levels improve and accountability increase,” mentions a supply/inventory technician at a small maintenance services organization. “Through cycle counting, we are now able to identify areas for improvement.”

- “Cycle counting has greatly reduced the amount of inventory on-hand by providing us with accurate, real-time balances,” declares an inventory manager at a large electronics manufacturer.

- “With cycle counting, our inventory accuracy went from 70% to 93%,” says a director of materials at a midsize producer of signal processing equipment. An ancillary benefit was that the “entire facility became more aware of inventory issues.”

Applications and Results

Many respondents described in detail their application of cycle counting. A sample:

- *Cycle counting by SKU and location.* The operations vice president at a midsize producer of ceramic tile explains, “We have reintroduced a cycle counting program into our operations using dual criteria, by SKU, and by location.” With one dedicated manager and two counters, they have been able to drive their inventory accuracy to 98.3% after only three months.

- *Focusing efforts on items that seem to generate the most problems.* “We’re reemphasizing our cycle counting procedure,” maintains an inventory control manager at a wholesale distributor. “Throughout the year we make extensive use of control groups that include the items we seem to have most problems with.” Working with these control groups, they have been able to

uncover problems related to outdated procedures that they are currently revising. Overall, he notes, “We have improved inventory accuracy, up to a consistent 97%.”

- *Implementing a forward cycle count.* The warehouse/MRP manager at a frozen food producer describes the process: “We generate a report from our Fourth Shift MRP program that shows all necessary supplies for the production schedule, which is kept three weeks ahead of the present. Items needed for production are cycle counted three weeks ahead every time the schedule is updated, regardless of ABC classification.”

- *Cycle counting only items that show an activity.* “We have recently begun counting bins every morning on only those times that had some activity associated with them, such as issues, receipts, the previous day,” says a stores supervisor at a manufacturer of newsprint.

- *Daily cycle counts now routine.* An inventory control manager at a large food processing facility combines daily cycle counts with a “very friendly warehouse management system.” The reasoning behind this, he notes, is that “as a company, we did not have control over our inventories. This translated into our service levels to customers being about 90%, which was not entirely acceptable.” The new process, he notes, has a 98% service level.

- *A most beneficial strategy.* “Cycle counting prevents us from becoming overwhelmed at the end of every month and provides up-to-the-minute reporting on a number of raw materials,” says a material control supervisor at a small producer of wood laminates. He credits cycle counting and improved sales forecasting for significant inventory reductions.

- *Cycle counting improves inventory variances by 75%.* “We implemented an intense cycle counting program that significantly improved our inventory accuracy,” says an inventory manager at a small manufacturer of disposable garments. “We have been able to reduce our quarterly inventories to semi-annual inventories, and look to doing only an annual.”

- *Inventory reduction of \$200,000 credited to cycle counting.* The purchasing manager at a small producer of laser-engraved promotional items notes a high level of inventory reduction (up to 40% in WIP and 30% in finished goods) since instituting cycle counting procedures. “We’re now using cycle counting procedures rather than biennial counts,” he explains.

- *Stockouts down, accuracy up.* According to a buyer at a small producer of rubber and urethane custom molding, “cycle counting has greatly im-

proved the accuracy of our inventory, thus reducing stockouts. The more accurate the inventory, the better we are at managing it.”

- *Cycle counting lends assistance in reducing safety stocks.* The materials management vice president at a large facility that produces food products explains that they have instituted cycle counts to “verify critical ingredients prior to the production run. This has reduced, by a significant factor, the amount of safety stock we now require.”

EXCLUSIVE SURVEY: HOW THE “BEST” OF THE BEST PRACTICES ARE USED TO REDUCE INVENTORY

Our readers are among the leading practitioners in adopting and adapting cutting-edge inventory management ideas. We culled the following tips from responses to our recent survey, in which participants indicated the “single most successful best practice they implemented over the past year.” Here’s what’s keeping your colleagues, and competitors, ahead.

Introducing kanban. “We implemented a kanban system to pull selected materials through the system and to establish min/max order quantities,” explains a warehouse and distribution manager at a small producer of electrical wire for the automotive and white goods industries. “We began with the raw materials required for specific products manufactured in-house.” They recruited a cross-functional team that was given the authority to select the end products, establish the procedures, and implement the process. The team also was heavily involved in tracking the results. “The cost savings are significant, and more than we had hoped for, but remain proprietary,” he states.

Shifting inventory ownership. A warehouse supervisor at a midsize manufacturer of railroad maintenance equipment states, “Our business encounters numerous engineering change orders, so by shifting inventory ownership to the suppliers, we do not need to invest large amounts of dollars in parts and materials.” The supplier carries a maximum three-month supply of inventory, for which the buyer is responsible. “In this manner, neither the supplier nor we have a major investment risk should there be an ECN issued,” he explains.

Enhancing cycle counting. “We have instituted a procedure whereby we now fully count A items three times a year, B items twice, and C parts only once

each year,” explains a materials services manager at a major builder of aircraft engine cases. “We have also introduced a spot check from accounting once a month to validate what we do weekly.”

The inventory control specialist for a transportation/salvage company in Missouri says, “My company has made major strides toward overall inventory control. We started a system of pricing product by UPC so that we could control shrink levels. We also use a cycle counting process that will eliminate three physical counts per year.”

Applying ABC classification system. The inventory control coordinator at an assembler of communications equipment and systems reports that very little effort was expended in the past to control finished goods inventory. However, in the past several months they “began implementing the ABC approach in combination with cycle counting to reduce inventory and to eliminate biannual physical counts,” she says. The preliminary results have seen an increase in inventory record accuracy, which is beginning to translate into lower inventory requirements.

Introducing the VMI concept. “By having the suppliers of our critical materials in charge of managing and replenishing our stock, the process enables us to maximize our run schedules and equipment usage,” explains the vice president of transportation at a small milling operation. “There’s an additional benefit for the suppliers, who also report better control over their inventory and more efficient use of their production lines.” In addition, the transportation executive also has shifted deliveries recently to late evening or early morning hours in an effort to improve equipment productivity further.

“Vendor managed inventories have saved us hundreds of thousands in inventory carrying costs,” says a logistics manager for a door and skylight manufacturer in Maine.

Switching to consigned inventory. The purchasing manager at a midsize manufacturer of rolling maintenance stock entered into a consignment inventory agreement with seven suppliers. “Quite frankly, we had difficulty in getting storeroom, assembly, and factory employees adjusted to the new consignment program,” he admits. However, after instituting an education and training program, they came around and are working with it. Overall, the purchasing manager points out, in the year and a half that the consignment inventory agreements have been in place, the credit to inventory has been well over \$1 million.

Using JIT buying techniques. “The most successful idea that we have implemented in the past 12 months has been the JIT buying process,” offers the inventory manager at a midsize automotive OEM supplier of control systems. “Our suppliers ship to us when they receive a faxed ‘pull’ signal,” he explains. “This keeps our inventory levels at a predetermined level and eliminates the buildup of excess materials.”

Better forecasting for demand planning. Software programs that track historical customer demand are a common solution to excess inventory. For example, “We implemented forecasting and distribution system requirements planning [DSRP] software,” says the vice president of corporate logistics for a retail home furnishings company in New York. “We justified its purchase with payback in terms of inventory reduction. Within the first four months, inventory decreased from 29,500 pieces at \$5.1 million to 26,400 pieces at \$4.1 million with no impact on customer service or stock outs.”

Reducing damage and theft. This is a subject that most inventory managers would rather not discuss—inventory shrinkage—through illegal or unsafe conditions. However, the inventory supervisor at a cigarette manufacturing and distribution facility agreed that the most focused effort was in the reduction of damage and theft.

“This basically entails gaining control of the inventory and storage facilities, as we have found out through our investigation that theft and damage occur when controls are loose,” he details. “This is a company with an annual growth rate that ranges between 30% to 80%, so inventory was scattered throughout the facility, and our control procedures were minimal at best,” the inventory supervisor concedes. “I am still in the process of implementing additional advanced security procedures. What we’ve done to date, which I won’t discuss for obvious reasons, is paying off rather handsomely in cutting back on the amount of theft.”

To reduce inventory and product damage, he has assigned several teams to inspect storage areas routinely, loading and unloading docks, and the plant floor. Their purpose is to identify and document potential hazards or unsafe conditions, photograph them, and recommend improvements. For instance, in one case they had to rewrite their stacking and binding procedures.

Moving inventory to a secure location. “We have had to take control of the inventory and move it to a caged location, where we can now issue it to the appropriate shop order,” says a material control manager at a small

manufacturer of automation machinery. “This gives the inventory department better control over the materials and tools. It also enables inventory personnel to improve their cycle counting process without having to hunt all over the shop for the inventory, and it prevents theft, which has emerged as a problem. The cage is under lock and key.”

Kitting of material. A materials manager at a gas and electric utility has a supplier who provides prepared kits of specific materials for individual jobs. “The kits make it easier in that the various parts are not put into inventory and picked by our operators, making the operations more efficient and controllable,” he explains. In addition, all materials requests for specific jobs are sent to the supplier via EDI transactions.

Hiring additional personnel. “We were at a point where we had to upgrade our staff in the materials department,” says the logistics director at a small maker of medical devices. The company hired a materials manager and a supply chain analyst. “For the first time, with these hires, we had individuals whose primary responsibility was inventory management,” he declares. Since they have been on the job, he notes, they have been responsible for reducing excess/obsolete inventory by more than 50%, which represents about \$3.5 million. They introduced such techniques as publishing an internal distressed-inventory price book and partnering with third-party medical equipment resellers who focus on the international community.

Focusing on inventory reduction. This received a lot of mention from respondents. Essentially, organizations went on a blitz, either through education and training or through concentrated communication campaigns to raise employee awareness about inventory. “We explained the importance of inventory, its role and costs,” maintains a production and inventory control director at a midsize manufacturer of fasteners. “We pointed out penalties associated with obsolete, excess, and off-spec inventories.” The campaign is a success: They have reduced inventory across the board by almost 60%.

Make sure everyone knows his or her role. Forging tight interdepartmental, as well as external, relationships can ensure that all supply chain participants understand the common goal of reducing inventory. This has proven extremely helpful for the logistics manager of an Illinois-based manufacturing company. He explains, “We secured standard inventory procedures so each department had a complete understanding of their responsibilities and how they fit into the supply chain.”

**EXCLUSIVE SURVEY: HOW MANAGERS ARE
REDUCING INVENTORY WITH TECHNOLOGY
AND SOFTWARE**

Many *Inventory Reduction Report* readers maintain that MRP II systems, bar coding applications, and other “technologies” are the “single, most successful” inventory control/reduction mechanism they instituted during the past year. The irony is that for many years these selections remained dormant, suddenly to emerge in the most recent reader survey that we conducted.

Although we are not about to predict a surge in these activities just yet, we believe that the rationale for this surge is of interest to other inventory management professionals. Following are comments and experiences of several respondents who have moved in this direction.

Driving inventory costs down by one-third. The materials manager at a small remanufacturer of turbochargers declares, “We needed to change from a usage-based purchasing method to a market-driven system. With the launch of the MRP II module to our new ERP system, we anticipate a cost savings from inventory reduction to be about 30%.” Their goal, he describes, is to generate more accurate bills of material (BOMs), scrub the database, and get a more accurate sales forecast.

Organizing a simpler part numbering system. “The installation of the MRP II software forced us to develop a part numbering system and also to reorganize our inventory,” maintains an inventory manager at a small producer of satellite communications systems. “The MRP II manufacturing software forced us to organize our inventory by developing a simple part numbering system. It also has made us more efficient in tracking inventory with our subcontractors.” He adds, “The software has driven us to achieve inventory accuracy greater than 95% consistently.”

Creating a balance between supply and demand. “We’ve gone the MRP II route as we’re working diligently to combine customer requirements information with supplier production information to achieve the perfect balance of inventory,” maintains a materials manager at a midsize producer of flexible packaging.

Doing quick cycle counts via bar coding. A purchasing coordinator at a small manufacturer of powder coatings notes that when initially implementing bar

coding, it was difficult to indoctrinate the employees because of a number of computer glitches. However, that has all been overcome. As he relates, “with the bar code scanners, we now can do quick cycle counts to give us more accurate inventory readouts.” They have also been able to reduce their safety stock levels and save hours every day by eliminating visual counts.

Tracking inventory through the production process. “We are a printing company that had trouble tracking inventory once it went to press,” the inventory/warehouse material manager at a midsize printer reports. “Prior to bar coding we had no method of tracking the waste involved in printing, or how much paper remained from the original order once the job was complete.”

Eliminating the physical inventory with RF technology. Radio frequency technology is another application that readers highlighted. As an example, the inventory administrator at a large manufacturer of consumer products declares, “The addition of RF technology to our current systems is producing outstanding results.” He explains, “We’re now using ABC cycle counting in our RF-equipped warehouse, which has enabled us to eliminate our physical inventory, reduce machine downtime, and increase our inventory accuracy to 99.2%”

Providing real-time control of inventory. In another application, an inventory manager at a midsize plastics manufacturer installed in-house developed software to work between RF terminals and AS400 software. He explains, “We installed RF terminals on all 17 forklifts to provide live-time control of inventory from the production belt to shipping docks.”

Standardizing the planning parameter input process. “The toughest thing is getting good data from our ERP systems,” contends a logistics analyst at a large producer of automation systems. “We have the same program in many different countries, but the way they use it varies just enough to make standard inventory programs challenging.”

In Mexico, they automated the planning parameter process (forecasts, economic order quantity, safety stock, ABC). “This replaced the anecdotal approach that people tend to use,” he says. As a result, inventory turns improved by 50% while customer service remained steady.

Tying different processes together with an ERP system. Few readers talk about their successes with ERP installations and better inventory control. How-

ever, a logistics manager at a midsize manufacturer of glassware explains, “We’ve been implementing an ERP system over the past couple of years. It has allowed us to better plan inventories of finished goods and all components.”

They opted for a commercial system that ties all their computer systems together, rather than go the custom route. “This arrangement will enable us to upgrade the system as needed,” he relates. Also, they are currently investigating the implementation of VMI on some items and moving to a new bar code system.

EXCLUSIVE SURVEY: HOW PURCHASING APPLIES ITS EXPERTISE TO DRIVE DOWN INVENTORY

Purchasing professionals are now taking charge and helping to lead the effort to reduce inventory. While always a force in controlling inventory investment, *Supplier Selection and Management Report* surveys show a trend toward more sophisticated and strategic initiatives, as opposed to simply moving the inventory back up the supply chain.

A shade less than one in three (32.6%) say that they are focusing on inventory management. In addition, those having inventory management responsibilities are excelling in their new roles. This is not happening only at the largest firms, as Figure II-2.1 shows. The following is a sample of the experiences shared by the respondents of what is being done.

Shifting Inventory to Suppliers

The most widely practiced technique that these purchasing professionals use is to move the inventory back to the supplier, or to shift its ownership upstream. “Our eventual goal was to shift the majority of our inventory needs to the supplier community,” explains the purchasing manager at a midsize educational facility. “We began by working with a supplier of office supplies first, during which we were able to work out the wrinkles in our process,” he reports. “Then we began a deliberate process of introducing the concept and its benefits to the remainder of our MRO suppliers.”

A natural evolution produced a consolidation of the supplier base. “With fewer suppliers, we were able to increase our volume. This led to better pricing and a vast improvement in delivery performance, effecting a position where we have very little of on-hand inventory,” he explains.

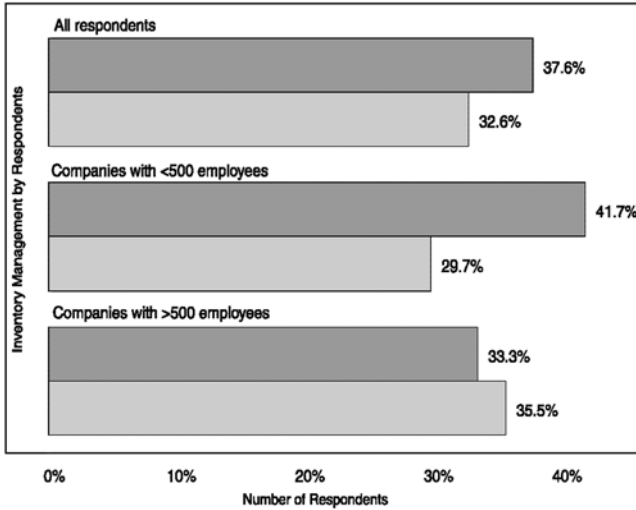


Figure II-2.1 Inventory Reduction Becomes a Major Thrust for Purchasing Professionals

Source: SSMR Reader Survey.

Sharing Information with Suppliers

The MRO purchasing manager at a small maker of footwear praises the idea of working more closely with the supplier community. “We have substantially reduced our in-house inventory levels and costs,” she says. “This has been accomplished by working more closely with the suppliers and by having more frequent meetings between their representatives and ours.”

Improving communications by sharing more information works for the director of purchasing at a large producer of large-diameter pipes and fittings. He declares that their best strategy has been to provide their plans and schedules to suppliers. “This procedure has enabled the suppliers to improve their delivery performance, which has led us to reduce the number of stock-outs we experience.”

“The cooperation between the suppliers and the plant personnel has improved significantly. And the sharing of information has been expanded to include our suppliers’ second- and third-tier suppliers as well.” He estimates the overall savings at a minimum of 15%.

Sharing can extend to copies of the MRP. A purchasing manager at a midsize producer of medical disposal products indicates that they provide their major suppliers with their own copies of the MRP for a rolling six-month horizon.

“They commit out for raw materials and produce one- to two-month requirements,” she explains. This reduces both the suppliers’ and the manufacturer’s inventory. “The added benefit is that the process also reduces the likelihood of obsolescence and allows the suppliers to produce on mutually agreed upon EOQs [economic order quantities],” the purchasing manager explains.

Reaping Other Benefits

Managers find that they achieve numerous other benefits in the process of working more closely with suppliers and shifting inventory upstream:

- *Building a stronger supply chain.* “Having our suppliers take responsibility for inventory has not only reduced our inventory levels significantly, but the participating companies have brought their expertise to the table and are helping us to manage our inventories better,” proclaims a purchasing manager at a large food processor.

- *Shortening the original lead times.* “Packaging materials are now stored at the supplier using a min/max quantity,” says a purchasing manager at a midsize facility that processes aluminum coils. “The supplier must have a minimum number in stock at all times but may build to the maximum level.” Not only has switching the inventory to the supplier been beneficial in reducing the dollars invested in inventory, but it also has reduced the original lead times “by a substantial number.”

- *Reducing storage space requirements.* A supervisor of central supply at a midsize converter of transportation equipment explains, “By moving the inventory to our suppliers, we have decreased the amount of storage area we previously needed, and now only order what we need,” she offers. “We advise the supplier what our monthly usage is, and they keep this amount in stock at their location.”

- *Improving the cash flow situation.* “By shifting inventories onto our suppliers, we have essentially established a JIT program that also improved our cash flow,” explains the purchasing manager at a small producer of medical lasers. “Our schedules also were easily manipulated, and the economic quantity to build was placed with the supplier.”

- *Establishing a consignment inventory protocol.* “Even though we shifted our inventory ownership to the suppliers, it was actually accomplished through consignment inventory that we held on our premises,” explains a materials manager at a small maker of carbon and graphite specialty

products. “There are several advantages that have translated into a series of cost savings.” They include

- Lead time is reduced to zero.
- Inventory carrying costs are reduced to zero.
- Lost production time waiting for incoming quality approval is eliminated.
- Lower pricing was negotiated in exchange for the long-term supply agreement.

The purchasing manager at a midsize publishing house that has initiated a consignment program for the strapping process adds, “The savings are not major, just \$5,000 per year, but we no longer are faced with shipping costs and inventory costs, as we pay for what we use, when we use it.”

Meeting Challenges with Many Other Techniques

Purchasing management is not by any means restricted to curing inventory problems only by shifting the inventory upstream to its supplier base. Readers report many inventory reduction ideas and experiences that they have successfully implemented. Among them are

- *Installing a kanban process.* “We are a custom manufacturer of capital equipment, which makes it difficult to utilize a pull system,” explains a purchasing manager at a large builder of machine tools. “However, we have worked out the system and supplier issues and are in the midst of implementing a kanban process. We believe it will have a significant impact on our inventory levels and carrying costs,” he believes.

- *Expanding application of external kanbans.* “We use JIT with external kanban for more components and external supplier consignment inventory control,” says the president of a midsize manufacturer of specialty machine tools. “We also take advantage of electronic replenishment technology and self-billing invoice creation to move inventory turns from three to ten.”

He adds, “Our new procedures also have reduced the number of POs [purchase orders] issued from 5,000 per month to less than 2,000. This requires excellent control of bills of materials, engineering changes, and inventory management.”

- *Implementing an auto-replenishment system.* The procurement director at a small maker of broadcast test equipment partially resolved the company’s

inventory management challenge through blanket orders, which focused on the quantity, but not the delivery. “The implementation of an auto-replenishment system, which places the burden of inventory on the supplier for delivery, took care of the balance,” he explains. “Inventory turns have increased dramatically on 150 of the 300 parts we currently have assigned on auto-replenishment.”

- *Implementing EDI.* “Our suppliers are now managing their products in our facilities and promising deliveries that are much improved than previously,” reports a scheduling supervisor at a midsize manufacturer of light fixtures. “Lead-time issues have caused us to have either too much or not enough parts and materials. By implementing EDI we’ve been able to save a considerable amount of time and money as our inventory levels are lower, costs are down, and customer service is moving up.” They are not stopping there, however. The supervisor continues, “We’re now pushing our suppliers to open miniwarehouses and distribution points so that they can supply us more often with smaller lots.”

- *Using better forecasting tools.* “On a corporate basis, it was customary to replenish and buy inventoried items in quantities that were sure to last more than a year,” states a contracting specialist at a financial services organization. “To correct the situation, we recently began a program to educate the requisitioners and buyers about excess inventory. We provided them with forecasting tools that used both historical and promotional data to better project buying needs,” she explains. The result has been a 50% reduction in inventory levels.

- *Reducing the supplier base.* “We also write more blanket orders with the fewer suppliers we have,” a commodity manager at a small manufacturer of adhesive products reports. “The change has enabled us to bring the suppliers into a JIT process that is reducing our inventories, which we carry at a 28% cost rate presently.”

- *Storing material at point of use.* “We’ve switched to an assemble-to-order process in our manufacturing area and introduced the kanban replenishment process as well,” maintains the director of materials management at a small converter of transportation equipment. “Since beginning the process, which has the supplier delivering the stock to its point of use, we’ve reduced our inventory by 25%.”

- *Focusing on A and B inventory.* The procurement manager of a midsize manufacturer of medical equipment reveals, “We’ve established JIT/kanban for certain class inventories. Through the new procedures, we have been

able to reduce our inventories by 20%. In addition, we are starting to send suppliers Excel spreadsheets via e-mail with our forecast attached. Eventually, we want to implement EDI, and several suppliers already have volunteered to be our beta site,” he details.

- *Introducing VMI.* “We’ve implemented a JIT and consignment stock program for laboratory chemicals and supplies,” explains the director of purchasing and logistics at a large pharmaceutical organization. “We’re also bar coding our MRO and supplies, with the system being provided by our primary laboratory supplier. It’s the key part of our new VMI program.”

“The organization and oversight of our VMI program has been assigned to one person who has the primary responsibility of dealing with and managing the VMI suppliers,” maintains a buyer at a midsize producer of synthetic fiber. With the VMI program, she relates, “We’ve reduced the number of suppliers and lowered the number of POs and monthly billing.”

- *Bar coding reduces inventory levels and cycle time.* “Since asking our suppliers to bar code products and packages, we have reduced the time that is required to receive inventory into our computer system,” explains the purchasing manager at a large manufacturer of machinery components. “It has improved our inventory accuracy, which impacts our inventory levels.” Additionally, the reduced inventory levels have opened warehouse space to more “useful” products. Also, “it has reduced the amount of interest we pay on the inventory collateral loans,” he reports.

- *Outsource the parts warehouse.* A purchasing redesign director at a large producer of chemicals has entered into an outsourcing arrangement with a third party for its parts inventory warehouse. “By using the new supplier’s purchasing leverage we are able to enjoy better pricing on the parts. The other major benefit is that we don’t have to worry about carrying all of that inventory on our books and risk an obsolescence, out-of-stock, or over-stock position,” he states.

EXCLUSIVE SURVEY: WHY IT IS NECESSARY TO STAY FOCUSED ON USAGE, LEAD TIMES, AND SAFETY STOCK

As inventory managers continue to fine-tune practices to reduce inventory levels dramatically, one practice remains a consistent winner for many.

About half the respondents to an *Inventory Reduction Report* reader survey continue to “more tightly manage usage rates, lead times, and safety stocks.” Their experiences serve as a primer for those who as yet are not tightly managing their usage rates, lead times, and safety stock—but might want to reconsider.

It begins with supply quality. A senior materials manager at a leading entertainment company states, “The single most successful inventory control/reduction concept used in the past year was to tightly manage usage rates and safety stock levels based on life cycle of the product.”

In conjunction with managing usage rates and safety stock levels, the manager is also working with the company’s supplier base to reduce lead times of all outsourced components and finished goods. “This was done by creating a formal supplier quality program and categorizing the supplier base into primary and secondary suppliers,” the manager explains.

He goes on to say that the initial strategy that spearheaded this success was the creation of a production planning department three years ago. “This enabled us to bring in the resources who had experience and were dedicated full-time to implement and review materials management best practices and performance measures,” he describes. “Before this, no time or thought was given to materials/inventory management.”

An extra boost from new MRP II system. “Since we instituted tighter management practices, we have been able to reduce both our safety stock level and other inventory in general,” notes an inventory control manager at a small facility that makes transportation equipment. “We’ve also experienced increased inventory accuracy, reduced stock outages, and boosted our inventory turnover performance from 18 to 24.”

The company currently is in the process of implementing an MRP II system to enhance its forward planning capability. “Coupled with the better management techniques we’ve installed, we now believe that our target of 52 inventory turns per year is reachable,” he says.

Forget the consultant’s advice. “Tighter management of usage rates, lead times, and safety stocks is the way to go. This approach was necessary,” argues the supply manager at a midsize specialty chemicals production facility. “Allowing inventory to be a ‘result,’ as the consultants’ advise, was not a good move. By managing directly, inventory was reduced by \$10 million, or more than 10%,” the manager reported.

Slashing millions in raw material inventories. “By working with manufacturing locations, our division significantly reduced its raw material inventories,” maintains a vice president at a large packaging manufacturer. To emphasize the achievement, he explained, “At 12% cost of capital, this generated a \$480 million savings.”

He then explained how it was accomplished. “Plants during the annual budget process lowered safety stock expectations, creating stringently lower budgeted inventory targets,” he detailed. “Improved communications between manufacturing plants and suppliers allowed for a better understanding of lead-time requirements.” One solution he cited consisted of having mixed full-truck shipments bringing in the goods to fulfill only immediate raw material needs.

Start by reviewing ways to reduce operating costs. A vice president at a small plant that makes electrical equipment credits tighter management for gutting its stores of obsolete, surplus, and damaged materials. “This alone represented about 7% of our total inventory,” he said.

Combining tighter management with more thorough analysis of A, B, C inventory classifications. A materials manager at a small producer of hoses and fittings not only initiated tighter management procedures but also went to work to improve forecasts and classifications of A, B, and C inventory items. “This led to a more balanced inventory to meet customers’ demands. In addition, days per week have been saved as the review process became more efficient.”

Inventory savings total \$38,000 a month—and keep growing. “Management of usage rates, lead times, and safety stocks has had a most profound influence,” shares a material planning specialist at a midsize manufacturer of electronics equipment. “The implementation was accomplished by a thorough study of usage, followed by establishing a closer relationship with suppliers to cut down on the lead times to our plant.”

This activity combined to reduce the safety stock requirements. “We have had a 12% reduction in inventory, and we’re still not through making improvements,” he notes.

Tracking performance by individual buyer. The CFO at a small maker of promotion merchandise has improved the usage rates and “keeps no more than three to four weeks supply on hand.” Inventory is now one-third of the previous year’s amount, and inventory turns have doubled to eight over the past

two years. An additional incentive, he mentions, is that they “also track and report inventory by individual buyer.”

Similarly, a materials manager at a midsize manufacturer of electrical distribution equipment went about increasing the awareness of inventory and instituted periodic reviews among his material planners on ways to reduce inventory. “We implemented a variety of projects, one of which focused on tightening the management of usage rates and lead times,” he explained. This activity alone was responsible for reducing inventory by \$150,000, he acknowledged.

Keeping top management informed. “To enable us to tighten our management of usage rates and lead times, we formed focus groups and specific inventory project teams,” offers the director of strategic planning and inventory at a large publishing organization. “We also provide our upper management with quarterly reviews, analysis, and outlooks that these activities develop.” This step keeps management informed, while also maintaining their interest in keeping inventories limited, the manager responds.

EXCLUSIVE SURVEY: WHY MORE INVENTORY OWNERSHIP IS BEING SHIFTED TO SUPPLIERS

Is shifting inventory ownership/responsibility to the supplier a legitimate inventory reduction practice? Surveyed readers say that this approach is among the most effective cost control practice they have instituted within the past year.

A “smart” move for many practitioners, but one with ulterior motives. According to practitioners, this is definitely a means to reduce inventory levels and investment and increase inventory velocity and turns. Even if the supplier or distributor attaches a fee for this “service,” we are told that it is still less than the 25% to 40% inventory carrying cost that inventory managers would assume. However, we also believe that shifting inventory, in some cases, is a reaction to the many suppliers who express reluctance to engage a VMI initiative.

By shifting inventory ownership/responsibility back to the supplier, we speculate that the inventory managers are signaling more forceful VMI and supply chain initiatives for the future. Even though some have reverted to

a “tried and true” inventory reduction strategy, it is being practiced with a major difference: It is not only “move the inventory back to the supplier.” A number of practitioners also are insisting on some “value-added” activities. Among surveyed readers’ comments:

- *Company leverages the volume of MRO buys.* “We’ve shifted inventory ownership and management responsibility to several of our key suppliers,” describes a purchasing manager at a large packaging manufacturer. “We have leveraged our volume of inventories of MRO items by utilizing fewer sources and requiring them to provide higher levels of value-added services for this increased volume.” Although time savings have not been calculated, he notes that cost savings average 10% to 20%.

- *Supply chain review initiates a change in policy.* “We shifted inventory usage/ownership to subcontractors that previously were supplied inventory consigned by us,” explains a manager of international subcontracts at a mid-size maker of portable power devices. “A review of our supply chain revealed a significant amount of inventory was purchased and then consigned to subcontractors who didn’t have the partnerships and alliances with our suppliers. The change in practice has lowered our inventory investment more than 25%.”

- *Consignment inventory is a partial answer.* “We have moved to a consignment inventory arrangement in which the material is located in our facility, but the ownership rests with our supplier,” explains a materials manager at a small manufacturer of lighting systems. “The arrangement provides us with benefits such as increased inventory turns, and we don’t have to include it as ‘our’ inventory until we use it, and the supplier replaces only what we use,” he describes. However, “it still consumes floor space in our facility.”

- *Third-party provider comments on “shifting” trend.* “For the organizations we serve, most of them are shifting the inventory responsibility to us,” notes a vice president of supply chain solutions. “The gain for us is the visibility of the inventory and all its uses without suffering the waves of inventory based on forecasts, orders that haven’t arrived, and so forth.”

- *Reduced space availability forces move to supplier partnership.* “We began to shift more of our inventory to a third-party logistics/warehouse provider while also insisting that the supplier maintain ownership of the inventory,” describes a manager of material distribution at a utility company. “We entered into a partnership arrangement with that supplier.”

- *Company shifts ownership but shares schedules.* “When we began to shift inventory ownership to our suppliers, we also introduced them to our production plans and schedules through EDI and autofaxing,” says a planning facilitator at a midsize producer of fluid control devices. “This effort was the beginning of a trading partner relationship. Part of the arrangement called for a quarterly discussion of service, delivery, and other appropriate items.”

EXCLUSIVE SURVEY: REDUCING EXCESS AND OBSOLETE INVENTORY NOW MANAGERS’ BIGGEST CHALLENGE

Inventory Reduction Report reader surveys indicate that inventory managers are putting more emphasis on removing excess, obsolete, or slow-moving inventory. As product life cycles continue to compress and new products accelerate to market at an ever-quicken pace, inventory managers will find their responsibilities growing in the area of identifying and reducing inventory that is no longer required. Here is a sample of survey responses indicating respondent experiences, actions taken, and the results achieved.

Defining, identifying, and removing excess inventory. A global service inventory manager at a large transportation equipment manufacturer explains, “We focused on reducing the excess on-hand as well as the excess on-order, at all of our locations.”

Excess is, by her definition, “good material that has arrived before we really need it.” They created weekly reports detailing which parts are held in excess and when open POs are scheduled to bring in the excess parts. “By putting these tools in front of the planners and buyers, we were able to reduce the inflow of material and bleed-off the excess on-hand,” she describes.

Focusing on large WIP inventories. “We implemented two processes to reduce our WIP inventories,” reports the materials manager at a midsize producer of brass valves and fittings. The process involves better synchronization of component parts and the introduction of machining centers that not only machine parts but also test and pack. “We also implemented a parts allocation software module,” he explains. It has eliminated an unattached parts allocation program and provided a real-time inquiry into the status of open production orders.

Selling obsolete and excess inventory. After publishing an internal “distressed inventory price book,” the logistics director at a small manufacturer of medical devices was able to remove 50% of his excess and obsolete inventory. This accounted for \$3.5 million. “The book contained significant discounts; and by partnering with third-party medical device resellers, we managed to move that inventory overseas.”

Instituting new review procedures slices obsolete inventories. “We routinely review material usage,” reports an inventory manager at a small producer of telecommunications equipment. “Now we’re beginning to look at all material over \$200 that remains unused for the past year.” For parts valued at less than \$100, they are routinely scrapped. For the higher-valued parts, buyers now have the responsibility to review and dispose of the excess material. To date, excess inventory levels have dropped from \$200,000 to \$60,000.

Ridding aged inventory when the market sours. The director of supply chain management at a large producer of dehydrated vegetables had a problem when sales declined in a fringe market. “We had a large supply of aged inventory, which we clearly identified and then went about disposing,” he explains. The options included holding a fire sale, reworking the stock, or disposing outright. “Our solutions have greatly reduced our excess inventory and the wasted time that would have been required to reconcile problem inventories,” he states.

Educating the maintenance managers. “Our maintenance managers want to keep parts ‘just-in-case,’” says an executive vice president at a small injection molder. “We spoke with them and explained the basics of inventory, its cost, and the impact it has on the company.” They then had the maintenance force rationalize parts and materials that are “absolutely necessary” from those that are “nice but not really critical.” Additionally, they have installed a software module that has also helped to “shave inventory across multiple storerooms,” he notes. Additionally, they are presently installing a Web-based version of the software.

Removing stock after a project is canceled. A warehouse supervisor at a midsize builder of specialized maintenance equipment for the rail transportation industry cites a canceled project with more than \$2 million of parts already bought and placed into inventory. “Since most of the parts are exclusive to our company, we began an item-by-item analysis to determine whether they

could be used in some other application,” he explains. “We’re doing this by descending extended cost, and we are still in the analysis phase.”

Removing the “emotion” from discarding obsolete inventory. “My biggest challenge is in convincing our branch managers to return stock to vendors at 20% to 30% restocking charge on slow movers,” explains a materials manager at a wholesale distributor of pipes and valves. “They seemed to have an emotional attachment and resisted discarding obsolete items.” Eventually, through training and education, the managers became aware of the negative effects of dead inventory and benefits of returns and write-offs.

Enhancing in-store processor eliminates manual inputs and wrong inventory information. “We do not have perpetual inventory,” explains the planning and inventory control vice president at a large chain of arts and crafts stores. “Our stores easily become overstocked as we push inventory without having an accurate on-hand inventory position for them.” Since they need accurate counts on strategic items, they enhanced the in-store processors to print count requests, allow input, and transmit to the home office. “We removed a manual process and no longer have the overstock situation we previously had,” he relates.

Phasing in the write-offs. “We had a problem with reducing dead stock that is still on the books but is no longer in the plant,” mentions a purchasing manager at a beef processor. “We’ve decided to reduce a given amount, such as \$20,000 per week, instead of writing off the inventory all at once,” he offers. “In this way, there won’t be a financial shock all at one time, which our management doesn’t want to take, anyway.”

Removing field stock requires a critical review. A production control manager at a midsize producer of fire prevention equipment and supplies zeroed in on reducing the inventory of items kept for field service repairs. “We developed a new service policy and revised our surplus inventory criteria as a result of this effort,” he explains. Inventory was slashed by 35%.

Organizing a salvation effort for off-spec materials. “In our business we have our share of aged and off-spec materials,” reports the logistics and materials manager at a midsize chemical plant. “To drive down the level of these materials we’ve organized a rework plan, became more conscious of FIFO [first in, first out], and aggressively sought a buyer for some of the off-spec

materials.” To date, they have reduced the level of these materials by more than 50%.

Reducing inventory in a short time frame. An inventory control manager at a small facility that makes air filters was given the task of reducing excess inventory in a short time period. By using Pareto’s law (80/20 rule) and working on the largest items first, he was able to achieve a 25% reduction in just four months.

Bartering excess inventory for advertising space. A retailer of home furnishings finds bartering an effective tool for eliminating “obsolete and nonproductive inventories,” according to the general manager of physical distribution.

Defining and communicating criteria for excess and obsolete inventory. Several respondents explain that they are creating a set of standard procedures relating to excess and obsolete inventory. The inventory manager at a large sporting goods manufacturer says it best: “We are currently working to establish criteria for the identification of obsolete inventory and determining ways to best remove it from our facilities while still getting some value for it.”

EXCLUSIVE SURVEY: TWELVE PRACTICAL TIPS FOR SOLVING RECURRING INVENTORY PROBLEMS

Managers of inventory often feel that their problems are unique. However, a recent *Inventory Reduction Report* reader survey finds more resemblance than difference. Forecast accuracy, excess inventories, ramp ups, and seasonal adjustments are among the most frequently mentioned. Culled from hundreds of responses, here are some common denominator problems and their solutions.

Buffer forecast error with material. “For a long time, we’ve been stocking extra material to make up for forecast inaccuracies,” acknowledges the senior director of production planning and distribution at a large producer of diagnostic medical ultrasound devices.

“We finally got to a point where the excess and obsolete material was unbearable, so we formed a team of middle managers to resolve the situation,” he explains. They made sure that the financial, sales, and material plans

all were in sync while ensuring that flexibility was maintained to achieve revenue and income from operations (IFO) targets.

Excessive raw materials inventory. “We were carrying an average of almost \$300,000 per day of activated carbon in raw materials,” explains a materials manager at a midsize organization. They initially proposed instituting a JIT delivery program of daily shipment. However, by so doing, freight costs moved from \$5,200 per month to more than \$20,000 per month.

Instead, she formulated an agreement with the supplier to deliver the charcoal once per week, on Sunday, but to invoice on Friday. The savings in inventory amounted to more than \$200,000 per week, while freight costs were almost \$15,000 per month.

Sell the organization on an inventory reduction policy. “Our management was reluctant to reduce its inventory levels because they feared negative impact on supply security,” reports a customer service supervisor at a midsize oil additive producer. “The issue was resolved by using a supply chain evaluation showing true cost/benefit analysis.” Part of the solution is using an inventory analysis tool that makes inventory targets quantitative rather than subjective.

Resolve the matter of “cheap” imported steel and high inventory. “We used imported steel to cost average inventory,” explains a material control manager at a small pipe and tube manufacturer. However, when the company suffered a sales downturn, its inventories escalated. As a solution, they stopped buying imported steel and, instead, used short domestic lead times to purchase more closely what is needed.

Accelerated seasonal demand causes out-of-stock situation. “Our sales volumes jump notoriously in summer, sometimes by as much as 30% without any warning,” explains a materials supervisor at a midsize manufacturer of electrical equipment. “This causes parts shortages which in turn drive our on-time shipment performance.” In answer, she received approval to put additional kanban inventory in place on critical parts to cover the unplanned increase. “We added almost \$1 million,” she reports. “However, this added inventory was well worth the investment, as we were able to keep our on-time customer shipment performance at 95%.”

Minimize forecast demand errors. “There are no bullet-proof methods,” concedes the senior manager of global logistics at a major producer of

semiconductors. “Therefore, we have minimized the problem by closely monitoring outside of a two-week window. The next window of 30 days is practically flexible ($\pm 25\%$), while the remainder of the forecast is 100% flexible,” he details.

Managing products in a ramp-up/ramp-down situation. “Both are equally challenging during a product’s life cycle,” maintains the director of materials at a small developer of broadcast equipment. “During these periods we’re only about 40% accurate to forecast. To alleviate these situations, we use build-to-order when possible, and insist on shorter planning horizons.”

Reevaluate lead times on subassemblies. A supervisor of planning and logistics at a small maker of electronic equipment finds that “vendor adherence to lead times” is his “biggest headache.” They’ve reviewed the established lead times and discussed them with the supplier community. “We’ve made changes where necessary, and emphasized the need for adherence to lead times in every other situation,” he explains. “This has greatly reduced expediting and late customer shipments while not impacting our inventory levels in a negative sense.”

Obtain funding for supply chain management system. “We finally received approval after using case studies to determine potential ROIs [returns on investment],” maintains the supply chain management director at a large producer of packaged foods. “We also developed a core team to lead the reengineering effort and to select the appropriate software solution.”

Protect inventory from theft. The purchasing and stores manager at a small maker of cement found that he was being victimized by “lost” cylinders of oxygen and acetylene. He solved that problem by entering into a VMI process and instituting a give one/get one policy for employees.

Educate sales on inventory reduction. “Our sales department vigorously opposed every effort to reduce inventory because they believed it would negatively impact sales,” reports the inventory control manager at a small wholesale jeweler. “We began an education program to inform them that reduced inventory does not reduce sales. Further, we invited the sales managers to attend and participate in our product review sessions,” he explains. “Once we gave them a voice in the matter, they no longer objected to our inventory reduction decisions.”

Minimize impact of international forecast inaccuracies. “The volatility in South American and Asian forecasts has offset the gains we’ve been able to achieve in our other inventory reduction efforts,” declares the logistics vice president of a large manufacturer of construction equipment. “More frequent communication and forecast changes have minimized the inventory impact,” he reports.

EXCLUSIVE SURVEY: WHY KANBANS ARE NOW CATCHING THE ATTENTION OF INVENTORY MANAGERS

As more inventory managers embrace the JIT philosophy, kanban becomes the preferred process of materials replenishment. In addition, its practitioners have discovered that it is also a driver of continuous improvement activities. Here are just a few of the comments from readers of a recent *Inventory Reduction Report* survey and from participants at a recent Annual International Conference of APICS.

- “We implemented visual replenishment and kanban programs managed by the supplier,” explains the acquisition management manager at a large manufacturer of industrial controls. “Suppliers come into our building and download the forecast to their MRP. The supplier also delivers the parts to the point of use.”

- “Our move to a demand flow philosophy to address a highly configurable product uses kanban as triggers for resupply,” maintains a production control manager at a midsize producer of medical equipment. “Order lead times have gone from 15 days to three days for many custom products, and our WIP inventory has since been cut by almost 80%.”

- “Since implementing an internal kanban pull system, we’ve reduced floor stock, stockouts, lead times, and material handling,” explains a materials manager at a small maker of automobile components. “Further, we increased our inventory turns appreciably.”

- Hugh F. Campbell Jr., materials manager at OPW Fueling Components (Cincinnati) cites some direct results for parts on kanban. “We have seen a 10% inventory dollar reduction and a dramatic increase in turns.” He explained that “some parts are now at 50-plus turns, while overall inventory turns improved from six to eight. In addition, on-time delivery performance improved to 95%.”

- At Macklanburg-Duncan (Oklahoma City), kanban systems have been used to integrate MRP and JIT practices. “By utilizing these concepts, one can minimize WIP inventories,” maintains Tom Kindinger, CPIM, CIRM, production planner.

The Move to Electronic Kanbans

In a new development, Toyota Motor Corporation and its key suppliers in Japan plan to computerize their system of kanban cards. The automaker is currently introducing its online kanban system after encouraging tests of the computerized system.

Reportedly, the data-recording technology enables the system to incorporate about 100 times more data than can kanban cards. In addition to increasing the amount of information available to suppliers, the new system will slash lead times. With the kanban card process, it is reported that it takes seven to eight hours for the card to reach the production point.

Under the new system, according to *Lean Production Report*, parts suppliers will receive ordering instructions online, print them out, and attach them to the ordered parts, which are then delivered to Toyota. According to one estimate, if Toyota sent all its transactions with a specific supplier electronically, that supplier would save 2,000 to 3,000 hours per month.

Clarifying Kanban Misconceptions

There’s no argument that kanbans work well in an environment where there are high product volumes and low product variety. However, William M. Boyst Jr., CFPIM, an Oliver Wight consultant focusing on continuous improvement programs, maintains that “kanbans do work equally well in both low-mix/high-volume and in high-mix/low-volume environments.”

However, he warns that it is critical to use the right kanban technique in the right environment. He described the two methodologies at the APICS meeting:

1. *Product-dependent kanban*. This is the choice for a high-volume/low-mix environment. Product-dependent kanbans provide a visible signal of what to do and when to do it. “When a kanban becomes empty, you simply replace what was there with another just like it,” Boyst explains. The advantage of this technique is that it is easy to explain and understand. However, it also requires more inventory and more floor space.

2. *Product-independent kanban.* This is preferred for the low-volume/high-mix environment. In this practice, kanbans provide a visible signal of when it is time to do something but do not communicate what to do. The “what to do” must be communicated independently of the kanban signal by an external method. The external source can be an MRP II dispatch list, a final assembly schedule, or a customer order. The advantage of this technique is that it does not require some of each item at each workstation. The disadvantage, however, is the difficulty of explaining and understanding it.

“Most companies start off using product-dependent kanbans because they are easy to explain and understand,” Boyst explains. “Then, as JIT expands to include more areas of the company, there is a shift into a hybrid approach. Finally, as the company converts all its operations to JIT, the approach changes to all product-independent kanbans.”

Supplier Partnerships Improve Success of Kanban Process

“At SOR [Lexana, Kan.], an important element of the supplier agreement is the inventory requirement,” explains Michael Weise, production manager. Suppliers agree to keep on hand a quantity of base stock that approximates four kanban releases.

SOR’s releases and supplier shipments are closely controlled and are an integral part of the program’s success. The release form for all needed kanbans is sent by fax to the supplier once each week. The supplier acknowledges receipt of the release in 24 hours by returning the release form confirming that the shipment will be as requested. “SOR will not accept the delivery of a partial supply kanban or a partial release,” Weise noted.

When the shipment arrives, the entire release is received with one transaction that transfers all kanbans into inventory. The supplier uses the release form as a packing list, which also initiates payment to the supplier within 48 hours after receipt.

Continuous Improvement Process Reduces Number of Kanbans in System

For each item on a supplier partnership agreement there were initially five supply kanbans in the system. Each card represented a one-week usage. Two supply kanbans covered internal safety stock during the installation phase.

However, through the continuous improvement process, they now have been eliminated.

Two-Bucket Kanban System for High-Dollar Parts at OPW

For each kanban item selected, supplier representatives were brought in to meet the OPW Fueling Components team and learn about the kanban process. According to Campbell, goals and objectives were discussed and agreed to, and fears and roadblocks were addressed. The procedures were then documented and sent to the suppliers for review along with the recommended kanban quantities.

“In several instances suppliers recommended a slightly different quantity due to packaging considerations,” he explains. “We reviewed them and reached an agreement with the supplier. We began the kanban start-up on an item-by-item basis.”

Kanban locations, which are bar coded for future cycle count data collection activities, are identified in the work cell. “As soon as a bucket is empty, the cell coordinator has a second bucket moved to the location and pulls a notification to ship form,” he details. “This is faxed to the supplier from manufacturing. Upon receipt of the fax, the supplier ships the next bucket, and the cycle continues,” he describes.

Chapter II-3

Inventory Reduction Strategies

Case Studies of Success

TEN PRACTICAL TECHNIQUES HELP CASE CORPORATION CUT INVENTORY

As an inventory manager, you are feeling the pressure to drive your company's inventory to even lower levels. The reason: the annual investment that companies make in inventory represents between 20% and 40% of invested capital. In addition, for every dollar by which the inventory is reduced, net income increases by the same dollar.

With good inventory management practices you can free up sizeable resources and make a significant contribution to your company's bottom line, increasingly an adjunct responsibility of inventory managers. The major stumbling block is how to reduce inventory without degrading customer service.

How Case Corporation reduces cost through better inventory management. Mark S. Miller, CPM, CIRM, purchasing manager (mmiller@casecorp.com), and Thomas M. Graddy, CPM, CIRM, manager of supply chain management (Tgraddy@casecorp.com), both of Case Corporation (Racine, Wisc.) have found the key to this dilemma. At a recent Annual International Purchasing Conference of the National Association of Purchasing Management (NAPM), they described the techniques that they use to reduce inventory costs.

1. *Improve communications in the supply chain.* "There is duplicate safety stock carried at each level of the supply chain," they explain. "By improving

communications, safety stock can be reduced without impacting customer service.” Two of the tools that help include electronic commerce and in-house supplier personnel.

With e-commerce, pertinent information can be exchanged throughout the supply chain electronically. Also, with in-house personnel, supplier representatives can be located at different levels of the supply chain to expedite orders and manage schedules, among other tasks.

2. *Reduce supplier lead times.* Lead times have a direct impact on inventory levels, yet studies show that lead times consist of as much as 95% of idle time. The challenge is to work with suppliers to reduce that lead time.

Miller and Graddy describe two steps that should be considered. First, track and measure lead time. “Measure how long it takes for each step of the supply chains,” they advise. Track supplier lead times, inbound transportation time, transport time to the customer, manufacturing lead times, and distribution cycle times. “Recognize which suppliers and which commodities have the longest lead times and start with these.”

Negotiating shorter lead times is another recommendation. “Challenge lead times,” they declare. “Ask for a breakdown of the components of the lead time.” Compare one supplier’s lead time to those of others. Challenge the supplier to reduce its idle time. Using distributors is another method to reduce lead times for some products, they offer.

3. *Standardize.* “Reduce the number of items carried,” advises Graddy. “Fewer items with greater quantities make forecasting more accurate.” Fewer items to buy means that lower safety stock is needed and therefore that inventory is lowered. Among the ways to reduce the number of parts: substitute for standard parts and consolidate common part numbers.

4. *Reduce surplus/obsolete inventory.* “Surplus or obsolete inventory can be reduced without risk to customer service,” they observe. Methods that they use to dispose of this inventory include using it elsewhere in the company, negotiating its return to the supplier, selling it to other company, and donating the inventory to a local charity.

5. *Improve supplier quality.* Poor supplier quality will result in added costs in many areas, including additional inventory. “Become involved in the supplier quality audit process or push the supplier to become ISO [International Standards Organization] certified,” they declare. “When suppliers have quality problems, initiate a corrective action plan and make sure it is followed.” By improving the supplier quality, less stock will be required.

6. *Challenge minimum order quantities (MOQs) and price quantity breaks.* Make sure that your purchasing department is aware that suppliers' minimum quantities and price quantity breaks can cause surplus inventory. However, realize that suppliers require MOQs or quantity price breaks to compensate for their costs of setting up a job.

Therefore, enlist the aid of your engineering department to work with suppliers to reduce set-ups or recommend an annual commitment agreement with the supplier so that it can build the entire MOQ while agreeing to hold the inventory and ship it in small quantities.

7. *Have parts delivered more frequently.* The more often a part is delivered, the lower the investment in inventory. As an example, Miller and Graddy cite a situation in which the order frequency of high-volume A and B items was increased, and the average weeks supply of inventory tumbled from 3.7 weeks to just 1.9 weeks (see Table II-3.1). "However, the cost of ordering and receiving parts must also be considered when reviewing the order frequency," they warn.

8. *Improve on-time delivery.* "One of the reasons that extra inventory is carried is to compensate for suppliers who can't be counted on to deliver on time," Graddy explains. He recommends applying the following to improve supplier delivery:

- *Measure on-time delivery.* There are many methods to measure this parameter, but the method applied is not as important as long as supplier on-time performance is tracked.
- *Make sure the supplier understands.* Talk to suppliers and make sure that they are aware of how you measure their delivery performance and of how you define on-time.
- *Set supplier goals.* Together with the supplier, set on-time delivery goals. Make delivery one of the key measures in your supplier-rating program.

Table II-3.1 More Frequent Deliveries Reduce Inventory Levels

<i>Class</i>	<i>Frequency</i>	<i>Average Inventory</i>	<i>New Frequency</i>	<i>New Average Inventory</i>
A	monthly	2 weeks	weekly	.5 weeks
B	quarterly	6 weeks	monthly	2 weeks
Class	6 months	24 weeks	6 months	24 weeks
Average Inventory		3.7 weeks		1.9 weeks

Source: Mark S. Miller and Thomas M. Graddy.

- *Reward supplier performance.* Recognize suppliers who achieve their on-time goals.

9. *Set up a supplier-managed inventory program.* “Work with key suppliers to develop a program to manage and hold inventory for you,” Miller offers. “The idea is to reduce the amount of total inventory and not just to transfer inventory to the supplier.” Some of the more popular programs in use today include

- *Vendor managed inventory.* Here, the supplier performs the inventory function for the customer.

- *Point of sale.* The supplier reacts to customer demand and replenishes the inventory level.

- *Consignment stocking.* The supplier owns the inventory when it is in your facility. Payment is made when the inventory is used.

- *Supplier stocking.* The supplier carries safety stock and ships just in time (JIT).

10. *Give credit for inventory reduction.* “Inventory reduction has a direct impact on your company’s financial success,” they remind. Therefore, they advise recognizing the importance of inventory reduction by

- *Getting everyone involved.* “Teach the impact inventory has on the bottom line,” they recommend. Form a team to focus on inventory reduction projects. Get suppliers, engineering, manufacturing, finance, and marketing involved in the team.

- *Counting inventory reduction as a cost reduction.* In many companies, inventory reduction is not counted as a cost reduction. Miller and Graddy are adamant: “Inventory reduction is important and should be recognized as a cost reduction.”

CASE STUDY: SCORE MODEL ROOTS OUT INVENTORY IN CROSS-COMPANY SUPPLY CHAIN

By Kate Fickle (kfickle@prtm.com), director, and Manoj Kumar (mkumar@prtm.com), manager, at Pittiglio Rabin Todd & McGrath. This article is excerpted from a lengthy case study originally appearing in PRTM’s Insight (www.prtm.com).

A “true” supply chain at a computer peripherals company we recently examined extended from its suppliers to its customers. However, it was heavy with

inventory. Part of the problem was attributed to the “bullwhip” effect caused by each party in the chain adding a hedge to the demand forecast. Another was its complex push-based replenishment process. While each company recognized the overall problem, none was motivated to tackle a solution on its own. However, with the application of the supply-chain operations reference model (www.supply-chain.org), the solution was put into place.

The elementary problem of high inventory. We were initially engaged by the sales company and its finished goods manufacturer to improve inventory turnover and increase the supply chain’s flexibility. Although both companies believed, or initially maintained, that their inventory levels were no worse than average, they also realized that by working jointly they could further reduce their inventory and improve their responsiveness to changes in demand.

The relatively short product life cycle (less than a year) meant that excess inventory resulted in write-offs, a very undesirable outcome in a very competitive industry. Working with us, the customer and its manufacturer enlisted the support of the major assembly suppliers to the finished goods manufacturer, and selected suppliers of components to the assembly suppliers. In total, we assessed companies representing four stages of the supply chain.

Applying the SCOR model to the supply chain. In our initial discussions with the participants in this supply chain, they ultimately conceded that their inventory levels were a “bit high.” We began by evaluating the supply chain’s overall performance, using the SCOR model and our Integrated Supply Chain Benchmarking Study as analysis tools. Our analysis revealed that sales were lost due to poor supply chain flexibility and a worst-in-class overall level of inventory to support sales.

The pointlessly high levels of inventory were driven not only by weaknesses in the planning process but also by deficiencies in the supply chain configuration and weaknesses in the product design from the standpoints of both design for manufacturability and postponement of final assembly. A Level 2 SCOR model (see the section titled “Pharmaceutical Giant SCORs with Winning Supply Chain Initiative” in Chapter III-3) of the “plan” process, which breaks that process down into multiple categories, revealed the complexity of the process:

- The plan process required a minimum of 51 discrete process steps between the sales company and the finished goods production company.

- Each monthly planning cycle took over 45 days. Because of the length and complexity of the planning cycle, each participant was acting on demand data from different periods.
- Forecast variability was high. The operant tendency was to overforecast demand in order to hedge against supply chain variability. This resulted in the upstream suppliers getting routinely and roundly “bullwhipped.”
- The lead times within each company were tight, but the overall, or “interconnective,” lead times were high. Although the average product life cycle was a year, the material flow started almost 165 days before the finished product reached the distributor. The horizontal lines in Figure II-3.1 grow longer as the products move closer to their completion dates and represent no value being added to the product. The most surprising result for the companies involved in this supply chain was that the theoretically best inventory days of supply given current policies was 113 days.
- Each of the production centers in the supply chain focused on a specific manufacturing technology. Products, therefore, moved from one factory or distribution center to the next until its production was completed. Some of the parts traveled through as many as six companies and countries before being shipped to the customer. This inevitably resulted in additional transportation and planning lead times.

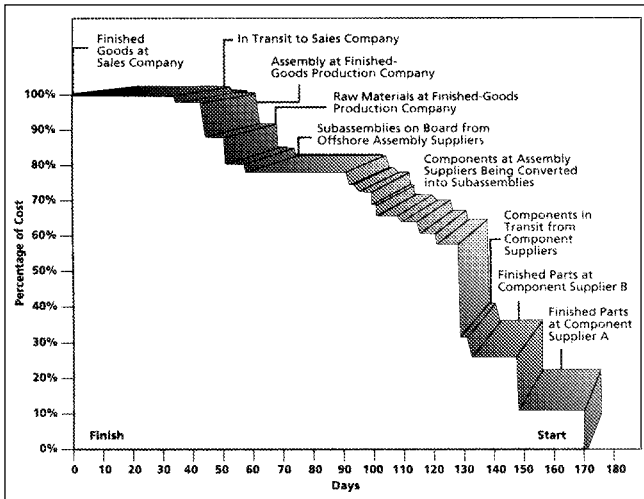


Figure II-3.1 Buildup of Inventory Value

The difficulty of solving the problem of supply chain configuration. This was harder to solve than the planning process and lead times. Each company acted independently, and any change in supply chain configuration meant that one company gained value-added activity while another lost it. Some of the companies involved in the supply chain are related and have begun to realign their activities so that more value-add occurs at each physical node in the supply chain.

The solution to reducing lead times and simplifying the planning process. After sharing the results with all of the companies in the supply chain, the sales company and finished goods company agreed to work jointly. They began by implementing a joint service agreement (JSA) that outlined their mutual roles in managing the supply chain and specified the performance standards guiding each party.

To supplement the JSA, the two companies implemented a breadman-type pull system between them. At the same time, they worked with each other and their suppliers to reduce lead times. As a result of these initiatives, the two companies cut their joint inventory from over 100 days of supply to less than 30 days.

The companies are now extending the JSA implementation and pull system to the other companies in the supply chain. They are also realigning their value-added activities to consolidate activities within fewer locations. The design activities themselves were the last elements to receive attention. The analysis showed that the high value-add components were added early in the supply chain, and all configurable functions built into the product at early stages of production. This resulted in high levels of inventory dollars in the supply chain and high obsolescence during product transitions. The companies are just beginning to introduce postponement concepts into the design phase.

The individual companies in the supply chain had good supply chain management. They were average or above average on most supply chain metrics, except inventory days of supply. By working together to analyze the supply chain, the companies identified areas in which coordinated joint activity could produce substantial results. The results included reducing planning and transportation lead times, shifting from push-based to pull-based inventory planning, simplifying the production planning process, realigning factories to integrate value-adding operations, and redesigning the product from a design-for-logistics perspective to enhance postponement.

HOW HENNESSY SLASHED INVENTORY 44% WHILE BOOSTING CUSTOMER SERVICE

Hennessy Industries proves that you can actually reduce inventory and improve customer service. A series of problems relating to their relocation from Chicago to Nashville found them increasing production rates and overtime work to improve their delivery performance. However, it was all done at the expense of building huge inventories. “We had a problem with excess inventory that was out of control,” acknowledges Michael C. Moody, CPIM, CPM, purchasing and materials manager. Today, however, inventories are down 44% and are moving toward the target objective of 50%.

Establish realistic goals for inventory reduction. “We began by taking a hard look at each category of inventory, and started brainstorming for areas of opportunity,” he explains. “Being a manufacturer of automotive wheel service equipment, we had to address raw materials, in-process inventory, and finished equipment, which included a significant inventory of service parts.”

Hennessy had to maintain adequate service part inventories for all current products. In addition, they also had to keep a supply for all products produced and sold over the previous seven years.

Once they had the essential tools in place for the planners and customer service to improve customer satisfaction (see sidebar), they turned their focus to removing the excess inventories. “We established a work plan for reductions, along with realistic targets,” Moody offers.

Company’s continuous improvement philosophy prevails. “We established a single-year target for each category of inventory, knowing each subsequent year would bring new, lower targets for reductions,” he describes. They benchmarked several General Electric practices, including safety stock levels for finished goods and raw materials.

“We were cautious on our reduction targets, as our order fill rates were just beginning to show improvement from the past year,” Moody explained at an Annual American Production and Inventory Control Society (APICS) International Conference. “We also focused on our excess and obsolete inventories, since we had over \$1.5 million in these categories.”

If the product change notice system is not working, get engineers involved. One of the first realizations was that Hennessy’s change management process was not functioning effectively.

Provide New Tools to Achieve Customer Service Objectives and Spare Parts Management

Hennessy designed a process to manage and track all shipments of parts and equipment from the plant to a third-party distribution center (DC). “A program was written that allows our employees to bar code scan all materials loaded on a trailer for shipment to the DC,” Moody explains. A tracking number is created for every part and for the entire truck.

Once the truck is unloaded at the DC and every part received is given a storage location, the transaction is complete. “An ‘in-transit’ inventory location in our computer allows our planners and customer service personnel full visibility of the materials produced and on their way to the DC,” he details.

To manage the inventories of service parts, accessories, and equipment at the DC, a “pick list” system has been designed to give material planners a daily exception report on what materials require replenishment at the DC, using redefined safety stock levels.

Additionally, an allocation system was designed and implemented. Customer orders are prioritized using classifications, such as emergency, export, regular, back orders, and new store opening. This provides customer service personnel with a tool not only for managing key orders but also for managing service parts or equipment that may be in short supply.

“This program has significantly improved our order fill rate, and it ensures that our oldest orders are filled ahead of new orders,” maintains Moody.

“We addressed this with an ongoing education process for our engineers, planners, and buyers so they could understand their roles and responsibilities in the change process,” Moody details. Many of them were unaware of the implications of how a change to one part can create excesses of another part, or even render it obsolete.

Hennessy had hired several new planners and buyers during the plant consolidation and had not provided them with sufficient training on how to manage parts changes. A “prime team” was established to analyze the company’s business processes and to define which required improvement. Techniques such as process mapping and cause-and-effect diagrams were applied.

They also used a professional facilitator to guide the team through a process-mapping kaizen of all company processes that led to the creation of excess and obsolete inventories. “The information gained during the kaizen provided a basis for several changes to our business practices,” he notes.

Service parts management: the most difficult task. “We discovered that due to our lack of an effective change process, we had hundreds of part numbers that were obsolete but had never been coded as such,” Moody explains. “After our engineers and manufacturing personnel had sifted through our parts records, we saw obsolete inventories grow again.”

Moody and the team then assigned obsolete dates to previously manufactured parts so that future obsolescence could be identified and acted upon. They also revisited the stocking levels to ensure that the reorder points were consistent with existing sales levels.

“To provide a basis for ongoing reductions, considering our obligation to provide service parts for up to seven years after a sale, we developed a report of all service parts for each planner,” he explains. It lists all service parts in descending dollar value of excess inventory.

This information is used to track excess inventories by planner and in total so that everyone can focus their efforts on reducing the excesses. Additionally, each planner now identifies and tracks the top five excess parts individually and reports them weekly.

“Once the planners could identify specific parts for improvement, the reductions came,” he relates. “We now hold weekly engineering change meetings by product type, and every planner, buyer, and engineer must attend to represent their areas.”

Kanbans and point-of-use storage take down raw materials inventories. “If you really want to reduce raw material inventories, try learning to live without MRP [manufacturing resource planning], or at least become less dependent on it,” Moody challenges. “We still use MRP to provide a ‘vision’ of needs to our suppliers, but we are currently implementing kanban across all production lines.”

Supplier relationships are also important. “Shorten your suppliers’ lead time, and you will reduce the amount of material you need to stock at your plant,” he advises. “Consider a supplier kaizen to drive this process.”

Use personnel from within your organization who are knowledgeable in cycle time reduction. Concurrently, establish kanban to release materials to the factory, as Hennessy does. “Kanban and point-of-use storage help eliminate wasteful, unneeded inventory,” he notes.

According to Moody, “To achieve significant inventory reductions, focus on the root causes and develop countermeasures and a work plan to execute these countermeasures.”

REPETITIVE MANUFACTURING LETS ITT AUTOMOTIVE MAKE MAJOR INVENTORY CUTS

Changing from traditional work-order-based planning and control methods to true repetitive can help you achieve considerable inventory reduction. Repetitive assumes that jobs will be intentionally grouped by processing characteristics to create logical, if not physical, production lines. According to leading authority Gary Langenwalter, CFPIM, CIRM, president of Manufacturing Consulting Partners International (Bolton, Mass.), “The repetitive approach dramatically reduces setup times, which in turn significantly reduces lot sizes.” These actions translate into massive reductions in inventory, lead times, and cycle times.

Switch to repetitive process slashes work in progress (WIP) 80%. As an example of what can be achieved by moving to repetitive manufacturing, Langenwalter cites the experience of Tier 1 automotive supplier ITT Automotive (Glencoe, Ontario). Since implementing repetitive practices, the company has achieved the following:

- Backflushing has improved WIP inventory accuracy to 97+%.
- Point-of-use storage is working well as each production cell now supplies itself.
- With work cells they reduced the number of pay points to one and directly supported the radical inventory reduction (see Table II-3.2).

**Table II-3.2 ITT Automotive’s Switch to
Repetitive Manufacturing Drives
Impressive Results**

Inventory turns	50
On-time deliveries	99.99%
Customer order ship times	4 hours
Sales	up 100%
Efficiency	>100%
Finished goods & WIP	down 80%
Raw materials	down 40%
PO release	1 minute
Materials manager workweek	40 hours
WIP accuracy	97%

Source: Gary A. Langenwalter, CFPIM, CIRM.

- Bills of material (BOMs) were flattened to a single level, reducing the number of pay points to one, reducing data entry transactions by 75%, and increasing inventory accuracy.

The end of safety stock? Additionally, the company installed an automotive supply-oriented enterprise resource planning (ERP) system that uses electronic data interchange (EDI) to link them tightly to customers and suppliers. Langenwalter told a recent APICS Annual International Conference that “the system calculates suppliers’ schedules so accurately that the materials manager no longer adds safety stock when ordering from suppliers.” Each shift enters its actual production so that incoming supervisors can easily determine the production remaining for each part’s run. They run MRP daily and rerun it during the day if there are major changes. “They have recently implemented electronic advance shipping notifications.”

Inventory turns triple. This happened when the inventory was reduced from three weeks on-hand to one week on-hand. “Management deliberately reduced inventory buffers to increase flexibility, reduce total cycle times, and improve throughput,” Langenwalter reported. Most of the reduction came from finished goods and WIP, which moved from one week each to just one day each. Also, raw materials shrank to just three days from the traditional one week.

As an encouraging aside, Langenwalter said, “The materials management professionals also have cut their work week from 60+ to just over 40 hours per week.”

INVENTORY CONTROL IN THE AFTERMATH OF AN ACQUISITION: HOW SERENGETI MANAGED IT

Inventory management for Solar-Mates, a small manufacturer of non-premium sunglasses, was a simple, uncomplicated process, but one that worked well for the organization—that is, until the company acquired Serengeti Eyewear Division of Corning Inc., a much larger company (by a factor of 5), and maker of high quality, premium sunglasses.

Phone call inventory replenishment. “At Solar-Mates, we literally could see that we’re going to run out of product this month,” explains Craig Davison, director of information systems of the renamed Serengeti Eyewear Inc.

(Sarasota, Fla.; craigd@serengeti-eyewear.com). “All we’d have to do is make a phone call to the Far East, and we’d have the product we needed to fulfill our customer orders within the next thirty days,” he says.

However, after the acquisition of Serengeti he realized that the new organization would require a more sophisticated information system. “The old system was purely accounting based and was very weak in inventory control, inventory management, and inventory reporting,” explains Davison. Further, because the linked databases were proprietary, managers could not get to the data within the system. “And since we could not access the data, we couldn’t customize it,” he adds.

Transition into a new business reality and impact on inventory. Davison cites several examples that had a critical impact on the organization’s inventory philosophy:

- *From a lead time of 30 days to 120 days.* “We had a pretty simple setup,” he notes. “We used three vendors, all located in the same country in the Far East, and they handled all the supply, raw materials, and manufacturing. We [Solar-Mates] acted more as a broker than a manufacturer.”

Premium eyewear is a very different product. The frames are of higher quality, and the lens technology is totally different from the polarized polycarbonate plastic lens found in nonpremium sunglasses.

Optical-quality lens technology requires many different manufacturing processes. In fact, the Serengeti premium sunglasses require a lead time of 120 days. “It’s a little harder to manage your inventory when you have to wait four months after you place an order,” Davison mentions.

- *From 12 SKUs to over 2,000 SKUs.* “We went from 10 employees to 60 employees in two months,” he describes. “And we went from 12 SKUs in our system to more than 2,000 in a month.”

Needless to say, they had an initial problem with excess inventory. “We didn’t have any sales history, but we knew we had four months to build the next product line,” Davison explains. “We bought what we thought was right—10,000 units of everything. It always doesn’t sell that way,” he concedes. “So, we had a lot of the wrong inventory, a lot of excess inventory, and zero technology.”

- *From “broker” to manufacturer.* The decision was made to manage the actual manufacturing process of the premium label. “Now, instead of just calling three vendors and ordering a pair of sunglasses, we have to deal with

20 suppliers in six countries, all of whom are doing something different,” Davison says.

“We’re now responsible for getting the raw materials for the glass lens; we have to secure the temple tips; and we have to arrange for the manufacture of the nose pads and get the frames assembled,” he details. “Then we have to match it all up with the frame for final assembly, and move it to Sarasota.”

- *From a small customer base to a more diversified base.* For the nonpremium sunglasses, Serengeti has 12 to 15 large discount national chains in the United States that require large, structured, very periodic deliveries.

The customer base for the Serengeti premium sunglasses is “extremely diverse.” It includes over 100 large national retail chains in the United States, Canada, Europe, and Australia, plus 1,200 smaller mom-and-pop type retailers.

Getting the inventory situation under control. Serengeti initiated a systems selection process that involved reviewing several ERP packages designed for small and midsize manufacturers. Davison quickly points out a key selection requirement that is common to many small and midsize organizations: “We don’t consider ourselves to be a technology-oriented company, so we have no desire to spend a lot of money on a computer system.” However, they still had a series of requirements that had to be met.

“Having to manage inventory and allocate scarce production resources was new to us,” he explains. “We also faced the challenge of developing processes to track material around the globe.” Additionally, because they now make premium products, Davison adds, “We don’t want to make more than we need, but we want to be able to tell our customers when they can expect delivery of the product.”

Serengeti is also an aggressive company, introducing new products every eight to 12 weeks. “We begin with small production runs, so we have to have a mechanism to let them know when to expect delivery of the new product.”

Narrowing the search to one software vendor. An additional aspect of his search was the fact that Corning used the DOS-based version of Macola (Macola Software, Marion, Ohio; www.macola.com). “With all of the other things going on, coming up with a brand new system from scratch really wasn’t too appealing,” he admits.

“We looked at all the different pieces of the Macola Progression Series 7.5—the financial, accounting, MRP, master scheduling, inventory, and order entry modules—and found what we needed to get our business running,” he shares.

Gaining visibility in the international inventory picture. Four months after the acquisition, the new Serengeti Eyewear had \$10 million of inventory sitting in the warehouse that they couldn’t sell. In addition, they had another \$10 million in backorders.

“Today we have a better handle on our inventory, and our backorders have been reduced by 90%,” says Davison. “We’re not carrying too much inventory, and the \$1 million on backorders is good for us and for our industry,” he notes. “With a four-month lead time, to have this low level of backorders, with an average selling price of \$60 to \$70 to the distributor, is a pretty good ratio,” he claims—this while the business has grown by an additional 10%.

“Less inventory frees up cash to do other things, like improve our infrastructure—training of people and improving processes,” Davison declares. “Now that we’ve learned more about the Macola system, we’ve found there are even more variables, more flexibility still in the system that we didn’t have any knowledge of in the beginning,” he notes. “It’s improved our cost management.”

For example, he explains, “It’s given us visibility for the first time, so we could see where our inventory is located. With four months of inventory, six different countries, and 20 different factories, it could sometimes lead to double purchasing. Today, we don’t necessarily have that risk as we can see where everything is, what it costs, and can find everything at any point in time.”

Additionally, and for the first time, Serengeti is able to use available-to-promise with its customers. The customer service reps are all trained and have access to the stock status or shipping status on their screens, so they can give accurate dates to the customer. Further, “all data we can now access is making our buyers and planners plan more accurately. We don’t have products way out of sync, and we’re no longer buying 10,000 units of everything.”

The real test for the system and organization occurred several months ago, when Serengeti’s top customer increased its demand 55% over forecast. “We were able to look at the schedule and see where all our capacity was in all of our facilities internationally,” he describes. “We have been able to adjust

our capacity, and even with a four-month lead time, have been able to meet the change in demand.”

As Davison concludes, “With the Macola system, we have been able to establish efficient new procedures for inventory management, production planning, and production scheduling—activities we didn’t have previous to the acquisition.”

HOW IBM SLASHED CHANNEL INVENTORY 50+ % WITH ITS ASSET MANAGEMENT TOOL

By Grace Lin (gracelin@us.ibm.com), manager of extended enterprises systems research, IBM Thomas J. Watson Research Center, Yorktown Heights, N.Y.

The International Business Machines Corporation (Armonk, N.Y.) has embarked on a global supply chain reengineering initiative to speed up responsiveness to customers while minimizing inventory. Key to this successful effort is a decision support tool, Asset Management Tool (AMT), developed by IBM Research and IBM’s Integrated Supply Chain team.

To date, AMT has been deployed in approximately half of IBM’s operations worldwide, with much success. For instance, AMT was used to analyze the supply chain for a printer product family by the IBM Printing Systems Company. It studied the effects of forecast accuracy, product structure, and the introduction of a new DC. In one case, the recommendations led to a new supply chain process involving direct shipments. The result was the elimination of 99% inventory at a site, inventory savings that approached \$4 million annually, and a 40% reduction in cash-to-cash cycle time.

Personal Systems Group, with AMT, reduces channel inventory by more than half. Large volumes but slim profit margins and falling prices in the personal computer market made IBM’s Personal Systems Group (PSG) an ideal candidate for supply chain reengineering. Using AMT, the business unit was able to reduce expenses by over \$750 million in one year alone. This was achieved in a number of ways. Inventory was reduced dramatically. Channel inventory was reduced from over three months to approximately one month. Consequently, the division reduced price protection expenses (what PSG reimburses business partners whenever it takes a price action on products that business partners are holding) by over \$100 million from the previous year.

In addition, the end-to-end inventory had been reduced from four-and-a-half months to less than two by the end of the year. By closing the gap between component procurement and product sale by four to six weeks, an additional savings on product cost of at least 5% was realized. This equates to more than \$650 million in savings.

Applying AMT at PSG. A cross-functional team was assembled to use AMT (see sidebar) to design and analyze the supply chain policies and strategies to create an integrated value chain. The team consisted of participants from PSG's manufacturing, procurement, distribution, finance, and reengineering operations divisions and from the IBM Research Division. The goals were to assess the impacts of the proposed policies and to agree on the optimal configuration of the supply chain.

The PSG extended supply chain was a hybrid push-pull system in which products were built (or pushed) to a certain level based on our current forecast and serviceability targets until they were "pulled" by the business partners. To model this type of environment, AMT inventory optimization was used to periodically set up the build plan, taking into consideration the forecast accuracy and customer serviceability factors. At the same time, the simulation module was used to generate customer orders, the assembly process, and the inventory policy used at the business partners, which is based on days of inventory.

After this study, a worldwide strategic supply chain initiative, the Advanced Fulfillment Initiative (AFI), was formed. The AMT is at the heart of this initiative, which was deployed to reengineer and restructure the total supply chain to form a virtual enterprise. The output from the tool provided the actual basis for the terms and conditions that PSG applied through AFI.

AMT also improves business-partner relationships. "The Advanced Fulfillment Initiative is viewed as the personal computer industry's leading initiative to redesign the supply chain to deliver optimal serviceability to the customer at minimum cost," says Bob Moffat, general manager for manufacturing, procurement, and fulfillment at IBM Personal Systems Group (Raleigh, N.C.) "In addition to the improved financial returns, we have also seen definitive qualitative benefits."

For example, he cites improved relationships with business partners, "making them more efficient, productive, and powerful in the marketplace." Additionally, Jean-Pierre Briant, vice president of IBM Integrated Supply

Defining the Asset Management Tool

AMT is a cornerstone of IBM's extended enterprise supply chain management. Reaching from the suppliers' suppliers to the customers' customers, it is a modeling and analysis system for strategic and tactical supply chain planning.

AMT quantifies the impact of the uncertainty in demand, lead time, and the supplier's reliability to support decision making. AMT has been successfully applied to solve many reengineering problems. These include channel assembly, inventory/serviceability tradeoffs, direct/indirect business model analysis, and collaboration and value chain integration.

With AMT's built-in optimization engine, the user can perform fast but very deep "what if" analyses that are beyond the capabilities of standard decision support tools. With a simulation engine, the user can perform periodic recalculations of the optimal inventory levels while simulating dynamic supply chain processes and policies. AMT is implemented using a client-server architecture in which the modeling functionality is separated from a graphical user interface.

The Asset Management Tool is built on the following functional modules:

- The *data-modeling module* provides a relational data interface, including product structures, lead times, cost, demand forecast, and the associated variability information. It has a built-in explosion of BOMs and data-reduction capabilities, as well as automatic checks for data integrity.
- The *graphical user interface* combines supply chain modeling with dialogue-based entry of supply chain data. It allows users to build supply networks by dragging and dropping model components such as manufacturing nodes, DCs, and transportation nodes onto the workspace.
- The *experiment manager* facilitates the organization and management of data sets associated with supply chain experiments. It allows users to view and interactively modify parameters and policies. Further, it provides automated access to output data generated during experiments and supports a variety of file-management operations.
- The *optimization engine* performs AMT's main function: quantifying the tradeoff between customer service targets and the inventory in the supply network. It computes target inventory levels throughout the supply network to minimize overall inventory capital while meeting customer service requirements.
- The *report generator* offers a comprehensive view for the performance of the supply chain under study. Among the reports are inventory, fill rates, average cycle times, shipments, and customer service levels. It also generates financial results, including revenues, inventory capital, raw material costs, transportation costs, and activity-based costs, such as material handling and manufacturing.

Chain (Somers, N.Y.), expressed, “We have deployed AMT to assist external companies in managing their supply chains, with effective results.”

AMT quantifies benefits of channel assembly. To Briant’s point, the team used AMT to model the benefits of channel assembly in which business partners stock a collection of components and build machines to order in their own facilities when customer orders arrive. AMT was used to assess the impacts of channel assembly in different product-mix settings.

The analysis helped the division to determine optimal policies for channel assembly. It also has extended the use of AMT throughout PSG North America and European markets and in the detailed supply chains of several business partners. The studies have helped improve the PSG extended supply chain.

For example, Jim Manton, president and COO of Pinacor (Phoenix, Ariz.), acknowledges, “The results that the AMT team delivered on the supply chain analysis have helped us identify opportunities for optimizing the product flow between our companies.”

Further, Mac McNeill, senior vice president of global operations at GE Capital IT Solutions (Cincinnati), explains, “The modeling allowed us to develop a base case using actual end-user customer sales and then to quickly model and optimize many alternatives.” These were based on various levels of GE forecast accuracy, IBM fill rates, transit times, in-bound and out-bound delays, and commonality of parts.

“The optimization results allow us to develop action plans to balance improved levels of serviceability with lower levels of inventory,” McNeill relates.

IBM goes commercial with supply chain analysis tool. Out of the reengineering initiative and the success of the AMT, IBM has introduced Supply Chain Analyzer. It uses the technologies and framework to enable companies to make strategic business decisions about the design and operation of their supply chains that directly impact financial results. The tool enables business and operational policies to incorporate dynamic supply chain evaluation.

GAMING EQUIPMENT COMPANY HITS INVENTORY REDUCTION JACKPOT WITH INVENTORY QUALITY RATIO

For over 10 years, International Game Technology (Reno, Nev.), relied on traditional MRP systems to manage inventories. However, as their markets

evolved from high-volume/low-mix to low-volume/high-mix, the designer and manufacturer of gaming equipment saw inventories rise over \$50 million, inventory turns languish at two per year, and shortages increase exponentially. To turn this situation around, International Game Technology used the inventory quality ratio (IQR) technique to prioritize the biggest opportunities for quick reductions.

“In the past, several programs were undertaken to remedy our inventory problems,” explains Richard Hardcastle, CPIM, manager of material planning. “Each one achieved a degree of success but was quickly replaced with another when business conditions changed.”

The most recent initiative, he notes, was to create a long-term solution. This solution was bolstered by the specific short-term objective of reducing inventory levels by \$10 million before the end of the fiscal year, which was less than four months away.

IQR helps achieve rapid inventory reduction. “The inventory quality ratio is both an approach for managing inventory dollars and a new technique for measuring inventory performance,” explains Gary Gossard, president of IQR International, Inc. (San Juan Capistrano, Calif.; 949-487-5400). The IQR logic first divides inventory into three groups: items with future requirements; items with no future requirements but with recent past usage; and items with neither.

The items in these groups are then stratified into typical ABC-type classifications using their future dollar requirements, their past dollar usages, or their current dollar balances, respectively. A target inventory level or rule is set for each item based on its classification. The balance on hand of each item is compared to the rule, and the dollars of each item are categorized as either active (A1 or A2), excess (E1, E2, or E3), slow-moving (SM), or no-moving (NM). These are the inventory quality categories.

“The inventory quality ratio is the ratio of the active inventory dollars to total inventory dollars,” explains Gossard. In a theoretically perfect situation, the IQR is 100%.

The IQR in application at International Gaming Technology. “The IQR methodology examines every item in the inventory, compares it to dynamic target levels, prioritizes the exceptions based on the dollar impact, and provides performance ratios for each planner and segment of the inventory,” Hardcastle said at a recent Annual APICS International Conference.

Using nominal inventory rules of 4-12-24 weeks' supply for A, B, and

C items, respectively, the initial IQR in June 1998 was 30%. “This meant that 30% of our inventory dollars were active and 70% were tied up in excess, slow, or no-moving items,” Hardcastle explains. Slow and no-moving items amounted to nearly 10% of the dollars, and one category (E2) accounted for 50% of total inventory dollars.

Scoring the “big” hit. “IQR was used to identify and prioritize the biggest opportunities for us to quickly reduce inventory dollars without creating more shortage situations,” he reports. “Interestingly enough, these were not with the slow and no-moving items, but with the \$27 million of Excess 2 inventories.”

IQR provided the week’s supply information for the planner/buyers to monitor and adjust scheduled receipts dates based on assembly requirements and the impact on inventory dollars. “We were able to reschedule many high-dollar receipts closer to their actual need date,” Hardcastle notes. Further, during the initial rapid reduction phase, a consultant, R. Michael Donovan (Framingham, Mass.), also showed company managers how to use the information in IQR to adjust lot sizes and safety stock levels as well.

In the two months prior to fiscal year-end, purchased parts inventories were reduced by \$10 million, a 20% reduction. In addition, the reduction in total inventories in the five-month rapid reduction phase was \$16.4 million, or 31.5%.

Expanding the application of the IQR approach to all planner/buyers and to additional inventory segments. After experiencing the merits of the IQR methodology, the company deployed IQR tools to all planner/buyers. This expanded their ability to use different parameters and material ordering guidelines. “We also began importing the dynamic ABC classifications developed within IQR back into our MRP system so that our ordering policies remained current,” explains Hardcastle.

Further, based on the success of the initial efforts, it was decided to expand the use of IQR to additional segments of the inventory that had been excluded from the rapid reduction phase because of their high mix and relatively low dollar volume. This addition actually doubled the number of inventory items being managed with IQR from 10,000 to 20,000 part numbers.

The not unexpected temporary blip in the improvement trend. “This move increased our inventory dollars and decreased our IQR performance because these additional parts had not been previously managed,” he explains.

“We consider the hiccup that this caused in our inventory performance tracking to be a temporary one and are more than willing to include the additional inventory items in a management tool that keeps us focused on dollars, regardless of the type of inventory,” Hardcastle maintains.

Moving into the continuous improvement phase, and more inventory reductions. The continuous improvement approach that IQR recommends is very simple and is prefaced with a strong, practical suggestion, Hardcastle notes. To avoid stalling out, the approach should be tailored to fit into the normal daily routine of the planner/buyers so that progress is made every week. The majority of the effort should be focused on very few parts that will return the biggest results. “We took this advice and started by attacking two or three parts per planner per week,” he explains.

The first step was to stop the bleeding. “With one of the standard tools in IQR, we reviewed all slow-moving and no-moving inventory that had open purchase orders,” he explains. Within a two-day period they were able to cancel or defer several hundred thousand dollars of material that was no longer needed.

They also used IQR to review their open purchase orders every week and to identify parts with excess inventory already on hand.

Step two: Clean up accumulated inventories. “Because we design all of our gaming machines, we have a very high percentage of unique materials that no other company can use,” says Hardcastle. “We started to look at ‘trapped’ material that could be reworked into something usable, and we sold off several hundred thousand dollars’ worth of electrical components.”

Even though they had a “reasonable” engineering change order process, obsolete inventory did work its way back into stock. Therefore, they used IQR regularly to catch this inventory and to reroute it accordingly.

Step three: Focus on managing the supply chain. “We embarked on a process to manage the supply chain so that the material flow into the plant was sequenced with the week’s supply recommendations from IQR,” he details. By changing the planning parameters in MRP to reflect the recommended weeks-supply rules in IQR, they have been able to change delivery schedules with the suppliers.

“We now specify more frequent and smaller deliveries, which has driven inventory down,” he notes. A critical part to making this work is the policy implementation of material ordering guidelines.

This document provides instruction on the use of planning parameters such as safety stock, over buys, lot sizing, and other factors that affect inventory. It further provides horizons that planner/buyers use to make long-term commitments to suppliers.

Moving beyond the “low hanging fruit.” A major part of the \$16.4 million reduction during the first phase was a 53% reduction in Excess 2 inventories, which had the additional advantage of improving cash flow by over \$14 million. Simultaneously, they were able to reduce both the balance on hand and the open order value for items without requirements by nearly 50%. They also reduced the value of open orders scheduled to arrive early by 60% and the open orders for excess inventory by 65%.

After five months of rapid inventory reduction, most of the low-hanging fruit has been picked. Only a few months into the continuous improvement phase, the results remain encouraging. “In the past 10 weeks we have reduced inventory by an additional \$3.8 million and have increased our IQR by 1.5% on a larger base,” Hardcastle details. The IQR for A items has increased from 44% to 52%; B items have remained constant at 63%; and C items have improved from 46% to 49%.

VERMEER MANUFACTURING GOES “LEAN” AND FOCUSES ON INVENTORY REDUCTION

With the change to a “lean” corporate culture, there was a significant emphasis on inventory reduction at Vermeer Manufacturing Co. (Pella, Iowa). The objectives carved out by management directive were stringent:

- Elimination of all warehouse space
- Raw material inventory reduction of 50% per year minimum
- WIP inventory reduction of 60% minimum
- Finished goods inventory reduction of 75% minimum

Why the need to reduce inventory? Vermeer management made a commitment to grow at a rate of 15% to 20% per year without building any new buildings or investing in any more racks. “We were going to achieve our objectives with what we already had in place,” explains Randy L. Gard, vice president of global planning (rgard@vermeermfg.com). That objective has

led to a distinct change in inventory philosophy at the builder of construction, environmental, and agricultural equipment.

“In the past, inventory reduction was an operational issue,” maintains Gard. “Today, there’s a shift away from the former position.” Part of the reason is Vermeer’s sheer size and new philosophy. At the Pella site, Vermeer manufacturing facilities are located on an 88-acre campus in eight plants, all of which operate autonomously. Thus, the inventory reduction initiative became very focused.

For example, one of the primary reasons for the inventory reduction is to free up floor space to allow for future growth in other areas or products. “Our warehouse space will go away,” affirms Gard. “We will be building product in the former warehouse space, and no longer store anything in there. To date, we’ve taped up close to a quarter of the former warehouse floor space.”

Point of use storage preferred. Inventory will now go to the point-of-use, on-the-line concept in each factory. “What we’re doing is carrying five days of inventory on the shop floor instead of having quantities in the warehouse,” Gard explains.

A benefit, he notes, is that the cash previously invested in maintaining and storing the inventory in massive warehouses now “hits the balance sheet and instead is available to fund future growth, acquisitions, and new products.”

Quality is also a major concern. Gard relates that “lower inventory levels help to improve the product quality, as the fewer parts there are in stock, the better the control.” There is less chance of building obsolete or excess inventory.

Less inventory will reduce Vermeer’s throughput, or lead time. “Our initiative for this year, from the time the customer orders the product until we ship it, is to cut it in half,” he notes. “It’s a formidable challenge,” he acknowledges, “but we’re working to do it with less on-hand, Vermeer-owned inventory.” Part of the initiative requires the “full integration of the suppliers into our supply chain.”

Vermeer’s approach to inventory reduction. Gard outlined their initiative, which places increased responsibility on suppliers. For example, Vermeer invited their suppliers in to discuss their goals, both current and future. “The more you know and the more they know, the better the opportunity to draw

down inventory,” he explained at a recent NAPM Supply Chain Management Conference.

“To be successful, you have to be willing to talk about numbers—even financials—with suppliers, how much you plan to grow and what it means to them,” he maintains. “We went so far as to tell them what model and what options, and also gave them a forecast for every model we have and told them we would be updating it weekly.” In practice, Vermeer e-mails a report to its suppliers at the end of every day notifying them of the day’s production.

“We tell them, for instance, that we built eight machines today, instead of the planned nine or seven, as the case may be,” Gard explains. “This advises them to adjust the incoming shipment so we don’t overstock or run short.”

Vermeer also holds five-day kaizen events with cross-functional teams, which include the supplier representatives, in an effort to gain additional input for inventory reduction, cost improvements, and the like. “We brought in the suppliers, and they spent time in our plants learning what we do, how we build the products, and how our products work,” he explains. This exercise helps to convert the supplier sales people into inventory and engineering support people.

Inventory metrics keeps all parties on target. Vermeer also instituted an extensive measurement program. Included are calculating inventory turns based on cost of goods sold and measuring actual throughput time in minutes rather than days or weeks. Additionally, they review and chart forecast versus actual planning accuracy and track accuracy of low lead times on components.

Gard is quick to share another inventory reduction technique: the dust/rack metric. “We take all of our buyers out into the plants and ask them to look at the racks, shelves, benches, and tables, and ask them to tell us the part number that has the largest amount of dust on it,” he relates. “Whatever parts have gathered the most dust probably means that we have too much of them in stock, so we tell them to deal with it. The buyers have carte blanche.” In some cases, the suppliers take it back for a restocking fee. “Based on our cost of carrying the inventory, we were able to pay the restocking fee and still come out ahead,” he mentions.

In the short period of time since the program has been implemented, the results have been really impressive. Vermeer is a private company that does not release financial data publicly. However, at the close of the last fiscal year, the inventory reduction efforts generated multimillion dollar

Vermeer Moves to Integrated Supply for Its MRO Inventory

Vermeer recently entered into a five-year (with options for renewal) single-source arrangement with Don E. Williams Company (deWco) for its MRO inventory. According to Don Adams, vice president of deWco, “Previously, Vermeer owned all the inventory in the four large tool cribs, all the bench stock, and the inventory kept in the ‘little’ tool cribs on the shop floor.”

Now deWco owns all that inventory, and Vermeer pays for it as it is used, or even after it is used, he notes. One specific that Adams related at the MRO/PRO 2000 Conference (Institute for International Research) was that under the agreement, deWco added and manages 16 to 20 point-of-use “mini” tool cribs that are located on each focused plant shop floor. “Our personnel come on site, manage them, and take care of the inventory,” he explains. Over time, it is expected that this arrangement will expand.

Vermeer will reap still additional benefits from its inventory reduction initiative.

savings; the parts center has been converted into consignment inventory (see sidebar), and all safety stock is now carried at supplier locations for “seasonal bumps in the road.” In addition, the cash flow has improved significantly, and growth has been achieved without requiring new brick and mortar.

SIMPLE, SMALL STEPS CREATE BIG INVENTORY CUTS AT MILGO SOLUTIONS

When Racal Electronics PLC announced its decision to divest its Racal-Datcom division, the only directive from top management was to sharply reduce inventory. The small but determined materials group did just that—reducing inventory by 50% and still counting—by using a series of tools and instituting a series of actions that might also serve others who are looking to slash their inventories.

Bringing reasonableness to the forecasts. “Like most service-based companies, we tended to overforecast,” says Donna Aubuchon, materials manager, and Mac Borgendale, CFPIM, master scheduling specialist, at the successor organization, Milgo Solutions, Inc. (Sunrise, Fla.; www.milgo.com). “We had implemented sales and operations planning, but until the crisis we still tended to forecast more at the unit level than we forecast as total sales dollars.”

The forecast was forced down to the level of historical sales and then

again to expected sales. “We accepted that this might affect some customers, as we would no longer have inventory to cover large orders in one or two weeks,” Aubuchon and Borgendale explained at a recent APICS Annual International Conference.

Compressing MRP horizon from one year to six months. The second action the materials group took, after reducing the forecast, was to tighten the MRP horizon. This immediately stopped the purchase of items needed beyond six months. “Since we had the personnel to handle the inefficiencies, we also instituted a review of all purchase signals, again reducing total purchases,” they reported. “We expected to absorb inefficiency as a cost of inventory reduction.”

Instead, as the buyers had fewer open purchase orders, they received fewer reschedule messages, and their workload went down. “As we analyzed purchase signals, we found inflated lead times, unnecessary lot sizing parameters, and old, invalid requirements in our MRP system,” they explain. As they fixed these, purchases and purchase signals continued to drop. After one year, they have returned to the one-year MRP horizon, but they still review all purchase signals.

Reducing manufacturing lot sizes has an impact on WIP. “At first we reduced lot sizes because we were uncertain about the future,” they offer, “but then we reduced them because the forecast was down.” As they reduced lot sizes, they also effectively reduced the total work in process, making the factory more efficient and allowing further reductions in lot sizes.

“We also found that, as a by-product of the lot size reductions, we were able to reduce manufacturing lead time,” they explain. This not only reduced inventory through reduced WIP, but it also made the factory more efficient and responsive. Lead times are down about 50%, and Milgo now can build from components in one to two weeks. “We no longer need to stock finished goods or subassemblies,” they note.

Getting control of the 100,000-plus parts inventory. With over 100,000 parts in inventory (about 20,000 active), a significant commonality of parts, and a 12-year old MRP system, part classification of inventory was not an easy project. However, with the divestiture announcement, Aubuchon and Borgendale realized that they had to initiate a project to classify the inventory by product.

“Our first analysis was done using a Pareto analysis of top-dollar items,” they explained. “We analyzed, by hand, the top items, looking at MRP and

the BOM where used, and then extrapolated an estimate to the entire inventory.” However, they needed a solution that they could duplicate on a regular basis. In addition, they wanted to classify all of the parts. They knew how to extract stock status information from the MRP system, but the file was too large for the state-of-the-art spreadsheet software. Instead, they used available database software to create an index of parts to product family.

“We used software that we already had, and as we slowly perfected our reports, we also continued to classify parts working down the Pareto list,” they reported. “Each step down the descending dollar list yielded less result for more effort, but it also required less accuracy.”

A system to identify parts and inventory dollars. It took about four months to finish, and now it takes about two hours per month to maintain. With the classification index, they are able to identify parts and inventory dollars to specific families. This information became critical as families were either sold or discontinued. “We also are able to identify inventory dollars to the master scheduler [planner] of each product,” they explain. “Inventory control became the responsibility of the employee making planning decisions, and that individual now has visibility to understand the impact of his or her decisions.”

While creating the index, they found a number of items that did not actively relate to any product family. This became their obsolete family, for the first time enabling them to identify what is obsolete. The obsolete family list has made it possible to salvage or scrap a significant chunk of inventory, they note.

How safety stock was cut by almost 90%. “Like most firms with high service goals, we kept a lot of safety stock,” they acknowledged. With 20,000 active parts, it was hard to manage safety stock levels. “The need to safety stock some components for assembly-to-order also made it difficult to identify invalid [dependent demand] safety stocks,” Aubuchon and Borgendale note.

Four factors enabled them to reduce their safety stock levels:

1. The first was the management directive to reduce inventory. This led to an immediate review and an “immediate, common sense reduction” that averaged 50%.

2. With management willing to accept longer lead time on large orders, the safety factor went down, allowing reductions in safety stock. “Quoting a longer lead time on a large order was no longer career-threatening,” they declare.

3. As manufacturing lead times went down and factory on-time deliveries went up, the standard deviation of demand during lead time went down.
4. The critical factor was the index of products, pointing safety stock to the family and master scheduler.

After one year, two major reviews of safety stock, and weekly reviews of purchase signals, safety stock is down about 90%, representing a savings of \$2 million.

The impact of product rationalization on inventory reduction. Typical of high-mix companies, Milgo Solutions finds it difficult to discontinue any product. “We also find it easy to add special configurations for one or two customers,” they reveal.

A major effort was made at the time of divestiture—and it continues today—to rationalize the product offerings. They set out to determine three numbers for each family. They sought the annual revenue, the inventory in dollars, and the number of printed circuit assemblies.

After two months of developing data, they found that half of the printed circuit assemblies, half of the inventory, and half of the overhead supported only 10% of revenue. “We found that inventory levels are a function of the number of printed circuit assemblies, and not a function of the revenue generated,” they declared.

The results, in just a year, have been astounding. “We are still in the process of developing future strategy and still taking small steps to continue our improvement,” Aubuchon and Borgendale offer. However, they do note the following achievements to date:

- Inventory has been slashed by more than 50% during the last year, representing a savings of \$30 million, and inventory continues to drop by almost \$1 million per month. Only about 20% of the reductions were due to scrap of obsolete inventory. The rest was used to build product for customers.
- The number of product families is down from about 80 to 24, and the number of printed circuit assemblies being built is down about 50%.
- Customer service levels have increased from 88% on time to 98% on time, and the response time is down approximately one week.

Chapter II-4

Technology / Computers / Software

EXCLUSIVE SURVEY: NEW TECHNOLOGIES FLEX THEIR MUSCLES FOR INVENTORY REDUCTION

At long last, the rhetoric of inventory management technology has become reality. According to our latest reader study, an overwhelming number of respondents—more than three in four—report that they have installed, are currently using, or are planning to introduce new hardware and software specifically focused to manage inventories better.

Encouraged by the dividends from previous technology-oriented investments, inventory managers are spending more on these solutions. Greater inventory turns, lower inventory levels, faster inventory velocities, and higher inventory accuracies are just some of the justifications cited when seeking additional funding for technology.

It must be working, as *Inventory Reduction Report* reader surveys find that technology-oriented practices are gaining in preference at a greater rate than is any other category. For example, installing new inventory management software is up more than 53% compared to two years ago. Bar coding, radio frequency (RF), and automated ID systems applications have shot up almost 25% in just the last year. In addition, more inventory management professionals are adopting vendor managed inventory (VMI) and quick response practices and are upgrading or installing new warehouse management systems (WMSs).

Following are some typical reader responses:

- “Our previous system was archaic, so we purchased new software (JDA/E3) to manage our inventory, forecasting, and several other related

functions that impact on our inventory,” says the finance vice president at a large retailer.

- “We are now using a new inventory control system along with DRP software and other processes to monitor lead-time components to better control the product flow,” explains the director of logistics at a large producer of wireless messaging products.

- “We’ve developed analysis programs that will better enable us to determine and monitor our inventory position by category and SKU. We anticipate this tighter control of order quantity will have a significant impact on our current safety and cycle stock,” advises an inventory analyst at a large manufacturer of consumer electronics.

- “Our emphasis has been in making improvements to our existing warehouse management system,” reports a vice president of a large transportation/distribution provider. “The updating involves adding RF capabilities so our management is immediately notified when a warehouseman has an inventory problem.”

It is still predominantly a “big” plant thing. However, a lot of interest in new technology has been reported also among those employed in facilities with fewer than 500 employees. While current installations may lag in midsize organizations, these survey participants are among the most active in planning future installations.

Many survey respondents shared their experiences in greater detail.

Decrease raw material inventory. Many of the respondents detailed their technology selections and provided great insight into where they are directing their capital funding and into the benefits that they have received. For example, a materials manager at a midsize manufacturer of bearing systems explains, “By implementing an updated software system, we had more flexibility in utilizing different planning and procurement methods. Use of reorder point purchase planning has helped us to decrease raw materials in some areas by more than 50%.” She also reports that work in progress (WIP) inventory is down “significantly” because of changes in manufacturing processes, the institution of kanban practices, and the elimination of safety stock.

“We implemented demand chain principles,” explains the director of purchasing and logistics at a small maker of promotional materials. “We feed our production plans into a materials deployment planning tool that allows

our deployment planners to then pass along the data to the supply base,” he explains. “Not only has this dramatically reduced our inventory levels, but it also has led to a vast improvement in the quality of our materials as limited storage time reduces the potential for crushing, bending, and warping.” In addition, they have developed and initiated an inventory location system, an inventory tracking system, and daily cycle counting procedures that have improved inventory accuracy to 98% since launch.

Improve forecast accuracy to optimize inventory levels. “We are in a major transition,” says the material vice president of a steel distributor. “Our long-term objective is to increase service levels by having stock on the shelf, ready for customer release. However, at the same time we will be driving down our raw inventory.” Working toward these goals, the company is now in the implementation phase of an inventory optimization software program. “We were looking for a mechanism to more accurately predict sales and part number forecasts,” he notes. “We evaluated several different packages and selected the one with a projected payback of 18 months.”

Meanwhile, a business/supply planner at a midsize chemical processing facility describes his major challenge as trying to reduce year-end inventories when that is the highest inventory point in the year because of seasonal and winter weather contingencies. He outlines the solution: “New inventory setting tools automatically feed a supply/demand planning tool that develops long-range inventory targets. That, in turn, automatically feeds a scheduling tool that controls inventory to the target levels throughout the supply chain.” Forecast demand is used as the basis for setting inventory as well as the standard deviation of the last 12 months of demand at the SKU level. The data and statistics are automatically generated on a demand management tool each month, he adds.

“We installed PC-based forecasting software to improve our projections for aftermarket purchases,” says the director of business coordination and logistics at a major manufacturer of bearings. “We’ve been able to reduce aftermarket inventory by 7% and have cut our slow-moving inventory by 15%.” The manufacturer now plans to extend the application beyond the aftermarket requirements and test an advanced planning system.

Better management of on-hand balances. The director of materials management at a health care services organization responds, “Our acquisition of inventory software in concert with our migration to integrated material management/financial applications has enabled us to acquire tools to better

manage set/reset order points and on-hand balances. Also, we now are better able to assess lead-time requirements by product and by vendor to minimize our inventory levels.”

Implementing enterprise resource planning (ERP) systems. “We developed a core business team of managers to address our business systems and conducted kaizen activities,” reports a production control manager at a large producer of automotive electronics. “Since installing our ERP system, along with new MRP II software, we’ve seen an increase in delivery performance and have reduced our line stoppages due to materials shortages.” They also have a goal of reducing inventory by \$9 million by the end of the year. “We’re well on target toward accomplishing that,” he predicts.

The business manager at a large manufacturer of telecommunications equipment says, “We implemented an SAP system at our manufacturing and distribution facility to increase inventory visibility and automate our production planning and purchasing activities.” He acknowledges that raw material inventory increased 20% because of a problem with the new system that handles consigned stock, and finished goods inventory was up slightly (10%) because of “poor service performance as a result of system conversion.” However, they are now starting to refine the range of coverage and safety stock levels. There’s also been a headcount reduction in the materials planning department.

The materials manager at a small producer of industrial laundry equipment credits the implementation of an ERP system and the continuous review of safety stock, order quantities, and lead times for reducing finished goods inventories by 25% over the past three years. “Our ERP system drives about 95% of product replenishment, which eliminates the emotion from ordering and time-phased replenishment,” he expresses. “The reports help us to better identify slow and nonmoving inventory, but we still need to improve our process to deal with engineering changes.”

“We’re in the process of implementing a fully integrated ERP system with warehouse management, transportation management, and bar coding software modules,” says an operations specialist at a large petrochemical facility. “We believe, when complete, we’ll have global visibility of inventory, as our corporation has plants producing similar or same materials worldwide.”

A large manufacturer of diagnostic medical ultrasound devices installed its SAP system in May 1998. “We are still in the process of refining the system and educating individuals on how to use the available data,” the senior

director of production planning and distribution shares. “Disciplines are still not 100% but are getting better.”

“We have put in place a PeopleSoft ERP system with enhanced reports and lead-time factors,” states the senior manager of global logistics at a large producer of semiconductors. “Our major improvement has been in gaining real-time information.”

“Currently we do not have a formal integrated system, as our inventory is managed by a series of stand-alone systems,” reports a purchasing and inventory control manager at a midsize maker of truck bodies. “We’re in the final phase of selecting and implementing a materials resource system that will aid in managing engineering, manufacturing, and inventory, as we’ve been growing at a 25% annual rate for the past few years.”

Use electronic data interchange (EDI) to improve forecasting efforts. The supplier manager at a small producer of weighing scales shares that since installing an EDI system, they have “better control of our A, B, C, D, E, and F inventory parts, and gain earlier visibility into potential obsolete inventory.”

Just-in-time (JIT) and bar coding combine to cut inventory and employee levels. “In one division, we have implemented more JIT work projects using distributor stock, delivery, and job kitting,” explains a vice president at a large utility. In addition, they have moved to bar coding technology for receiving, issuing, inventory counts, and tool room applications. Further, the company is piloting VMI for fast-moving items. With the improvements, inventory has been reduced almost 60%, and full-time equivalents for company warehouse workers have decreased 20%.

Reduce finished goods and raw materials when sharing plans with customer. “We’ve moved to automatic data collection and are in the process of getting all of our vendors to bar code their materials,” notes an MRP II manager at a large packaging manufacturer. “We interfaced an RF system to our MRP II system and use it for receiving and locating purposes.” He adds, “We’ve worked on improving the accuracy of production plans by end item, which when blown through the MRP system creates a better suggestion for raw materials.” Additionally, by sharing plans with customers and including their inventories, “we’ve reduced both finished goods and raw materials inventories.”

Examining all the variables in the supply chain. “We use an inventory target-setting tool that factors in all key supply chain variables,” notes a customer

service supervisor at a midsize maker of lube oil additives. “Our demand management, supply/demand planning, and plant scheduling tools have reinforced the business process reengineering of the supply chain,” he adds. On-time performance and supply chain costs have improved substantially along with an inventory reduction of more than 20%.

Heighten ability to identify slow-moving stock more quickly. “We implemented an improved inventory management software solution to forecast slow-moving items and apply appropriate safety stock distribution to achieve higher service levels,” maintains an inventory and customer service manager at a major manufacturer of earth-moving machinery. To date, finished goods inventory has fallen by 5%.

The director of logistics at a large medical supplies manufacturer is using the “capability of our warehouse management system to identify product that has not sold in six months and those that have more than six months of supply in stock.” This has helped to eliminate a lot of “non-value-added inventory.” The savings he reports translate into a 20% reduction in space requirements and 10 days of supply reduction. He credits the “bottom-up forecast improvement at the weekly, DC [distribution center], and SKU levels.”

The warehouse supervisor at a midsize maker of maintenance equipment reports, “We added a module to identify and extract part numbers that do not have any activity during a specified period.” This has helped in obsolescence analysis. “By doing this, the quantity of part numbers to be analyzed is reduced, saving money,” he says.

Tighten control and improve accuracy during triple-digit sales growth. “We’ve had a 100% increase in our sales but wanted to limit our additional raw material, WIP, and finished goods stocks,” offers a purchasing manager at a small manufacturer of engineering wood products. “We’ve implemented PeopleSoft version 7.5 for purchasing and accounts payable,” he explains. “The system is more user friendly and allows for better inventory accuracy and control. Since this is an enterprise-wide system, all of our plants and locations have access to the same vendor base and common item stock numbers.”

Gain control of inventory when business declines. “We installed an ADP Distribution 2000 inventory management system,” explains a materials manager at a midsize wholesale distributor. “This has helped us not only with inventory management but also with forecasting and purchasing. It has been

instrumental in reducing inventory when our business began to slow down,” he describes. “The system adjusted safety stock levels, demand, and forecasting time cycles.”

Couple high-tech system with traditional methods to review inventory opportunities. “Inventory control is a significant priority for our planning group,” states the director of materials management at a midsize producer of pharmaceuticals. “We’re operating with 50% higher raw materials and WIP inventory levels so we can support a 250% increase in plant throughput. But we’ve been able to decrease finished goods inventories by 25% due to reduced plant cycle times.”

Additionally, they use an SAP system, coupled with traditional methods of A, B, C analysis, suggested order quantities (SOQs), and monthly data reviews to keep their inventories within control.

Replace a manual system to achieve savings. “We had a software system that still required a large amount of manual effort,” explains a purchasing manager at a small manufacturer of paper products. “We have since added new software, and while it’s difficult to put actual savings on it, we believe that we may be freeing up three to four full-time people.” Further, he advises, “We’re working a lot closer with our suppliers, electronically sharing forecasts and production schedules in an effort to further reduce lead times and increase our inventory turns.”

“We have had problems with vendor purchasing schedules and as a result do not know when to order,” explains a purchasing manager at a small industrial distributor. “Our solution was to develop a day-to-day computerized calendar of purchases for each supplier based on our parts-per-day basis. This calendar has solved our inventory control and service level problems,” he notes. Currently, the company is investigating an update to the automated purchasing system.

A Lawson inventory control, accounts receivable, account payable package was installed at a midsize manufacturer of wood doors. “There was no inventory control system in place before, and we essentially guessed on our inventory,” the purchasing manager acknowledges. “Since installing Lawson’s version 6.0, we’ve been able to reduce overall inventory by 30% in two years. We now can track special parts for shorter lead times.”

A controller at a small maker of photographic equipment tells of their J. D. Edwards inventory control system. “It has allowed us to better control our inventory levels. Also, we have smaller cycle count variances and an easier time tracking variances.”

Using bar coding technology to improve finished goods inventory accuracies. “Our bar coding application has made a definite impact in increasing the accuracy of our finished goods inventory,” says the cost/inventory control manager at a midsize furniture manufacturer. “There has been a tremendous decrease in labor dollars and manual errors that were formerly associated with the transactions and time spent expediting and searching for product.” Further, she explains, “We currently offer over 100 fabric selections to our customers. These fabrics have high minimum-order quantities and long lead times. Forecasting is difficult due to the lead times and changing trends in selections.” The organization plans to add a new position of inventory/materials manager, which will also include a forecasting responsibility. “Since we are putting more responsibility in this area, we’ll be looking into forecasting software packages that will help us to further reduce our high levels of fabric inventory.”

Adding a parts allocation module. “It has eliminated an ‘unattached’ parts allocation program and provided a real-time inquiry as to the status of open production orders,” explains a materials manager at a midsize producer of valves and fittings.

Two-way VMI practice levels inventory. “We’re a believer of vendor managed inventory, and we practice it with both our suppliers and customers,” explains an inventory management director at a steel minimill. “It has enabled us to lower both our raw materials and finished goods inventories.” In addition, he tells of using computerized inventory level control techniques to “capture 35% of the existing merchant bar customer base by guaranteeing 100% order fill rate with no stockouts. We’ve seen a 10% time reduction in order entry and a 5% freight reduction since starting this practice,” he explains.

WMS installation enhances loading accuracy. “The capacity of our finished goods warehouse is only three days of production,” explains the warehouse manager at a small builder of wood products. “The new warehouse management system has been responsible for helping us to achieve a 15% reduction in finished goods inventory, along with shrinking our raw materials requirements by 30%.” The WMS installation also links to their order entry system and includes RF scanning, which updates production and inventory tracking, from order entry to load sequencing cargo. “This arrangement has generated 5% faster dock times and 3% better loading accuracy,” the manager details.

A lead person in inventory control at a major manufacturer of material handling equipment “implemented a warehouse management system three years ago to better utilize the cube within our distribution center.” To date, inventory accuracy has increased 15%, and space utilization has improved 30%.

Upgrading existing MRP systems. “We are in the process of converting our Unix-based MRP system to a Windows NT-based system,” says a planning and logistics supervisor at a small manufacturer of electronic equipment. “This will allow us greater flexibility, improved efficiency, and easier management of inventory data.”

“We switched to a new scheduling software, called Rhythm, from i2 Technologies,” answers a materials manager at a large manufacturer of office furniture. “Before setting up the new software, we ran a traditional MRP through our mainframe in which materials were based on weekly requirements. Rhythm has taken us from weekly to daily requirements,” she explains.

MRP II software minimizes inventory increases. “Our sales have increased by more than 20%, yet our overall inventory increase is a mere fraction,” maintains a production planning manager at a small producer of natural foods. “Forecasting and safety stock levels have been kept to a manageable level,” he notes, pointing out that they are “still in the early stages of MRP usage.” Currently, they are building the correct mix of inventory to maintain high availability without stockpiling product, the manager shares.

“By installing Alliance MRP II software, we were forced to organize our inventory by developing a simple part numbering system,” says an administrative/inventory manager at a small maker of components for satellite communication systems. “Now our inventory is always at least 95% accurate by count, and we’re more efficient in tracking inventory with our subcontractors. It also saved us from hiring an additional person.”

The future: more MRP/ERP integrations. “One of the most successful inventory management solutions we have witnessed is in implementing MRP/ERP systems,” declares a management consultant with an extensive supply chain management practice. “From our experience, we have seen that better-managed inventories allow for more opportunities to reduce total supply chain cost without shifting any cost to other parties.” He explains, “This is an enterprise-wide effort, and not relegated only to inventory man-

agement. The most important step is to understand the process, then simplify it before automating.” For those considering such an approach, the consultant estimates that the project takes from four to eight months to complete.

Not now, but in the future. A number of readers acknowledged not making any recent upgrades or new systems installations. However, they did emphasize that changes were under consideration or in planning. Among the more common replies were the following:

- “We’re looking into bar code applications. Installation is planned for midyear and should facilitate speed and accuracy of inventory management transactions,” offers a production control manager at a midsize producer of door controls.
- “We have a program that will be installed during the third quarter that will allow us greater flexibility in reviewing inventory from several different aspects,” explains a logistics director at a small maker of medical devices.
- “We will be installing a new forecast system during 1999. We want to take advantage of real time change versus monthly mainframe change, and we believe we can then make some significant and lasting inventory reductions,” describes an inventory control manager at a small producer of air filters.

EXPERT ADVICE ON INSTALLING INVENTORY SOFTWARE IN SMALLER FIRMS

Many small to midsize organizations have purchased, or plan to purchase, WMSs, inventory management software, or enterprise solutions. However, smaller installations are a relatively new and untried market segment for many of the software vendors. Therefore, individuals in these companies and software vendors alike are not fully aware of the unique problems that size can present to complicate implementation and threaten success, according to one leading expert.

“Implementation challenges are often daunting and may encompass various issues, from software selection and scalability, to methodology and mindset, people, and personalities,” describes Jay Taylor, CPIM, executive director of professional services at Macola Software (Marion, Ohio; www.

macola.com). He reviews nine specific challenges that await the inventory management professional when selecting a software solution and provides some guidelines that should be considered to reduce the angst.

Challenge #1: Scalability of the software solution. “One problem small firms experience in buying packaged solutions is that the software is not really geared to the size and scope of their business,” Taylor explained during the “IT in the Enterprise” track at National Manufacturing Week. “One size does not fit all.”

It is only logical that applications designed to meet the needs of global companies will have advanced capabilities and complex features that a smaller firm may never need and should not have to pay for, he explains. “Technology ‘overkill’ is not only more costly to begin with, but will likely prove to be more complicated to implement and configure in a small enterprise, and will definitely cost more over the long haul for maintenance and upgrades,” Taylor notes.

It makes much more sense for small to midsize organizations, he advises, to source proven solutions scaled to their specific needs, with the flexibility to upgrade and expand as business needs change and grow.

Challenge #2: Streamlining implementation methodology. Large software vendors and systems integrators serving large clients have devised effective implementation methodologies comprising hundreds of individual steps and milestones that take at least a year. This prolonged implementation is far beyond the scope of smaller companies and is totally unacceptable.

A small organization needs to get the job done in far less time. However, the general framework will be similar to that used in large implementations. The steps include mapping out the plan, defining the scope, securing management commitment, modeling the processes, developing the pilot, converting the entering data, and testing comprehensively. Each of the elements can be simplified if a software package of the right size has been chosen.

“Most software vendors provide rapid implementation tools and templates that enable fast, easy configuration without customized code, speeding implementation and ROI [return on investment],” Taylor assures.

Challenge #3: Setting realistic expectations. Most small companies do not have an information systems (IS) department, and usually a single employee fills the role. The people involved in defining the business processes and en-

tering data are the same people who will be using the system after it is installed.

Given this scenario, it is essential to establish open, honest communications among all concerned right from the start. This includes company management, key employees, system users, the software vendor, and business partners or integrators. “It might also be advisable to have an experienced consulting partner who can act as facilitator, mediator, coach, and cheerleader through the rigors of implementation,” Taylor suggests.

Challenge #4: Allocation of resources; not just the integrator’s job. Securing the commitment of management and enthusiastic buy-in of users is a key element of any successful implementation. Taylor also notes the increasing trend among companies to ask for a consultant’s guarantee of a successful implementation and even link compensation with guaranteed results.

“This trend is commendable, so long as the buyer doesn’t abdicate its own responsibilities, a situation that tends to occur more in smaller companies, where personnel resources are already stretched,” he warns. “The company management or project steering committee has responsibility for ensuring the people assigned to the project will be available, motivated, and focused, with no political maneuvering or infighting.”

Challenge #5: Overcoming the fear of change. Handling fear and insecurity is a task best performed by leaders with change management and project management skills. They will involve users in the implementation process and provide frequent reassurance that using the system effectively is doable given time and training. “Once it becomes demonstrable that the system will make many of their tasks much easier, most employees will ‘buy in’ and become enthusiastic supports,” Taylor notes.

Challenge #6: Mapping out key business processes. When building the new process model, it makes sense to choose the embedded processes and templates that are most closely aligned with the business. Companies lacking experience in process definition can usually turn to the technology partner for recommendations based on experience and industry best practice.

Because smaller companies may not be familiar with advanced manufacturing technology and concepts, more pressure and responsibility is placed on the implementation partner to configure the application properly

and assist in aligning processes. Training users in the application's operation and maintenance is also critical and must not be overlooked.

Challenge #7: Technical issues—data conversion and disparate systems. The good news is that small companies do not have as much data to deal with as do larger ones. The downside is that their data are seldom organized in one repository to provide streamlined data conversion.

In many cases business processes are performed manually. In other situations there may be a homegrown proprietary system or a series of disparate functional systems from which data must be extracted, cleaned, and converted. "Ample time must be allotted for these tasks if the new system is to use the data effectively," Taylor explains. Another key element is to make sure the data are accurate.

Challenge #8: Tendency toward taking shortcuts. The process-modeling phase is typically the longest and most difficult aspect of an implementation, and it is the most critical to success. "Smaller firms often have to be sold on this concept, since their experience with off-the-shelf software is to simply install it and run it," he notes. With enterprise applications, running the software without accurately modeling the processes can be disastrous.

The challenge for integrators is to convince the individuals in smaller organizations to suppress their ingrained "we'll do it ourselves" mentality, to slow down and take the time required to model the processes, develop the pilot, perform parallel testing, and make adjustments. Because of limited resources and a strong desire not to disrupt the business, many small companies often set an arbitrary due date without allowing adequate time for fine-tuning, which may take days or weeks.

Challenge #9: Shortchanging training and technical support. "It is critical for management to budget for thorough user training, especially in small companies without internal IS resources," Taylor emphasizes. Whether training is classroom-based or hands-on, on-site or off-site, the important thing is not to shortchange this very important process.

"Adequate training in the use and maintenance of the new system will pay dividends in the maximum utilization of its features and functionality, and offer a high level of comfort and confidence for users," Taylor assures. It is also helpful to have the technology partner be present for the switchover from the old system to the new, and to return for a few days later to ensure

that the system is working as expected and to assist users who are performing periodic tasks for the first time.

“These are major steps that demand extra support,” Taylor insists. “Demand it.”

GET READY FOR THE APS REVOLUTION IN YOUR ORGANIZATION

Advanced planning and scheduling (APS) is the current “hot” technology in enterprise software. Inventory managers are taking a close look at it because it includes the full spectrum of enterprise and interenterprise planning and scheduling functions. John Bermudez, group director of supply chain management at AMR Research, Inc. (Boston; www.amrresearch.com), maintains, “APS allows the development of new supply chain processes, reducing cost and inventory while improving customer service.”

What is APS, really? According to Bermudez, “APS utilizes new planning and scheduling techniques that consider a wide range of constraints to produce an optimized plan that makes the best use of available material and plant capacity.” This enables the business to meet such objectives as minimizing total cost (often from inventory and setup reductions) and maximizing overall plant operations, he says.

Sara Gillam, CEO of Intuitive Manufacturing Systems (Kirkland, Wash.; www.mrp9000.com) defines APS as a planning system that combines MRP and capacity requirements planning (CRP) to offer available-to-promise and capable-to-promise scheduling options. However, she and other experts agree that many different definitions arise beyond that.

For example, Rami Batlevy, manager of systems and processes for Raytheon Systems Company (El-Segundo, Calif.), agrees: “APS is a pretty loose term that covers a lot of applications.” He listed some of them at a recent APICS Annual International Conference:

- *Long-term strategic planning and supply chain network design.* This includes decisions about how many plants or distribution centers there should be, which market they should serve or what products should be made to resolve conflicting objectives like customer service, cash flow, and revenue margins.

- *Demand planning and forecasting.* This tool can be used to collaborate, coordinate, and communicate a coherent and repeatedly updated sales forecast, including the impact of promotional events, and to consider the enterprise constraints. This can be done intracompany (marketing and production) or intercompany as a collaborative effort of the supply chain.

- *Resource utilization.* APS optimizes the use of on-hand materials and constrained capacity, overriding MRP to obtain optimal results. Objectives may be minimum deviation from the schedule, maximum customer service, maximum work on the floor, increased short-term deliveries, minimum inventory, improved cash flow, or a balanced mix of several of these objectives.

Know what you're getting when selecting an APS. “When selecting an APS system,” Gillam warns, “it is important to know each vendor’s definition of exactly what their APS does, as the label of ‘APS’ is simply no guarantee of certain functionality.” At National Manufacturing Week, she recommended that the following questions be asked of each vendor:

- Does the system create an optimized plan based on orders entered?
- Can the system fit new orders into the existing plan? Is this the only way it can be done?
- Is the APS a linear, mixed integer linear, or heuristic model?
- Are Gantt charts provided? Are they interactive?
- Most importantly: What is required to implement the system? Is it a “configure it yourself” or a standard out-of-the-box implementation?

Is APS for the smaller manufacturer? APS can be an outstanding tool, but it comes with a very high price tag. Bermudez notes, “While many manufacturers are interested in APS, the too-good-to-be-true claims and high product costs have caused most companies to proceed cautiously.”

“Many APS vendors sell their product for hundreds of thousands of dollars as an entrance price, and implementation costs are even more,” maintains Gillam. “Smaller manufacturers need to be aware of these costs, and of what it will take to achieve the benefits that APS can bring.”

However, she does insist that APS “does have a place in smaller manufacturing companies”; however, they should not consider the “big” APS systems. Just as ERP has been compressed into the smaller market, so has APS.

Gillam advises those in small to midsize manufacturing organizations to consider the following points before moving into APS:

- *Do not make APS your primary software consideration.* “Look internally at your business and determine if you realistically have the data in place today to make APS worthwhile,” she offers. Most small and midrange manufacturers do not, she insists.

To gain the benefit of APS, “you need to have good enough data to take advantage of this very powerful tool,” Gillam explains. Your routing times and costs need to be accurate. You cannot get a plan to the second if your routing times are in hours or minutes.

- *Is an APS plan truly your biggest and most immediate problem?* For the smaller manufacturers, most often it is not, she asserts. “The biggest problems are customer service, inventory management, and the like,” Gillam notes. Although APS can help these areas, it is not a cure-all.

“The overall ERP backbone with which you work is more important than the APS piece at this point,” she explains. “It is easy to get caught up in the APS mania and select your ERP system solely on the flashy APS demo. You need to remember that APS is only a piece of the whole ERP system.”

- *Use your existing ERP vendor to supply you with APS functionality.* Keep in mind that ERP vendors geared to the smaller manufacturers know the needs of the smaller manufacturer. “They are experts at providing the smaller manufacturer with solutions that meet their needs at a price that they can afford,” Gillam explains. But there are risks and rewards to this approach.

When an APS package is bundled in with an ERP package, you receive a few benefits that you would not get if you purchased a stand-alone APS system. Among them are

- Complete integration between your ERP and your APS system
- One single implementation that includes both ERP and APS
- Much more streamlined implementation that will take less time and money

The streamlined approach is possible because some ERP companies have taken a new approach to implementation of APS systems (and, for that matter, ERP systems), she notes. Rather than building the entire system to meet your specific needs, you have a system in a box.

“To configure this system to exactly meet your requirements,” she explains, “you simply set parameters in a flag setting.” For example, instead of identifying and configuring the APS system to meet the specific constraints

for your company, the planning system would come with the standard constraints (lowest cost, least inventory carrying cost, on-time deliveries), and you simply number them in your highest priority. This allows you to customize the system to fit your parameters easily without building the system from a template to fit your company's requirements.

NEXT-GENERATION APS INSTALLATION REDUCES INVENTORY AT PHILIPS

To improve their competitiveness and meet the market demand for sustained growth, Philips Semiconductors reengineered its procedures for forecasting demand, accepting work orders from customers, making commitments for orders, and completing product deliveries. "Our delivery performance was of particular concern," says Cherie Malmstrom, logistics project manager at Philips Semiconductors (Albuquerque, N.M.). "We wanted significant improvement, and we sought it through a next-generation advanced planning and scheduling system that would help boost customer service, shrink inventory, and reduce cycle times for planning."

According to Malmstrom, "Our systems were static and cycle-driven. They were not finite scheduling systems in any way." Philips deployed an APS system (Paragon Management Systems; Los Angeles; www.paragonms.com) at its North American facilities and improved delivery performance from 50% to over 97%. It also made major reductions in inventory while improving overall cycle time 10%.

A bevy of benefits from the APS installation. Malmstrom described the APS improvements at a recent APICS Annual International Conference. Among them were the following:

- *Delivery performance, before and after.* Before deploying Paragon applications, Philips's shipping dates were based on historical fixed lead times, "which did not take into account the product mix, WIP, and dynamic bottlenecks," says Malmstrom. "The MES drove lots and schedules based on target average cycle-times but had no visibility on the actual customer-driven due dates attached to these orders."

As a result, lots with later due dates took priority over lots with earlier due dates. The new software changed this by driving the plant to move lots based on real customer order due dates, while simultaneously driving each lot to meet target cycle times by respecting resource constraints.

- *Relieving bottlenecks.* “Before implementing the new system, WIP was generated from a predefined number of starts per day,” she describes. The number of starts was based on capacity availability of certain bottleneck resources but was not dynamic. Instead, this number was a static value that was revised periodically. “As more WIP accumulated, the lead times increased, causing more late orders,” Malmstrom notes. Philips and Paragon knew that predefining bottlenecks in fabrication lines was not an effective approach because bottlenecks shift based on product mix and availability of equipment. This is an inherent characteristic of process-oriented industries.

Now, Paragon recommended the “smart release” of lots into fabrication lines. This means starting the lots at a point of time to minimize the wait time of lots and use the bottlenecks as much as possible, without compromising due dates.

- *Reliable commitments.* Work orders from customers are made several times a day with a requested due date. Philips then checks the requested quantity against reserved capacity based on monthly contracts. Finally, they determine a shipping date based on material and capacity availability.

By dynamically assigning manufacturing lots to orders based on due dates and management objectives, the planning engine drives the plant to move lots in order to keep promised shipping dates. By integrating intelligent planning and visibility into the order-to-manufacturing-lot connections, the planning engine allows Philips to control performance at the lot-customer level, rather than at the more generic total-moves or throughput levels.

- *Streamlined manufacturing.* At Philips, two fabrication areas feed products into a common test area. Work orders come in from internal customers, and forecasts are received from each product group as unconstrained demand on a monthly basis. Work orders are routed back with an accurate date for delivery of the product.

The Paragon software addresses two aspects of this requirement. Through intelligent planning it optimizes the release and schedule of competing lots on key bottleneck resources. Then, because of the integration with reports and MES, it is able to update commit dates and manufacturing lot due dates based on a capacity-constrained model.

Necessary steps to successful implementation. The Paragon software, according to Malmstrom, “serves as the ‘planning engine’ for the production process. It receives data (routings, resources, and customer orders) and produces a recommended wafer start schedule.”

The software also serves as the engine behind reporting and analytical tools used by planners to verify data integrity and make planning decisions. Malmstrom also identified the following as primary to the implementation:

- *Understanding the manufacturing process and business requirements.* “This includes a detailed walk-through and in-depth discussions with the industrial engineers to identify the modeling requirements and to understand how business restraints impact these requirements,” she describes.

- *Integration and data verification.* Once a working model of the manufacturing process is complete, the data need to be “seamlessly” pulled from a variety of sources, ranging from the MES to spreadsheets that are manually maintained. “This process is nontrivial because it involves cleansing the data and verifying the integrity to match Paragon’s software data model structure and the operational requirements of the plant,” she details.

- *Starting output, commitments, and model testing.* Once the data are cleaned and the integration process runs smoothly, the plant uses the software to drive two primary business functions as a way of verifying the software’s accuracy and functionality. Output of the software is used to determine the number of daily wafer starts to load into the fabrication line and the commit date for customer orders based on capacity and inventory availability. “Based on these two primary outputs, we worked with Paragon to assess the accuracy of the software,” Malmstrom explains. “Once a comfort level was reached, we used the software to drive business processes, which resulted in significant performance improvements.”

- *Reporting and business process.* The planning and scheduling engine, by itself, serves as a tool. End-users required interfaces and reports to enhance and supplement their business process. “We used our resources to make the information and decision support provided by Paragon software visible, usable, and interactive for specific metrics and business analysis by the end-users,” she describes.

In evaluating the implementation, Malmstrom describes the success factors as

- Cross-functional involvement and support from the planning and manufacturing groups
- Change of performance metrics from volume-driven goals to customer request and commit dates
- Union of generated plans to a viable and visible execution plan

Future improvement to include reactive dynamic sequencing. Philips is currently evaluating the next phase of implementation. One of the steps includes adding Paragon's reactive dynamic sequencing module to the test area. The module provides detailed, shop-floor-level sequencing of lots based on complex sorting business rules.

"The expected benefits from this are recommendations on the precise order of lots in queue on particular machines based on metrics such as critical ratio, slack time, due date, and WIP-buffer levels," Malmstrom describes. "We plan to use this to schedule optimal preventive maintenance and achieve higher utilization and lower cycle-times because of the added local optimization at each resource."

The next step for Philips is to directly tie the corporation's global order entry to the demand that the plant receives. "This will allow the customer to place an order with a sales group and receive, in real-time, a reasonable commit and availability date based on the fabrication plant's capacity and inventory levels," she adds.

WHAT TO LOOK FOR IN A NEW INVENTORY MANAGEMENT SYSTEM

A certain amount of inventory is an essential ingredient of a successful supply chain management practice. For example, in a distribution-intensive enterprise inventory can be an efficient buffer for managing the complexity of its supply chain, improving customer service and operating efficiency.

Managers seek the inventory management system that ensures that their organizations receive the most value from their investment in raw material, WIP, and finished goods inventories. Yet the rhetoric from inventory management system providers clouds rather than clarifies these issues for many inventory managers.

New research report provides some of the answers about inventory management systems. Greg Girard, senior analyst of supply chain management at AMR Research (Boston; ggirard@amrresearch.com) has come to the aid of inventory managers. He authored a comprehensive report on the critical functionalities of inventory management systems. Though focused on applications for distribution-intensive enterprises, his analysis nevertheless contains many insights that will be useful for inventory managers. In our opinion, his report is a resource that should be reviewed and studied

before taking on the process of selecting an inventory management system.

The key functionalities for evaluating inventory management applications. “Because of their complexity and breadth, it’s easy to get bogged down in the process of defining software requirements and selecting vendors for inventory management systems,” Girard concedes. His research, however, shows how distribution companies, for one, can derive benefit from these systems with a relatively short list of core functionalities that can be considered when evaluating alternatives. Key findings concerning a shortlist of enterprise applications identified by Girard appear in Table II-4.1.

He notes in his report that some supply chain planning vendors (Manugistics and Logility) offer inventory management systems “within a broader framework of supply chain capabilities.” Also, some supply chain execution vendors (Endura) are bringing “robust inventory management systems to market.”

Parameters that inventory management systems must satisfy. According to Girard, “The value of inventory management systems increases with the ability to apply statistical, economic, and trading partner business rules at the level of item location.” To achieve this type of increase, he recommends that inventory managers seek software solutions that can do the following:

- Scale the application of scientific inventory management techniques (statistical safety stock, economic order quantity) to review fairly high volumes of granular item-location replenishment and redeployment decisions in short (daily or weekly) cycles.
 - Automate routine replenishment and redeployment decisions.
 - Comprehend the full costs of acquiring, carrying, (re-)deploying, and disposing of inventory.
 - Manage inventory by safety, cycle, build, and investment classes for each item location in the network.
 - Manage inventory allocation decisions based on economic value of inventory reflecting gross margins and turns.
 - Map inventory policy by item location to channels and customers with common service expectations.
 - Adjust parameters that control item location replenishment and deployment decisions quickly by the following:

- Shortening the item-location control review cycle
- Identifying significant seasonal, promotional, and life-cycle changes in demand to adjust forecast in the next review cycle
- Identifying variances in supply lead times and fill rates to adjust safety stock in the next review cycle
- Identify potential inventory excesses and shortages at item locations and redeployment network inventory to minimize revenue lost from stock-outs and product obsolescence, considering transportation and the handling cost of redeployment and product substitution opportunities.
- Manage replenishment decisions to get the most out of the following:
 - Suppliers' trade promotion programs and forward-buying opportunities
 - Lot size economies of suppliers, manufacturing, transportation, and warehousing
 - Manage item-location inventory through product life cycles, adjusting replenishment and redeployment control parameters from new product introduction, through maturity, and into obsolescence.
 - Manage product-to-product substitution and product reuse opportunities.
 - Manage aging inventory against shelf-life constraints.

For a copy of the complete report, *Inventory Management: Do You Have the Goods: The AMR Report on Supply Chain Management*, contact AMR Research, 2 Oliver Street, Boston, MA 02109; 617-574-5120; fax, 617-542-5670.

14 INVENTORY CONTROL SOFTWARE MODULES NOW RATED AND COMPARED

More than one in four (26.0%) respondents to a recent reader study indicate that they have installed inventory management software within the past year. Another 32.6% say that they are currently at the planning stage. Considering the growing importance of inventory control modules to the overall solution, Table II-4.2 presents a guide that identifies modules best suited to your needs by size of company, type of business, platform, and price.

Once you have found the software that best fits your company profile,

Table II-4.1 Software Core Functionalites

Inventory Mgmt. Functionality	Demand Management (St. Louis)	E3 Corporation (Marietta, Ga.)	Eventus Logistics (Cambridge, Mass.)	GAINSystems (Napierville, Ill.)
Forecasting	Twenty forecast algorithms plus seasonal and product life cycle curves. Twenty-one filters are employed to identify anomalies and outliers; the forecaster manually revises the methods used. Reviews are typically on a monthly cycle.	Each item is treated uniquely, using a combination of adaptive exponential smoothing and probability forecasting. The method is chosen by the system; users interact only when directional changes are needed. Review cycles is user-defined and based on item characteristics.	Bayesian statistics are used to provide a forecast based on a combination of statistical models to optimize forecasting level, models, and causal factors selection.	Thirty-two forecast algorithms are provided. The system may suggest a revised method after one user-defined review cycle passes.
Replenishment Buying	Takes lot size, including minimum order quantity, into consideration when determining the order plan. The replenishment quantity is independent of obsolescence, which is determined by the forecast used.	All replenishment components are updated daily and replenishment decision is made daily for each vendor/item/location combination.	Stock/inventory calculation takes into account recycle time, lot minimum, lot increment, demand horizon, safety stock, and lead times. A DRP mechanism is used to calculate reorder point. Done for item, location and channel.	Optimal Replenishment Quantity calculation takes into account purchasing/manufacturing lot-sizing constraints and product obsolescence, and optimizes the total annual cost using 28 cost factors.
Manage Supply Variability	Lead time can be adjusted.	Lead-time receipt history is used to forecast an item's lead time and lead-time variability.	Variability in lead times can be introduced in calculation of safety stock and buffering for SKUL inventory.	Considers lead time, yield and unit count error calculates a service stock and order quantity that accounts for this error.
Statistical Safety Stock	Forecasting module allows calculation of safety stock based on forecast error and lead time	Considers an item's demand forecast, lead-time forecast, demand variability, service levels, and item's order cycle.	Considers forecast, forecast error, lead times and lead-time uncertainty, and service level.	Considers demand patterns, forecast error, order quantity, and supply variability for each item/location.
Inventory Cost in Purchase	N/A	Carrying costs are categorized as either Physical (taxes, depreciation, insurance and obsolescence) or Alternate Return on Investment costs (the return the company realizes from its inventory).	Visible but not included in calculations.	Utilizes 28 different inventory costs.
Maintain Item Location Inventory by Type	YES	YES	YES	YES
Multiple Stocking Locations	YES	YES	YES	YES
Multi-Echelon Stocking	YES	YES	NO	YES
ABC Support	YES	YES	YES	YES
Slow-Mover Logic	N/A	Limited	YES	YES
BoM Logic	N/A	YES	YES	YES
Product Shelf-Life Logic	N/A	YES	YES	YES
Maximum SKULs in Operation	N/A	12,000,000+	N/A	500,000

Table II-4.1 (continued)

IBM (Waltham, Mass.)	LPA Software (Fairport, N.Y.)	Mercia Software (Marietta, Ga.)	Prescient Systems (Ft. Washington, Pa.)	Supply Chain Solutions (Manetta, Ga.)
Six forecast methods are provided. Simulation functions allow changes to any of the forecast methods to assess long-term effects for optimal forecast methods. User defined review cycle.	Twelve forecast methods are provided, configurable by thousands of variants. Multiple methods are run simultaneously to compare historical performance, and the controlling forecast is monitored for consistent bias. Sensitivity and frequency of review cycles for both perspectives are user-defined.	Unlimited forecasting models are enabled by Dynamic Linear Modeling methodology centered on Bayesian statistics. Statistical thresholds trigger alerts for review, with the review cycle defined by the user.	Three forecast models are used. Demand anomalies are identified by user-defined numbers of standard deviations. Review periods are user-defined.	Four forecast models are used. Forecast can be adjusted manually at item-location levels, or they can be updated automatically by the system based on a selected forecasting frequency. The system prompts users when forecasts are not tracking closely to actual demand.
Utilizes the following factors: bracket costs, dying item, alternate lead times and adjustment to trends.	Periods of supply, lot for lot, and economic order quantity are supported at the item-location level via mapping of different variables based on item or group characteristics. Also supports supplier-specific and internal transfer lot sizing.	Factors are item-location specific. Factors are considered include forecast, item cost, ordering cost, carrying cost, opportunities to replenish, minimum quantities, rounding increments, shelf life, and yield.	Order quantity, safety stock, and reorder point are computed using the forecast, forecast error, customer service level expectations, lead-times, and user-defined considerations. System can test alternative methods of calculations.	Factors considered at the SKU level are forecasts, lead time, safety stock, lot sizes, bracket discounts, order frequency economics, etc. Can build order quantities to 10 different criteria: dollars, eases, cases, volume, weight, pallets, layers, cubes, dozens, or user-defined.
Lead-time variability is considered in the calculation of safety stock with consideration to sales rates and desired service levels.	Supply variability is measured as reported against the standard lead time. The system does not automatically adjust safety stock to buffer the variability.	Historical actual deliver times are measured against planned lead time, and lead time uncertainty is calculated and included in calculation of safety stock.	Lead-time variability is considered in the calculation of safety stock.	Incorporates item-location lead time and lead-time variability, variance in supply, allocations of product and desired service level.
The statistical measure of forecast error and the user specified service levels are used to calculate safety stock.	Calculated with the following methods: fill rate/ service level, stock-out probability, and table-driven stock-out probability.	Can be set at an item-location level using a range of service-driven strategies. Safety stock dynamically reacts to changes in supplier performance and demand variability.	Considers forecast, forecast error, service level and lead times in the safety stock calculation.	Safety stocks are calculated at the item-location level. Factors considered are user-specified safety-stock strategy, item-location forecast error, lead time and lead-time variance, item pack sizes order frequency, and service level objectives.
Factors in cost of capital, storage costs, taxes, insurance, depreciation/obsolescence, pallet handling costs, purchase order handling costs, and offsite storage costs.	A summarized carrying cost value can be applied at the system, item group, item, and item-location levels to determine lot size and cycle stock, which inversely influences safety-stock quantity.	Factors are item-location specific. Factors considered include forecast, item cost, ordering cost, opportunities to replenish, minimum quantities, rounding increments, shelf life, and yield.	Carrying cost is used in the calculation of safety stock when the Economic Order Quantity calculation is specified.	Carrying costs are used in the developing safety stock requirements and in the aggressiveness of a forward buy. Carrying cost elements include the physical carrying rate, opportunity cost rate, borrowing rate, and ROI.
YES	YES	YES	YES	YES
YES	YES	YES	YES	YES
NO	YES	YES	YES	YES
YES	YES	YES	YES	YES
YES	YES	YES	YES	YES
NO	YES	YES	LIMITED	YES
YES	NO	YES	YES	YES
N/A	5,000,000+	5000,000+	75,000	8,000,000+

Source: The AMR Report on Supply Chain Management.

Table II-4.2 Fingertip Guide to Inventory Control Modules for Microcomputers

<i>Software / Vendor</i>	<i>End User Profile</i>	<i>Operating System</i>	<i>Networks / Platform</i>	<i>Module Price</i>
<i>Industry (size)</i>				
ACCPAC for Windows 3.0 Computer Associates www.accpac.com	D (L) LM (M,L)	Windows	Novell, LANtastic	\$595
BusinessWorks 12.x Sage Software Inc. www.sota.com	R (S) D (S,M) LM (M) C (S)	Windows	Novell 3.11+, LANtastic 5.0+, Windows 95, WWFG, Windows NT	\$495
Great Plains Accounting 9.0 Great Plains Software www.gps.com	R (M) D (S,M) LM (M)	DOS, Windows	Novell, LANtastic	\$695
Great Plains Accounting 4.0 Great Plains Software www.gps.com	D (M,L)	Windows, WWFG, Windows NT, Windows 95, Mac, Power PC	Novell, NT Server	\$1,000
Impact Encore 1.0 Syspro, Inc. www.sysprousa.com	D (M,L) LM (M,L) C (M,L)	DOS, Unix, AIX, Windows NT	Novell, Windows NT	\$1,400
Macola Progression 7.5 Macola Software www.macola.com	D (M,L) LM (M,L)	Windows 3.x, 95, NT, Novell Netware	Novell, Windows NT	\$1,750
MAS90 for Windows 3.x Sage Software www.sota.com	D (M) LM (M,L)	Windows 3.1, 95, NT, WWG Sco Unix	Novell, Windows NT, SCO Unix	\$1,300

Navision Financials 2.0 Navision Software www.navision-us.com	D (M,L) LM (M,L) C (M,L)	IBM AIX, HP-UX, Windows 95, NT, OS/2	Windows Compatible TCP/IP, Netbios Compatible LANs	\$1,000
Platinum for Windows 4.6 Platinum Software www.platsoft.com	D (M,L) LM (M,L)	Windows, Dos	Novell, Netbios Compatible	\$1,595
Realworld Classic 8.0 Realworld Corp. www.realworld.com	D (M) LM (M) C (M)	Dos, Unix, Xenix, AIX	Novell, LANtastic	\$795
SBT Professional 5.0 SBT Corp. www.sbtcorp.com	R (M) LM (M) N (S,M,L)	Dos, Windows, SCO Unix	Novell 2.5, Windows NT, SCO Unix, LANtastic 6.0	\$1,295
Solomon IV 2.8 Solomon Software www.solomon.com	R (S) D (S,M,L) LM (S,M,L) N (S,M,L) C (M,L)	Windows 95/98, Windows NT Workstation	Windows NT Server, Novell Netware	\$1,295
Solomon IV for BackOffice Solomon Software www.solomon.com	D (M) LM (M)	Windows 95/98, SQL Server	Windows NT Server	\$2,995 (or more)
Southware 7.1 www.southware.com	R (M) D (M) LM (M)	Xenix, Unix, AIX, Dos, Windows, Windows NT	Novell, 3Com, LANtastic, Net Bios	\$800 and up (depends on reseller)

Note: End user profile key: Industry: R (Retail), D (Distributor), LM (Light Manufacturing), N (Nonprofit), C (Contractor). Size: S (Small): less than 100 inventory items; M (Medium): less than 1,000 inventory items; L (Large): less than 4,500 inventory items.
Source: Computer Training Services.

Table II-4.3 Pros and Cons of 14 Popular Inventory Control Modules

Pros and Cons of 14 Popular Inventory Control Modules	
ACCPAC for Windows 3.0	
Pros: <ul style="list-style-type: none"> ● separate costing for each location ● flexibility in assigning G/L accounts to different transactions, to accommodate all types of accounting configurations (even the most complex) ● can handle very sophisticated pricing strategies 	Cons: <ul style="list-style-type: none"> ● cannot enter multiple bin numbers for an item within a location ● no lot tracking
BusinessWorks for Windows Version 12.x	
Pros: <ul style="list-style-type: none"> ● kit processing feature ● flexible pricing options ● variety of stock reorder functions ● built in purchase order functions 	Cons: <ul style="list-style-type: none"> ● sales codes by product line only
Great Plains Accounting 9.0	
Pros: <ul style="list-style-type: none"> ● easy access to inventory data ● generous description fields ● maintenance and tracking of serialized inventory 	Cons: <ul style="list-style-type: none"> ● stock status report does not indicate which serialized items have been allocated
Great Plains Dynamics 4.0	
Pros: <ul style="list-style-type: none"> ● ease of data entry ● serial and lot number tracking ● easy to define units of measure 	Cons: <ul style="list-style-type: none"> ● lack of customer specific price matrix
IMPACT Encore 1.0	
Pros: <ul style="list-style-type: none"> ● outstanding for multiple warehouse and multiple bin location processing ● comprehensive inquiry capabilities with drill-down ● ability to have both lot and serial number tracking for the same item ● full physical count processing built in ● comprehensive note tracking; notes can be tied to orders, receiving, dangerous goods notices, production, etc. 	Cons: <ul style="list-style-type: none"> ● cannot have multiple valuation methods per company
Macola Progression 7.5	
Pros: <ul style="list-style-type: none"> ● can copy from existing items while setting up new items to simplify and speed up inventory item setup ● excellent physical count/cycle count process ● support for multi-warehouses and multi-bins ● extended inventory item notes (1,000 lines of 60 characters each) 	Cons: <ul style="list-style-type: none"> ● must complete two sets of screens to add one inventory item
MAS90 for Windows 3.x	
Pros: <ul style="list-style-type: none"> ● sales kits ● very powerful pricing options ● physical count process with freeze process ● automatic unit of measure conversion ● MAS90 Custom Office ● can elect whether to keep sales history by item 	Cons: <ul style="list-style-type: none"> ● no link to inventory from A/R or A/P
Naviston Financials 2.0	
Pros: <ul style="list-style-type: none"> ● full featured with few limitations ● historic and statistical information ● easy access to data 	Cons: <ul style="list-style-type: none"> ● requires a two-step process for valuation of inventory

see Table II-4.3 for a list of the pros and cons of the vendors' inventory control modules.

Inventory control modules asked to do more. A common thread throughout many responses is that the inventory control software solutions are bolted on

Table II-4.3 (continued)

Platinum for Windows 4.6	
Pros: <ul style="list-style-type: none"> ● extensive reporting ● multiple costing methods ● can custom configure 	Cons: <ul style="list-style-type: none"> ● serial/lot number tracking ● lack of bill of materials, WIP reporting ● no standard cost variance reporting ● no tag control
Real World Classic 8.0	
Pros: <ul style="list-style-type: none"> ● work order processing ● flexible inventory labels ● strong general ledger integrations 	Cons: <ul style="list-style-type: none"> ● lack of bar code printing and capabilities ● weak physical count capabilities
SBT Professional Series 5.0	
Pros: <ul style="list-style-type: none"> ● multiple costing methods supported: weighted average, standard, LIFO, and FIFO ● multiple locations can be tracked, with the option to track to the store and/or bin level ● extensive inventory management options, such as mass price/cost changes, product line, serial number, and lot number tracking, ABC analysis, cycle counting according to user-defined frequency ● unlimited price schedules for items, complete with the ability to set up customer-specific pricing and pricing promotions ● cost tracking by location 	Cons: <ul style="list-style-type: none"> ● inventory count tag printing and entry not provided; this is provided by cycle count worksheet only ● system prevents shipment and receipt activity for items locked for cycle amount ● no automatic purchase order creation for shortages
Solomon IV for Windows 2.0	
Pros: <ul style="list-style-type: none"> ● supports a wide range of costing types including specific identification and user specified ● can specify different costing types by item ● good control of quantity available 	Cons: <ul style="list-style-type: none"> ● pricing schemes are limited to one price scheme (with quantity breaks) per customer and are cumbersome to set up and maintain ● decimal precision of costs and prices are limited to three places and cannot be changed ● standard costing is supported, but development of standard costs requires the Bill of Materials module ● standard sales analysis reports are limited
Solomon IV BackOffice 4.0	
Pros: <ul style="list-style-type: none"> ● supports a wide range of costing types including specific identification and user specified ● can specify different costing types by item ● good control of quantity available ● unlimited number of warehouse sites and locations ● flexible lot-serial number handling ● physical counting capability ● decimal precision of costs and prices can be expended to nine places 	Cons: <ul style="list-style-type: none"> ● standard costing is supported, but development of standard costs requires the Bill of Materials module ● standard sales analysis reports are limited
SouthWare Excellence Series	
Pros: <ul style="list-style-type: none"> ● alphanumeric stock item code with three lines for description ● multiple pricing options including stock item by customer ● tracking can be by serial number, lot, color, size, or bin ● flexible unit of measure conversions for purchasing, stocking, and selling ● supports multiple warehouses and locations ● Standard Bills can be used as a shortcut for entering line items ● Bill of Materials for assembly manufacturers ● fully integrated purchasing and UPS shipping modules ● supports full bar code reading and printing 	Cons: <ul style="list-style-type: none"> ● Vendor Catalogue can only be accessed from Order Entry ● limited ability to enter blanket orders with release dates ● cannot freeze inventory during physical inventory update ● no Bill of Lading ● because of the many customized options, installation is considerably more complex than the other modules

to the organization's new/legacy accounting software systems. These modules not only monitor and track inventory movement and ensure its accuracy, but also provide customers and suppliers with access to inventory data. Additionally, the software must now link to accounts payable, accounts receivable, and the general ledger.

The source for this information is *Guide to Accounting Systems for Microcomputers* (Computer Training Services, Inc.; Rockville, Md.; 800-433-8015; www.ctsguides.com). Overall, this excellent tool provides an in-depth module-by-module analysis of 14 accounting software packages. Included is a list of the many features and functions required of inventory control modules. The guide also gives ratings for each detailed function. The guide (\$694) also comes with a Requirements Analyst Software Program (\$795 together with guide).

Though revised and updated, this material is still 12 to 18 months behind the upgrade cycle. Some vendors have strengthened many capabilities that have been described as cons. At the same time, they raise issues for you to investigate if you are considering a program with a certain weakness. Meanwhile, the pros represent minimally acceptable performance standards for any module on your shortlist.

NEW INVENTORY MANAGEMENT SOFTWARE INTRODUCED AT NATIONAL MANUFACTURING WEEK

Software vendors made quite an impression at the National Industrial Enterprise Show during National Manufacturing Week. Several, in fact, were pitching products and solutions for the inventory manager, some of which were targeted for midsize manufacturing. A sampling of these packages includes the following:

Oracle introduces initiative to increase inventory turns for midsize high-tech manufacturers. Oracle FastForward Manufacturing for High Tech is the newest fixed-price, fixed-time implementation solution for midsize companies. The package includes software, consulting, education, and support for high-tech component assembly manufacturers.

It is designed to implement critical financial and manufacturing applications in 90 business days or less. Oracle is also working with best-of-breed software partners through its Cooperative Applications Initiative, which provides complementary functionality and is tightly integrated with Oracle applications. Three examples include Agile Corporation (product data management), Paragon Management Systems (advanced planning and scheduling), and Yantra Corporation (warehouse management and transportation).

For information, contact Oracle Corporation, 500 Oracle Parkway,

Redwood Shores, CA 94065; 650-506-7000; fax, 650-506-7200; www.oracle.com.

MAPICS delivers advanced planning and scheduling system to midsize manufacturers. MAPICS XA Wisdom offers manufacturers using the MAPICS product suite an advanced supply chain planning functionality. Among the features of this software are synchronized planning and scheduling of all resources.

Wisdom summarizes plan/schedule problems with emphasis on eliminating late orders, critical bottlenecks, and material shortages. In addition, a decision-support tool compares trade-off scenarios when considering customer order fulfillment.

For information, contact MAPICS, Inc., 5775-D Glenridge Drive, Atlanta, GA 30328; 404-705-3000; www.mapics.com.

New partnership provides resource locating solution. WiData Corporation and Symbol Technologies announced a marketing alliance to provide resource locating solutions.

The WiData Wireless Resource Management System is a real-time locating system for tracking and managing high-value supply chain resources. It will work along with Symbol's Spectrum24 RF-based wireless local area network and bar code data-capture products to provide users with up-to-the-minute business information from a single, integrated tracking system. The combination can be used for real-time yard management and enhanced inventory tracking.

For information, contact WiData, 1259 Oakmead Parkway, Sunnyvale, CA 94086; 408-774-2270; fax, 408-774-2277; www.widata.com.

TigrSoft launches four new products and debuts new name. Formerly ShivaSoft, the company announced TigrAPS 1.5, a next-generation APS software that incorporates ShivaSoft's artificial intelligence (AI) techniques to generate optimal schedules. With TigrAPS Scenario Manager added to the release, it simplifies developing what-if plans through an interface that allows for the modification and management of any APS parameters.

Developed for both file/server and client/server applications, it is the parent solution to a family of other products. TigrVision is a plant-wide reporting tool; TigrTrak is a shop floor tracking and real-time dynamic scheduling tool; and TigrIOQ is an immediate order quotation system.

For information, contact TigrSoft, Phipps-McKinnon Building, 10020-101 A Avenue, Suite 400, Edmonton, Alberta, Canada T5J 3G2; 780-496-7495; www.tigrsoft.com.

DISTRIBUTION/COMPUTER EXPO PROVIDES INVENTORY SOFTWARE SOLUTIONS FOR EVERY NEED

Inventory managers, warehouse managers, and supply chain professionals could not help but be impressed with the array of software solutions on display at Distribution/Computer Expo. Niche players, single-source providers, and best-of-breed vendors came in full force to present their new releases, advanced technology, and expanded product lines.

It's not just inventory management software anymore. To be sure, products are extending beyond exclusive focus on inventory management. While some pitch inventory management as the heart of their WMSs, others posit WMS as an integral piece of the broader supply chain management technology.

The marketplace still carries a caveat emptor warning. The solutions are becoming more integrated and the packages more complex. Yet the vendors' messages still emphasize user friendliness, fast implementation, and customer service. So when it comes down to distilling the claims of the new features and benefits provided by the software releases, several attendees cautioned readers not to be swayed by the technology. Instead, focus primarily on the solution that will get rid of your problems.

Our list of show-stopper technologies. More than 200 exhibitors displayed their products at Distribution/Computer Expo (produced by C. S. Report, Inc.; Uwchland, Pa.; 610-458-6410). Among those of interest to our readers, we found the following 12 to warrant further consideration:

- *Applied Tactical Systems announces ATS Continuum for the Warehouse.* The new, robust, highly secure, configurable warehouse information management system utilizes the latest in RF mobile data collection devices to improve inventory accuracy greatly and direct employee activities in the warehouse. ATS Continuum for the Warehouse operates independently, though in concert with the ERP/host system.

A unique, cost-saving feature of the software is the use of a standard Web browser interface to conduct warehouse transactions. Workstation-based users in the warehouse can use familiar hyperlink navigation with either Mi-

Microsoft Internet Explorer or Netscape Navigator to access all ATS Continuum for the Warehouse information and data entry screens. It also can interface with a wide variety of third-party tools and systems.

For information: Applied Tactical Systems, Inc., 22 Audrey Place, Fairfield, NJ 07004; 973-808-1750; fax, 973-808-1776; www.atsworld.com.

- *TECSYS premieres EliteSeries release 6.2.* The e-commerce-based, fully integrated distribution and warehouse management software solution offers end-to-end integrated functionality for the entire distribution enterprise. In addition, EliteSeries 6.2 combines customer-centric order management with distribution and warehouse management systems. It includes automated merchandise drop-shipment capabilities, enabling distributors to take an order and have a supplier deliver it directly to the customer. Release 6.2 also incorporates a number of new EDI capabilities.

For information: TECSYS Inc., 1840 Trans-Canada Highway, Dorval, Quebec, Canada H9P 1H7; 514-333-0000; www.tecsys.com.

- *Haushahn releases 5 series WMS.* New features and functions available in the 5 series WMS include multilingual capability, graphical user interface, user-configurable shipping documents, and Oracle RDBMS support. Haushahn's WMS now can be used and operated in any language using standard character sets available on a PC. Already available in Spanish, the user interface and RF screens can be displayed in the user's language preference, which is specified automatically during log-in. Users also have a graphical, PC-based tool to modify the format of shipping documents produced by the WMS. Shipping documents can be created in-house.

For information: Haushahn, 5460 Corporate Grove Boulevard, SE, Grand Rapids, MI 49512; 616-285-3311; fax, 616-285-3312; www.haushahn.com.

- *EXE Technologies introduces EXceed Crossdock Facility and EXceed Crossdock Component.* EXceed Crossdock Facility, a new addition to the EXceed product line, is designed to operate in dedicated cross-dock/flow-through facilities that do not employ or need to employ classic warehouse management systems. It provides the full spectrum of prereceipt planning tools and postreceipt execution processes necessary to move goods rapidly from point of receipt to point of shipment.

Building on the capabilities of EXceed WMS, the EXceed Crossdock Component adds significant tools for the classic warehouse and distribution center to handle cross-dock and flow-through. It is for both the preplanned movement of goods from point of receipt to point of shipment and interactive analysis of opportunistic tasks.

For information: EXE Technologies, Inc., 8787 Stemmons Freeway, Dallas, TX 75247; 214-775-6000; fax, 214-775-6080; www.exe.com.

- *Distribution Resources debuts XPDT distribution technology.* XPDT is a Windows NT-based distribution management technology. It is completely Web-enabled and object-oriented to facilitate order capture from virtually any e-commerce or traditional source. The product is a total operational platform for distribution operations, including order management, inventory management, business entity management, warehousing management, financial management, and commerce interface management. The software features an expansive data warehousing/knowledge management infrastructure for sales, financial and operational analysis, and inventory planning. Implementation takes approximately three to six months.

For information: Distribution Resources Company, 5340 S. Quebec Street, Suite 300, Englewood, CO 80111; 303-889-4500; fax, 303-889-4533; www.xpdt.com.

- *Optum inaugurates Action Optimization.* This strategic e-business fulfillment initiative helps companies anticipate and respond to dynamic delivery expectations. Optum will drive Action Optimization with its new Optum SCE Series advanced supply chain software. It includes three components: SCE Response Center, which provides dynamic deployment capabilities to maintain real-time visibility and control overall supply chain operations; SCE Demand Center, which manages warehouse processes and inventory for fast-response order fulfillment; and SCE Transportation, which manages the complete transportation execution life cycle, from enterprise planning to postshipment audit.

For information: Optum, Inc., 2550 West Tyvola Road, Suite 500, Charlotte, NC 28217; 704-423-7200; fax, 704-423-7176; www.optum.com.

- *Auto-Soft releases MCS Two Thousand.* An integrated supply chain execution system, MCS Two Thousand integrates manufacturing, warehousing, distribution control, and scheduling within a single product. It provides dock-to-dock visibility of material as it moves through a facility. The fully scalable Windows NT-based system with a seamless graphical user interface offers a distribution/warehouse management system for inventory control at every operational stage: receiving, storage, retrieval, order picking, consolidation, and control of both manual and automated systems. It can be used as a stand-alone product or can be fully integrated with ERP and APS systems

For information: Auto-Soft Corporation, International Center, 5245

Yeager Road, Salt Lake City, UT 84116; 801-322-2069; fax, 801-322-1846; www.autosoft.com.

- *HK Systems demonstrates SCM/Enterprise Architecture and SCM/Express.* SCM/Enterprise Architecture facilitates the easy integration of HK Systems' SCM/Enterprise application suite of Order Management, Warehouse Management, Transportation Management, and Equipment Management applications with third-party software vendors. Essentially, it forms the basis of HK Systems' own component-based technology.

SCM/Express, a rapid implementation supply chain execution product, is a single solution scaled to fit a growing business, packaged to be cost-effective, and installed quickly. It consists of a state-of-the-art, Y2K-ready software coupled with expert implementation, training, and support services. SCM/Express features a fixed predictable cost of licensing and installation.

For information: HK Systems, Inc., 2855 S. James Drive, New Berlin, WI 53151; 800-HKSYSTEMS; www.hksystems.com.

- *Descartes launches Energy DeliveryNet.com MBO.* The dynamic supply chain solution enables companies and their customers to monitor delivery activities via real-time messaging, gain instant awareness of changes to plans, re-optimize delivery activities, and instantly remit new delivery details to field personnel and customers via the Web. Energy DeliveryNew.com Mobile Business Optimizer utilizes DeliveryNet.com to connect shippers, carriers, customers, and delivery vehicles via the Internet and a variety of other networks.

For information: Descartes Systems Group, 120 Randall Drive, Waterloo, Ontario, Canada N2V 1C6; 519-746-8110; fax, 519-747-0082; www.descartes.com.

- *Kinetic Computer announces PC/Piranha and PC/Rover.* A highly integrated, thin client platform, PC/Piranha is specially designed for warehousing operations. The Windows CE integrated vehicle computer is equipped with a versatile touch screen and voice recognition input capabilities. PC/Rover is a rugged Windows 95/98/NT vehicle- or fixed-mount computer system that facilitates the flow of warehouse and vehicle freight. It also provides up-to-the-minute tracking of customer shipments.

For information: Kinetic Computer Corporation, 76 Treble Cove Road, Billerica, MA 01862; 978-439-0500; 978-439-0501; www.kin.com.

- *INNOLOG unveils AssetIQ.* The integrated solutions suite captures, manages, optimizes, and reports transactions throughout the life of an asset. AssetIQ blends client/server, Web, and data warehousing technologies to

link the management of mission-critical assets to their overall business management processes. The five components of AssetIQ (Asset Transaction Engine, Asset Business Intelligence, Asset Optimization, Asset Dynamic Location Monitoring, and Asset Call Center) can be purchased together or separately.

For information: Innolog, 2010 Corporate Ridge, 9th Floor, McLean, VA 22102; 703-506-1555; fax, 703-506-4559; www.innolog.com.

- *Adonix launches Adonix X3*. Designed for middle-market companies, Adonix X3 ERP system integrates all functions to ensure seamless information flow. It includes modules for sales order management; purchasing and inventory control; warehousing and quality control; manufacturing planning and execution; and finance, budgeting, and analytical accounting. It can be scaled to match company size, and it allows companies to set a wide range of parameters and accommodates different distribution and manufacturing processes at multiple locations.

For information: Adonix, 1380 OldFreeport Road, Pittsburgh, PA 15238; 412-963-6770; fax, 412-963-6779; www.adonix.com.

Chapter II-5

Purchasing/Supplier Issues/ Vendor Managed Inventory

VMI TAKES CENTER STAGE AS INVENTORY REDUCTION BEST PRACTICE TOOL

Vendor managed inventory (VMI) is becoming a best practice. Considering the drive to integrate supply chains and remove inventory from within them, and inventory managers' own desire to reduce on-hand inventory, VMI is a concept that definitely merits consideration.

The trend toward VMI. J. Paul Dittman, vice president of global logistics at Whirlpool Corporation (St. Joseph, Mich.; john_p_dittman@email.whirlpool.com) is one industry leader who concurs with this assessment. At the Proven Performance Metrics in Logistics Conference (Institute for International Research, New York), he confirmed the existence of a megatrend of inventory being pushed backward in the channel. "Just like you're pushing your inventory back on your supplier through concepts such as vendor managed inventory, if you don't own your dealer's inventory today, you will. Be prepared for it," Dittman warns.

Inventory reduction benefits are real. Although there is some debate about the "real" benefits of VMI, James G. Hutzler, CPIM, who leads the production inventory control, demand management, and master planning functions at Werthan Packaging, Inc. (Nashville, Tenn.), is an advocate. "The benefits of a well-functioning VMI process include reduced lead times and finished

goods inventory in the supply chain,” he explained at an Annual American Production and Inventory Control Society (APICS) International Conference. “This is facilitated through the tighter control of, and quicker response to, changes in demand for these items.”

He also estimates savings of up to 20%. In the case of Werthan, “this percentage will result in a savings of \$1 million of on-hand inventory for our company,” Hutzler maintains.

But does it “cement” the customer to the supplier? Mark K. Williams, CFPIM, consulting manager at North Highland Company (Atlanta, Ga.) believes that it does. “Once a VMI system is established, a customer has effectively outsourced its material management function to its supplier,” he told his APICS audience. “After a period of time, the customer will no longer have the resources to perform this role in-house, making him more dependent upon the supplier. Nothing short of a major breach in a supplier’s performance will prompt the customer to search for a new supplier,” he concludes.

However, Drew T. Curtis, CPIM, CPM, strategic programs manager at TTI, Inc. (Tewksbury, Mass.; 978-851-2000), believes that “a true partnership where both the customer and supplier work in harmony toward a common inventory management goal can accomplish a great deal and reap substantial rewards for both companies.” He argues that customers can reduce their supplier base and decrease their inventory liability while increasing production flexibility. Suppliers benefit by solidifying their customer base, which results in better material support and increased communication with customers.

Supplier selection critical to establishing VMI process. “There are two key components that are unique to supplier-managed inventory programs that need to be addressed during the evaluation and supplier selection process,” explains Curtis. They are inventory management and order release.

“A supplier’s inventory management process and capabilities, as they relate to supplier-managed programs, are often overlooked and/or misunderstood by many customers.” Nevertheless, he declares that it is probably the most influential factor in the success or failure of this type of program.

It is not uncommon for customers to remark to the supplier, “I don’t care what mechanism you use to accomplish the bonded quantity we need; that’s your business.” Wrong approach, he insists. “As a former procurement

manager and a current value-added program supplier, I vehemently assert that you should care. It's imperative that you qualify the inventory management process as thoroughly as you would any other process," Curtis emphasized at the APICS conference.

What to look for in a supplier's inventory management process. Specifically, Curtis advises determining what planning process the supplier will use to establish a "bond" quantity and assure that it will be in stock when needed. Will this process be automated based on an electronic transmission of the customer's material requirements planning forecast, or will the planning for reservation be done manually by the supplier's personnel?

"Manual planning is a common occurrence, and it is nothing more than transference of workload from customer to supplier," he observes. Manual planning may be acceptable when dealing with a small number of line items, but it is prohibitive when dealing with higher line counts.

Always ask the following questions, Curtis advises:

- What will you do with the electronic transmission of my manufacturing resource planning (MRP)?
- Will you upload it automatically into your planning system, or will you print it out for someone to analyze?

"If it is uploaded automatically, have the supplier give you a live demonstration to qualify their capability," he strongly recommends. Automatic integration of the material forecast is the preferred method to ensure timeliness of material reservation and elimination of data entry errors.

Take a look at the order entry process, too. According to Curtis, it is just as important to tell the supplier what to ship and when. Most of the release mechanisms or "triggers" from customers to suppliers to ship product are similar. The five most common methods are

- Electronic data interchange (EDI) 850 purchase order
- Fax purchase order
- Scanning of a bar code
- EDI 830 with embedded purchase order
- Supplier-determined release

“The releases for this program should be for current shipments only and should not contain future orders,” he advises.

Don't overlook internal organizational issues before dealing with the customer. According to Hutzel, when on the other side of the aisle, and when VMI initiatives are initiated, it is important to

- *Dedicate personnel to the project and to support on an ongoing basis.* “At Werthan, we have combined the traditional customer service representative position, the master production scheduler, material requirements planner, and shop floor scheduling functions into one position,” he details. This position is dedicated to performing all aspects of planning product for our customer. It also minimizes the number of communication links internally within the organization, and improves communications with both suppliers and customers.

- *Educate all of those involved in VMI.* “We focused a lot of the initial education with the sales force at the beginning of our project since they were the ones on the front line,” notes Hutzel. “They did a lot of the preliminary evaluation to see if a particular customer fit our criteria for VMI and to determine if that customer was interested in participating in the VMI process.”

- *Provide the proper justification for top management so that you get the required commitment.* “You must convince top management that ‘bottom line’ VMI is a good business decision,” he declares. This means pointing out that VMI will help to reduce lead times and inventory and that it is cost effective. “Tell them it is a priority for us as well as our customers, and it makes us indispensable to those customers who partner with us in VMI,” Hutzel details.

- *Realign customer and supplier organizations and contacts to enhance communication and minimize the links of communication.* The primary communication between companies moves to a direct link with master scheduler communicating to master scheduler/material requirements planner—no more sales person to the customer’s purchasing agent. “In our case,” Hutzel explains, “our primary VMI person is a customer demand management representative.” This person has experience in demand management, forecasting, master production scheduling, capacity planning, JIT practices, shop floor scheduling, and production and inventory control.

As the experts agree, VMI is the process that will result in less inventory for both the customer and the supplier, and many companies will be considering VMI from the perspective of both a supplier and a customer.

**EXCLUSIVE SURVEY: NEW APPLICATIONS
PROVE VMI'S VALUE AS TOOL
FOR INVENTORY REDUCTION**

VMI holds much promise as an effective inventory reduction tool. Foremost among its strengths, VMI grants trading partners, and eventually the entire supply chain, an opportunity to establish more open communications. At the most basic level, this means the sharing of forecasts and scheduling information, and possibly automating some routine, transactional functions. In the ultimate, it is a full-blown collaboration initiative involving joint planning and development activities among all the parties.

The operations vice president at a large metal-forming facility provides an example. "We're in the process of improving the linkage of our suppliers with our internal systems, processes, and information. We're going all out to apply the principle of substituting information for inventory."

VMI interest is high, but actual applications remain in the planning stages. According to a recent *Inventory Reduction Report* reader survey, one in five respondents says that they are "adopting" VMI strategies. Earlier survey responses to the question were less than 10%.

In reviewing responses to the survey, we are encouraged by the growing numbers of readers who have at least one VMI partnership. For instance, a director of procurement at a utility company says, "Our most effective inventory reduction method appears to be VMI, especially for fast-moving items and their availability."

In another case, a major electronics company is actively working with its customers to establish VMI partnerships. The manager of business planning explains, "We're trying to get to critical mass and to get our primary customers interested in joining with us. We know we can reduce their inventory significantly based on the initiatives we already have in place. Ultimately, we'll also be reducing our own inventories, and that of our suppliers as well," he responds.

Without a doubt, there's a lot of optimism in the responses we received. As an example, a finance vice president at a small assembler of navigational equipment reports that "efforts are being concentrated on getting our key suppliers on board with the concept and its implementation."

Similarly, an inventory analyst at an office supply distributor says, "We're in continuing negotiation with suppliers about VMI inventories. In our first

year we reduced inventory by \$50,000, and we expect to double that in our second year. Now we're entering discussions with our customers, surveying their interest in our setting up a VMI stocking program for them. We tell them we will be able to reduce their lead times and order quantities to match their customers' demands."

VMI focuses on MRO items, for now. "Our first VMI initiative with a key MRO supplier has enabled us to increase fastener turns over 225%," reports a materials manager at a midsize facility manufacturing reduction equipment. "We're in the process of studying how to optimize supply chain technology to maximize VMI initiatives. Part of the plan is to integrate logistics within the supply chain to achieve partnerships in our total business process."

VMI implementation rolled out to seven warehouses. An inventory management manager at a large utility established a VMI program for janitorial and consumable inventories. "We rolled them out, one at a time, over seven warehouses, after holding extensive briefings with the union representatives, our own accounting people, and the director of materials management," he reports. To date, they have removed \$500,000 from their average inventory investment. The manager also reports ancillary benefits from eliminating handling and monitoring activities by warehouse workers and a reduction of invoice processing to only once a month.

Suppliers have latitude with VMI process. "We moved into VMI partnerships with our primary suppliers, those who provide us with our 'A' stock and components," mentions an inventory control manager at a small producer of air filtration equipment. "The suppliers are provided with min/max levels, and they can ship anytime within this window," he explains. "This results in the fastest throughput of our 'A' items, and no POs [purchase orders] are ever issued for these items," he adds.

Storerooms eliminated with VMI practice. The director of purchasing at a midsize maker of thread is currently "working with two suppliers on a VMI system. We began by establishing a pilot program to demonstrate the effectiveness of the practice and technology. From this pilot alone we have been able to do away with the storerooms," he explains.

The director tells of another VMI project in which a supplier will purchase and install the hardware that will automatically "read" the liquid level in a series of tanks. "This will enable the supplier to monitor and automatically

refill the tanks for us at the appropriate time. For us, it eliminates the need for manpower and paperwork associated with controlling this inventory.”

Information sharing helps to slice lead times. “We’re sharing more information of our anticipated and forecasted needs with suppliers and also have increased the amount of preseason planning information we provide them,” explains a manager in a midsize apparel company. “By so doing, and experimenting with VMI concepts, we’ve been able to reduce our lead times and overall commitment within the pipeline,” she offers. “We have also increased use of uncommitted reserves at the suppliers.”

Adopting VMI and melding it with bonded inventory a success. The director of quality and operations at a small producer of telecommunications test equipment announces that the organization already has implemented a program to unite VMI and bonded inventory.

“We’ve been able to reduce on-site inventory levels significantly, while also increasing the turnover ratio dramatically,” he explains. “Furthermore, we’ve been able to just about eliminate any vestiges of obsolete and excess inventory, which is extremely costly in our industry.”

Information sharing reduces total cycle time. A third party logistics provider reveals that VMI partnerships have enabled him not only to increase inventory accuracy but also to reduce the total cycle time of moving products to the customer. “We find much value in partnerships where we and the customer share information with each other,” the general manager offers. “We’re currently investigating how we can apply gain-sharing benefits to these relationships.”

Local warehouse finds additional business to pay for VMI initiatives. In an interesting development, an inventory manager at a major producer of medical instrument assemblies tells of a supplier with whom they entered into a VMI relationship. The supplier decided to locate a warehouse near the manufacturing facility, believing that it would more effectively handle the VMI demands. In reality, the supplier found that they were servicing their entire regional market from this warehouse, enabling them to extend VMI services to other customers. “In a few months, they were able to recover the costs of the new facility and VMI technology,” he reports.

VMI initiative helps slash 75% off raw materials inventory. A materials manager at a midsize builder of telecommunications systems has entered a “supplier

managed inventory program where the supplier stocks inventory and we only keep five days worth in our plant.” He explains, “This is a significant reduction of inventory we normally kept on hand, and it also cuts in half our need for outsourced finished goods.”

Seeking additional VMI relationships for the future. A cost and inventory control manager at a midsize maker of furniture plans to “further extend our VMI relationships and increase the number of partnerships with our suppliers. We’ll be doing a lot more sharing of forecast and production plans with them,” she insists.

However, another reader, the director of logistics at a large supplier of office products, cites an interest in pursuing VMI in the near term but admits, “We need to learn to walk before we’re ready to run. We’ll start by re-vamping our supply chain practices, and then look to VMI,” she declares.

CASE STUDY: TEXTBOOK VMI PAYS DIVIDENDS IN JUST FIVE MONTHS

By Rodney A. MacLea, Assistant Vice President of Materials, Tekelec, Inc. (Calabasas, Calif.; rod.maclea@tekelec.com)

Tekelec has implemented a VMI program that is integrated into its manufacturing process. We have created a fully integrated, closed-loop, transactionally error-free, and highly auditable process that stretches from customer shipment to inventory replenishment.

Within only eight months we were able to identify, adapt, program, and test this system. Fully operational now, we have been running increasing production levels through the system for five months and have achieved the following:

- Inventory turns for the division have increased an average 40.6% from the preceding year to a current high of 7.9%.
- Inventory levels for the division have been reduced by 30%, and on-time shipments are up 1% to over 98% .
- Months supply of inventory based on forecast are down 30% from what they were in January 1997, and we have not had a single stockout. Our months supply of inventory is 1.5 months, with reported telecom industry mean of 3.1 and a best in class at 1.7.

Identifying project objectives that VMI had to meet. We began by selecting our switching division production line for our first VMI program. Our decision was based on the bill of material (BOM) structure of the products, their growth rate as it relates to the company, and the capabilities of the contract manufacturer used for the division.

The primary objective was to reduce the cycle time required for replenishing the manufacturing cell inventories (which it has done by 40% to date) and to better support the pull manufacturing method. We only “pull” product through the system to replenish shipped product, and we do not “push” work orders based on MRP outputs.

Our second objective was not to add any liabilities typically associated with increased inventories (delayed implementation of engineering change orders, increased scrap risks, increased carrying charges). Last, we wanted to maintain maximum flexibility by not committing material early in the process to finished goods.

Developing the VMI strategy. We identified the core competencies of all parties to be involved in our replenishment process. Once we agreed with the role that each organization would play, we began to select suppliers. Two of the component suppliers were already working with another telecommunications company in a VMI project. They also had a basic understanding of where we wanted to take Tekelec.

An additional advantage was that the two component suppliers and the contract manufacturer shared our vision of the potential gains that could be achieved if we were to work as a dedicated team.

Putting the team to work. We began by reviewing the existing replenishment process for redundancy, inefficiencies, and monetary risks. Major areas requiring attention included multiple repeat purchase order, excessive handling, and large inventory balances.

The Tekelec process for producing printed circuit boards at a contract manufacturer was typical of others in the industry. However, we differed in that we used a two-bin system to replenish our raw materials inventories. Although we achieved a two-week cycle time, which was close to best in class, we were not comfortable with the level of waste and redundancy in the process.

The team identified several companies (and here the suppliers were especially helpful) that were considered to be leaders in efficient material management. We visited their facilities so that the team could see firsthand what others were doing in materials management.

Designing the VMI system. The basic flow of the new Innovative Material Pull Assembly Concept Team (IMPACT) process has three key differences from our original process:

- The material is owned by the distributors until it is delivered as an assembly.
- All transactions typically associated with ordering, receiving, issuing, and paying for materials are highly automated.
- The process has an extremely short cycle time (6 to 8 days) while maintaining flexibility.

In addition to reducing cycle time by approximately 40% and reducing component handling by 25%, the new VMI process limits our material liability to only those components used to assemble products received from our contract manufacturer. The component distributors maintain ownership of all material warehoused at the contract manufacturer.

Testing the VMI System. The required programming was given to the team for testing in the fourth quarter. After testing the entire process in a duplicate test database supplied by our information systems (IS) department, the programming changes were loaded into the Tekelec database.

The team began pilot testing the following January. The approximately two-month pilot process included a final phase at complexity levels that stressed the system beyond any that we would typically see during actual production.

Adapting the system for installation. The Tekelec main information system presented some unique challenges. First, the system was not capable of handling EDI transmissions, which is a key requirement of VMI. This was resolved by purchasing an EDI package and integrating it into our system. Some of the additional programming (done by our own IS department) included adding data fields to the stock files, modifying the purchasing module, rewriting the receiving module, and modifying numerous reports.

All but one transaction in this new process are either electronically generated or entered as bar code to eliminate any risk of input error. Issuing “push” items to work order is the one transaction that is not fully automated.

We continue to maintain full control over push items such as custom ICs or bare PCBs. This transaction remains as in the original process and is easily audited.

Reviewing the new system's operational controls. To ensure that there is adherence to established controls, the team signs off the impact checklist monthly. This validates that they have reviewed their areas of responsibility and that no unusual issues have occurred during the month. Among the operational controls introduced are

- *Back-flush.* Extensive controls were put in place at the receiving dock to ensure that transaction errors cannot be created here.

- *Material and labor costs.* All costs are reviewed and, if necessary, negotiated each month. Upon approval by all parties, they are signed off and input for use in the coming fiscal month. Because we pay for product as we consume it, inventory valuation for finished assemblies runs closer to actual market value.

- *Data accuracy.* To ensure that the back-flush process operates correctly, all pertinent data points in the stock file must be complete, accurate, and not in conflict. An automatic audit process was developed to monitor these data during any input or update to these files. Conflicting entries are prohibited, and changes to the database automatically generate e-mails to both accounting and purchasing. Our suppliers, having confidence with our system's accuracy and control, allow Tekelec to generate the invoices at the time the material is received.

CASE STUDY: SUPPLIER SCHEDULING PLUS VMI EQUALS POWERFUL INVENTORY REDUCTION TOOL

Many inventory managers are exploring VMI, but few have gone the next step by combining it with supplier scheduling and enterprise resource planning (ERP). Werthan Packaging, Inc. (Nashville, Tenn.), has.

Transformation begins with VMI. “Requests by certain key customers identified VMI as a high priority,” asserts James G. Hutzler, CPIM, director of production and inventory control. Werthan started VMI with their second largest customer because it had been the most interested in the process. “This created the need for realignment of customer service, master planning, and production and inventory control functions,” he reported in a presentation coauthored with Donald P. Belmont, president and COO, and Mark K. Nichols, who assists in the VMI, ERP, and agile manufacturing implementation.

Werthan hired a demand planner at the outset. The new ERP system also played an indispensable role within the VMI project by providing previously unavailable information about demand patterns. “Not even our customer had this type of information,” Hutzel declared at a recent Annual APICS International Conference.

Providing products on a predictable basis. Werthan created master production schedules to replenish products on a timelier basis, and customer service jumped to new levels. “This allowed us to exchange information for inventory,” he explains. “We dedicated a lot of effort to fully analyzing and understanding our customer demand patterns and calculating run rates and safety stock levels for finished goods.”

The demand planner position is extremely important. It is the primary link with the customer on a daily basis, he notes. Also, it is the one position “most directly involved in predicting demand pattern changes and our subsequent obligation to provide the product.”

With the demand planner working directly with the customer’s planner, the accuracy and speed of information exchange improved significantly. “The planner soon became more than just a demand planner,” Hutzel notes. They were soon performing master production scheduling activities, such as maintaining and loading the planning BOMs, releasing master production schedule (MPS) orders, releasing customer orders, capacity planning, and VMI planning.

Later duties included sales and operations planning (S&OP) preparation, leadership of the S&OP meeting, and leading the daily production control meeting with master planning and production personnel. “We were broadening this individual’s experience and skills with total exposure to our business processes and regular, frequent interface with our customers,” Hutzel maintains.

Look back into the chain and engage the suppliers. “Once we had a stable, level-loaded master production schedule and had cleaned up the shop orders and other parts of our ERP database, we were able to move to a supplier scheduling process,” he explains. Working with the purchasing team, they moved the MRP items (dependent demand items) for these customers to the demand planner.

In effect, Werthan had vertically integrated four levels of the ERP flow into one position. “Supplier scheduling was critical to our success since lead

times for paper, our critical component for all bags, can be five to six weeks," he notes. The only effective way to reduce that lead time is through supplier scheduling.

Reserve production time with the supplier. "We have to get projected paper requirements to our suppliers in order to get on their MPS so we do not have to wait the entire five- to six-week lead time," he explains. "We arranged to buy capacity in their schedule and not part numbers until the demand time fence was reached."

A detailed project plan covering all key activities/tasks was the foundation of the supplier scheduling project. They ascertained that fewer than 12 suppliers provided more than 80% of Werthan's raw material. These became the targets for supplier scheduling.

"We targeted the A items and the A suppliers," Hutzel declared. "This would give us the most benefit for the amount of effort in implementation." One of the first things they did was to bring in the suppliers for an educational session. "We wanted to bring them up to speed on what we were doing and how this new process would affect them," he explains.

Combine VMI with supplier scheduling and make it work. The linking process began by involving the master planner in the implementation of this new, combined initiative. "This was natural since the master planner performed all activities associated with the 'top end' of ERP with these customers," Hutzel describes. "One key to this project is we did not give the demand planner all product lines and all customers. We gave him just A customers (all items) and all dependent demand materials associated with those finished goods-level items."

They also allocated the MRO and expense items to one buyer so that this demand planner was spending time on the "valuable" A and B material and not on 1% items.

"We reorganized the previously horizontal alignment of duties with several separate associates within the organization to be a vertical one with one master planner covering all duties and responsibilities for several A customers," he details. "This planner is much more efficient and handles all tasks involved in supporting one or more customers through to the supply base."

Werthan set up planner codes for each grouping of items by customer. This allows the master planner to identify all items associated with a given customer quickly and easily. "It also allows us to track inventory levels by planner code and produce other critical reports effectively," he states.

The master planner is the key link between customer and supplier. The master planner works the VMI process, determines demand rates, sets the planning BOM, creates the MPS, and does MRP for shop and purchasing requirements and supplier scheduling.

“Normal ERP reporting processes are sped up dramatically, since there is no one else to communicate with,” Hutzel explains. “Instead of relying totally on an ERP system report, many tasks/activities are handled within the scope of this one position. Follow-up tasks are internal within this function.”

The master planner’s primary contact is a planner position that is similar in many ways to his or her position. The planner position at the customer’s or supplier’s operation is defined mostly by those organizations’ directives. However, Hutzel maintains, “We have seen that the initiation of these new processes has a positive effect on the level of performance for these external supply chain planners and that the exchange of information is essential to creating a well-functioning supply chain process.”

HOW TO CALCULATE THE SAVINGS ASSOCIATED WITH VMI PROGRAMS

Thirty-three percent of the respondents to a *Managing Logistics* survey say that they initiated VMI programs to control logistics costs. How much are they actually saving? New data from the Distribution Research and Education Foundation (DREF), the research arm of the National Association of Wholesaler-Distributors (NAW; Washington, D.C.; 202-872-0885), offers advice on how to calculate the savings associated with VMI and determine if it is right for you.

One Distributor’s VMI Experience

NAW measured one distributor’s performance in its three branches (small, medium, and large) before and after implementing VMI across three parameters: inventory levels, out of stock position, and sales and purchasing effort.

Measurements began eight months into the VMI installment. At that point, inventory levels had dropped (after an initial spike up), in-stock percentages had leveled out, and the initial purchasing effort required in the transfer of responsibility for the day-to-day ordering had also decreased. To

Table II-5.1 Analysis of Pre- and Post-VMI Implementation

Small Branch	
Average in-stock percentage prior to VMI	98.5
Average in-stock percentage after VMI	98.1
Average weekly sales prior to VMI	\$10,267
Average weekly sales after VMI	\$11,429
Average inventory level prior to VMI	\$94,535
Average inventory level after VMI	\$78,555
Number of hours spent by rebuyer/buyer each week prior to VMI	8
Number of hours spent by rebuyer/buyer each week after VMI	4
Medium Branch	
Average in-stock percentage prior to VMI	97.6
Average in-stock percentage after VMI	98.2
Average weekly sales prior to VMI	\$18,860
Average weekly sales after VMI	\$24,208
Average inventory level prior to VMI	\$195,957
Average inventory level after VMI	\$165,123
Number of hours spent by rebuyer/buyer each week prior to VMI	10
Number of hours spent by rebuyer/buyer each week after VMI	4
Large Branch	
Average in-stock percentage prior to VMI	93.1
Average in-stock percentage after VMI	96.1
Average weekly sales prior to VMI	\$151,421
Average weekly sales after VMI	\$157,057
Average inventory level prior to VMI	\$1,963,130
Average inventory level after VMI	\$1,167,519
Number of hours spent by rebuyer/buyer each week prior to VMI	12
Number of hours spent by rebuyer/buyer each week after VMI	6

Source: Electronic Commerce for Distribution Channels; DREF.

further refine the analysis, the study averaged the four weeks prior to VMI and the last four weeks using VMI (see Table II-5.1).

Calculating the Benefits

In analyzing the cost benefit of reduced inventory, subtract current inventory from previous inventory levels. Then multiply this reduction in inventory by a carrying cost factor. For the purpose of the NAW study, a carrying cost of 20% was used. The carrying cost includes all costs associated with inventory, such as cost of money, cost of storage, insurance taxes, increased work effort to move and work around extra inventory, and the like. The bottom-line benefit before taxes for each of the branches is shown in Table II-5.2.

Establishing the value of changing service levels can be more difficult.

Table II-5.2 Inventory Reduction Analysis

Small Branch	
Before VMI	\$94,535
After VMI	\$78,555
Lower inventory	\$15,980
Carrying costs	20%
Bottom line	\$3,196
Medium Branch	
Before VMI	\$195,957
After VMI	\$165,123
Lower inventory	\$30,834
Carrying costs	20%
Bottom line	\$6,167
Large Branch	
Before VMI	\$1,963,130
After VMI	\$1,167,519
Lower inventory	\$795,610
Carrying costs	20%
Bottom line	\$159,122

Source: Electronic Commerce for Distribution Channels; DREF.

The primary benefit of increasing service is believed to be increased sales, but the NAW survey shows that sales increased with VMI, despite a decline in in-stock percentage. Further, the distributor recognized that an increase in in-stock percentage might have a far-reaching impact on sales by affecting a customer's perception of the service being received.

To calculate an increase in sales percentage, multiply the in-stock percentage by the lost sales percentage. Then multiply this increase in sales percentage by the average weekly sales prior to VMI. Finally, multiply this sales increase by the yearly gross margin to arrive at an annual bottom-line impact (see Table II-5.3).

In many ways, buyer productivity is the easiest benefit to analyze. In the case of the NAW distributor, the buying function carried responsibility for resolving order-to-invoice errors as well as the actual act of placing purchase orders. Much of the reduction in time came from invoices matching orders on a more regular basis.

To put a dollar figure to this benefit, establish the fully loaded cost of an employee, including insurance, taxes, training, and salary. Then determine how many hours are saved each week and annualize this against a 2,000-hour work year. The calculations are shown in Table II-5.4.

Table II-5.3 In-Stock Percentage Analysis

Small Branch	
Increased service	-0.4%
Lost sales	50%
Increased sales	-0.2%
Average week sales	\$10,267
Expected week sales	\$10,246
Actual week sales	\$11,429
Annual increase	-\$1,092
Gross margin	30%
Bottom line	-\$328
Medium Branch	
Increased service	-0.6%
Lost sales	50%
Increased sales	-0.3%
Average week sales	\$18,860
Expected week sales	\$18,917
Actual week sales	\$24,208
Annual increase	\$2,942
Gross margin	30%
Bottom line	\$883
Large Branch	
Increased service	3%
Lost sales	50%
Increased sales	1.5%
Average week sales	\$151,421
Expected week sales	\$153,692
Actual week sales	\$157,057
Annual increase	\$118,092
Gross margin	30%
Bottom line	\$35,428

Source: Electronic Commerce for Distribution Channels; DREF.

Finally, Table II-5.5 shows total savings. For this, add together the three bottom-line benefits and then annualize sales based on the average of before- and after-VMI sales averages.

Jumping Over VMI Hurdles

If the savings do not add up to what you had hoped for, you might want to think about how you implemented the VMI program in the first place. One of the greatest snags in the pre-VMI stage is misconception by CEOs, says

Table II-5.4 Buyer Productivity Analysis

Small Branch	
Employee cost	\$70,000
Hours pre-VMI	8
Hours post-VMI	4
Hours saved per year	200
Bottom line	\$7,000
Medium Branch	
Employee cost	\$70,000
Hours pre-VMI	10
Hours post-VMI	4
Hours saved per year	300
Bottom line	\$10,500
Large Branch	
Employee cost	\$70,000
Hours pre-VMI	12
Hours post-VMI	6
Hours saved per year	300
Bottom line	\$10,500

Source: Electronic Commerce for Distribution Channels; DREF.

Thomas A. Kozak of Pan-Pro (Tinley Park, Ill.; 888-507-5400), a VMI service provider. Too often, he says, executives see VMI as a tactical opportunity that departmental people should execute. Everyone involved must view it as a strategic priority.

Another big hurdle is getting all supply chain partners to see each other as trust partners with whom they must share data, effort, and benefits. “This goes against 100 years of close-to-the-vest haggling,” says Kozak. “You know that once you decide to go for a basic VMI relationship, you have to stop all of the channel-loading bribing games that make both sides feel like they have achieved a short-term victory. This winds up undermining the longer-term, bigger benefits of inventory flow through the pipeline.”

Stephen Kemper, principal at Pittiglio Rabin Todd & McGrath (Mountain View, Calif.; skemper@prtm.com), says that if VMI is to flourish, the following developments must occur among partners:

- *Formal inventory management parameters and mechanisms for tracking service performance.* Without rules-based inventory models and target service levels, the amount of inventory will rise to excessive levels.

Table II-5.5 Total Savings with VMI

Small Branch	
Reduced inventory	\$3,196
Increased sales	-\$328
Reduced buyer effort	\$7,000
Total benefit	\$9,868
Projected sales	\$564,096
ROS increase	1.7%
Medium Branch	
Reduced inventory	\$6,167
Increased sales	\$883
Reduced buyer effort	\$10,500
Total benefit	\$17,550
Projected sales	\$1,119,768
ROS increase	1.6%
Large Branch	
Reduced inventory	\$159,122
Increased sales	\$35,428
Reduced buyer effort	\$10,500
Total benefit	\$205,050
Projected sales	\$8,020,428
ROS increase	2.6%

Source: Electronic Commerce for Distribution Channels; DREF.

- *Mechanisms for exchanging information on levels of on-hand inventory, daily consumption, and inventory in transit.* For a VMI program to be effective, there must be nearly real-time visibility of channel inventory levels and required replenishment actions. Caution should be used when designing these information exchange mechanisms to ensure that they are scalable across the various channel partners' systems.
- *Processes for consistently delivering products to channel partners within set lead times.* Without reliable and timely deliveries, uncertainties about product availability will result in excessive inventory buffers.

If you would like a copy of *Electronic Commerce for Distribution Channels*, contact NAW Publications, 1725 K St., NW, Dept. T, Washington, DC 20006; 734-468-4126; pubs@nawd.org. Price is \$93 for NAW Direct Members, \$115 for NAW Member Associations members, and \$131 for non-members. Shipping and handling charges are \$5.50. Online orders receive an automatic 5% discount (www.nawpubs.org).

WHERE PURCHASERS HAVE MAJOR ROLES TO REDUCE CYCLE TIMES

One of the pressing challenges confronting purchasing is reducing cycle time (see sidebar). However, of the respondents to the *Supplier Selection and Management Report Cost Control Survey* who cite cycle time as a problem, about one in four admits that he or she has not yet solved it. For them and others who are wrestling with cycle time reduction challenges, this exclusive article by noted authority Richard (Rick) Titone, president of The Why How Consulting Company (Clifton, N.J.; 973-478-8965), provides some guidelines and directions.

Procurement lead time is the critical component. A rule that applies to any manufactured product is that procurement lead time will always be longer than the manufacturing lead time.

Where Purchasing Is Guilty of Stretching Cycle Times

Purchasing may “unwittingly foil cycle time reduction efforts,” according to Richard (Rick) Titone, president of The Why How Consulting Company. By reviewing its own processes, a company can detect several candidates that will shorten cycle time requirements. Titone cites some examples of where purchasing activities do contribute to longer cycle times:

- How many times have you gone out for multiple quotes on a relatively simple-to-purchase item? Then you waited around for a few weeks for all those requests for quotes (RFQs) to come back, just to meet a corporate directive for so many RFQs per dollar or number of buys?
- Does sourcing an item offshore really make sense if the delivery lead time and transportation cost increase so significantly that it offsets the cheaper price?
- Have you ever arbitrarily increased the quantity on a requisition in order to obtain a better price, or just to meet a price break point? It does take longer to make 10,000 pieces than it does to make 1,000. Even though the supplier saves some setup time, and you get a price break, the lead time may have been longer.
- Have you ever tightened up on specs or quality requirements in an effort to improve the quality of incoming materials? Doing so may require the supplier to conduct additional tests or inspections, thereby increasing lead time.

This is the question purchasers must ask: “Are my supplier’s lead times padded?” And if so, by how much? Supplier visits, comparisons to other suppliers in the commodity field, or a check with your own manufacturing engineers will help verify the validity of a supplier’s lead time. Other indicators are how quickly they respond to emergency orders and how many advance deliveries they make.

Looking internally for cycle time reduction opportunities. Purchasing can play a significant role in cycle time reduction on an internal basis. Your actions will assist other functional areas to shorten their cycle times as well. For instance:

- Establish supplier partnerships that ensure frequent deliveries of high-quality materials. These will not require intermediate incoming inspection, and the materials can go from dock to point of use in the factory. This will reduce manufacturing’s lead-time requirements.
- Specify container or lot sizes in line with manufacturing kanban size. This will reduce storeroom picking time and material handling time. Also, storage in, as well as reuse or recycling of, the containers is a time and money saver.
- Arrange for some consignment inventory to be stored somewhere close to the manufacturing facility. This initiative reduces both the transportation time and the availability time of the material for manufacturing.
- Establish an EDI network between the supplier and your company. This can greatly reduce the amount of time required to call in orders, mail POs, receive acknowledgments, and receive and pay invoices. An untold amount of data of a nonproprietary nature can be transmitted via these EDI networks, and this greatly contributes to the reduction of cycle time in numerous organizations. Further, using the EDI link with the supplier to place orders automatically on approved supplier partners based on a fixed low-limit quantity in inventory is another good use of such networks.

Be the one to resolve those problems that arise with suppliers. Purchasing agents and buyers are the eyes and ears of the company as far as suppliers are concerned. Therefore, they should know the internal chain of command inside the supplier’s company, and in many cases they should know the de facto powers who can really get things done when there is a problem to resolve. By working with inspection, accounting, production control, quality, and product and manufacturing engineering, the buyers can greatly assist in expediting the resolution of problems.

Get involved in product development to accelerate cycle time reduction. The time it takes to get new products to market is critical in today's highly competitive environment. For instance, for the electronics industry, using privately funded research and development takes two years to bring a new product to market, with an 80% success rate. In the computer industry, it takes just one year, with a 95% success rate.

The secret is that in many of these organizations a buyer serves as a member of the design or product development team working on the new product. Every time designers or engineers specify a new part or material that is not currently purchased or available, they have to first run it by the purchasing member, who determines availability and cost. This process not only keeps new product costs in line but also prevents designers from specifying new and exotic materials when something more common and available will do.

With these and additional initiatives, purchasing professionals can be major contributors to successful cycle time reduction initiatives.

Chapter II-6

Audits and Physical Inventory / Accuracy

CYCLE COUNTING OFFERS QUALITY ASSURANCE FOR INVENTORY MANAGERS

Cycle counting has gathered an impressive array of followers. According to our recent survey, one in three respondents has started a cycle counting practice in just the last year.

What cycle counting is really all about. For most practitioners cycle counting is thought of as a tool to achieve inventory record accuracy. In reality, the primary objective of cycle counting is to identify and reduce the causes of inventory error. Leading authority Kenneth B. Ackerman, president of the K. B. Ackerman Company (Columbus, Ohio), asserts, “The by-product of identifying and eliminating errors is accurate inventory.”

Meanwhile, cycle counting expert Robert A. Stahl, CPIM, president of R. A. Stahl Company (Attleboro, Mass.), emphasizes, “As with any well-designed quality assurance procedure, the role of cycle counting is not only to measure the level of conformance to expectation but also to provide for cause and corrective action when conformance is not achieved.”

Defining the “real” goals and objectives of cycle counting. According to Stahl, there are two fundamental types of cycle counting. One is geared toward identifying cause and corrective action (control group cycle counting), the other toward ensuring conformance to the expectation (random cycle counting).

The distinguishing characteristic of control group cycle counting is a “short interval of time since the last known and accurate count,” he notes. Steps to performing a control group cycle count are explained in the sidebar.

Be wary of early cycle counting successes. Because control group cycle counting pays a lot of attention to a few items, Stahl observes that the individuals pay particular attention to the items in the control group. “Therefore, the errors are not corrected throughout all practices, but only in those practices that affect the items in the control group,” he warns. Therefore, he advises changing the control group to different items after success with the initial control group. “Creating a rolling control group is the solution to this situation.”

When to begin the random cycle counting process. “This type of cycle counting should not be started on a regular basis until the control group counting has solved the causes of inventory record inaccuracy,” Stahl advises. “If the accuracy is not meeting expectation, the causes must be identified and fixed. Random cycle counting does not provide a good means for doing either,” he notes. Random cycle counting only establishes whether conformance to expectation is present. It is a type of mathematical sampling. A sample of the inventory is taken, and an inference to the entire inventory is drawn. If the sample yields a 95% accuracy level, then the inference is that the entire inventory is 95% accurate.

What and when to count. Ackerman follows Pareto’s law (80/20 rule), or the A-B-C inventory stratification concept, in defining what to count. For instance, he advises, “A typical scenario would involve counting 6% of the A items, 4% of the B items, and 2% of the C items each week.” When should you count the items? When the counting is easy, he says, citing these examples:

- When an item is reordered
- When an inventory balance is zero or a negative quantity
- When an order is received
- When the inventory balance is low

Looking at the requirements of the individual cycle counters. Ackerman believes that the number of people who should do cycle counts depends on the

How to Establish a Control Group Cycle Counting Process

The steps to perform control group cycle counting include the following:

Task 1: Select the Control Group

The selection of the control group should represent the inventory in the target area, including parts or materials of all types, involving all activities. It should include

- high cost vs. low cost
- hand count vs. scale count
- high usage vs. low usage
- big parts vs. small parts
- stockroom vs. floor stock
- discrete issue vs. bulk issue trans.
- backflush

Usually there is a relatively small number of items in the control group. It makes sense to record the results by area of responsibility, in order to make the corrective action responsibility more clear as the project expands.

Task 2: Count the Control Group

Physically count the parts/materials of the control group. Take extra care that the counts are correctly supervised. It often helps to have the material handling or warehousing people perform their own physical counts. This way, they more easily achieve “ownership” of the process.

The counting interval should be no greater than one week so that they can most readily identify causes of error. Actual counting, however, can be done daily; that is, count one-fifth of the items every day.

Task 3: Compare Counts with Records

This administrative step simply compares the physical count with the computer records. Care must be taken to ensure a clean cutoff of inventory transaction information.

If reconciliation shows that a discrepancy between the physical count and the computer records exists, the first action is to conduct a second count to ensure accurate physical accounting. Once it is clear that a discrepancy is identified, the counters submit an adjustment to the computer records. This adjustment must be approved by the person responsible or accountable for inventory record accuracy (i.e., the stockroom manager).

(continued)

Task 4: Reconcile and Identify Causes of Error

This is the most important task to gaining and sustaining inventory record accuracy. In the initial stages (when errors are high), it is a very time-consuming effort; however, it is one that must be done thoroughly.

Since the interval to the last known count was only one week, it is highly likely that the precise cause of error can be found. Regardless, an exhaustive effort needs to be put forth to determine the certain cause of error. Conclusive evidence is the objective; circumstantial evidence causes people to be uncertain and defensive.

Task 5: Develop Corrective Action

There are only two ultimate causes of errors in inventory record-keeping practices:

- Procedures inadequate to achieve the objective regularly
- Human error in executing the procedures

Unfortunately, the tendency is to blame people too quickly for errors. If this is done, the result is often that people feel threatened and spend more time defending themselves than looking for solutions.

If people are making mistakes, it might be that the procedures are incapable of being executed regularly with normal care. Perhaps the procedures (or tools to do the job) need to be changed and improved.

There are various techniques that help with this problem-identification and problem-solving part of control group counting. Among them are Pareto charts, storyboarding, cause and effect diagrams, run charts, check sheets, and control charts.

If the errors continue, focus on that in discussion: What's wrong with the problem-solving process? Simply that if the errors are not eliminated, inventory record accuracy will not be achieved. If the errors continue, do not accelerate the cycle counting effort.

Task 6: Publish Results

Publishing the results takes two directions: to the people doing the work and to management that is supporting the effort. The results published include not only the statistical accuracy results but also the causes and corrective actions.

Source: Robert A. Stahl, CPIM.

quantity of items in inventory, the desired count frequency, the number of storage locations for each item, the number of count irregularities (re-counts), accessibility of items, and physical characteristics of the items.

“A realistic standard for a cycle counter is 40 items per day,” he offers. “The cycle counters should be familiar with the stock location system, the warehouse layout, and the items being counted.” He recommends that cycle counters be assigned to the job permanently, but “it does not mean cycle counting is necessarily a full-time job,” he insists. Cycle counters also must recognize the probability of crossovers. “When a count reveals an overage in one item, the counters should be able to identify and check those items that would normally be confused with the one that is not in balance,” Ackerman explains.

Cycle counting is not a one-shot effort. Even after success is achieved, “the job is not done,” warns Stahl. “Maintaining error-free record keeping is necessary.”

“Continuous error investigation is critical to the cycle counting process,” affirms Ackerman. Stahl concurs, “Cycle counting is a must to ensure that as changes occur and when the attention wanes, error-prone practices don’t return.”

EXCLUSIVE SURVEY: HOW THIRTEEN INVENTORY MANAGERS ARE EXPANDING CYCLE COUNTING APPLICATIONS

When there’s a problem with inventory accuracy, inventory management personnel often turn to cycle counting for the remedy. In a recent *Inventory Reduction Report* reader survey, almost 70% of the respondents who cited “maintaining inventory accuracy” as their major challenge listed cycle counting as the tool of choice to correct the condition.

For example, the manager of quality/materials at a midsize producer of motors said, “Since establishing an active cycle count program, our inventory accuracy has moved from 80% to 95%, and we’re still improving our performance with each passing month.”

Cycle counting is not only for improving inventory accuracy. Beyond its accuracy-enhancing benefits, cycle counting is also becoming a prominent inventory management practice. In the same survey, cycle counting moved into the top

five practices that readers claim have been the most effective in controlling their inventory during the past year. Specifically, one in three respondents cite cycle counting as an effective practice. Only two years earlier, the response was below 30%.

In our opinion, this growth has accelerated because of the impressive results that inventory managers are experiencing. In fact, many readers have shared their experiences and applications. The following excerpts provide real-world examples of where cycle counting is working successfully.

Making inventory accuracy a priority. “When I came to this company 10 months ago, inventory accuracy carried a low priority,” says a materials manager at a large producer of power generation equipment for the utility sector. “One of my first priorities was to ‘sell’ the advantages of inventory accuracy within the organization, especially what it means to the bottom line.”

Simultaneously, he organized a “focused physical inventory,” which was done “all at one time, and with the proper manning resources.” Following the physical, which provided the company a base, “We greatly upgraded the cycle counting program and coupled it with ABC analysis. We now can report that we’ve significantly reduced our inventories and have a much better understanding of what we have and where it is located throughout the facility,” he continues.

Payback covers additional salary of one person. “Our inventory situation was a mess,” explains a materials manager at a midsize maker of surgical devices. “Our recommendation was to reinstitute cycle counts. However, since our resources were rather limited, we had to hire a person and train him in the technicalities of the process.”

But it was the right move. “The savings we’re recording in less machine downtime due to inaccurate inventory far exceeds the salary of this additional individual,” the manager boasts.

Boosting accuracy to 99.7% for finished goods inventory alone. “We began a daily cycle counting program, and together with using the ABC approach, count about 50 parts per day,” reports a material services manager at a midsize maker of highly sophisticated electrical test instruments.

Over the last 12 months they have counted more than 20,000 parts and verified inventory accuracy at 98.2% for parts count and 98.8% for dollar value on raw materials. Similarly, for finished goods, accuracy is 99.5% for parts and 99.7% on a dollars basis.

“Primary to our success, we believe, is the emphasis we place at identifying and quickly correcting the root causes of errors that cycle counting brings to our attention,” he declares.

Eliminating plant shutdowns to do physical inventory. The logistics director at a large provider of logistics services summarizes his experience: “We enhanced our cycle counting procedures, which then helped us to eliminate inventory out-of-stocks, reduce inventory errors and loss, and cut back our quarterly shutdowns for a physical inventory. Now we do it only once a year.”

Improving planning decisions. “Our cycle counting and internal audit processes have finally convinced our planners that our inventory accuracy is consistently high enough for them to make their decisions with much more confidence,” explains the lead person of inventory control at a large manufacturer of material handling equipment. “They no longer have to pad their decisions because of concerns over inventory accuracy.”

Better view of slow-moving inventory. A distribution manager at a small supplier of electrical tools maintains that “cycle counting has allowed us to view patterns in our inventory that show up as slower-moving and obsolete items. It throws up a red flag that prompts quick action.”

Training initiatives essential to cycle counting program’s success. “The previous manager had eliminated the cycle count program, and some material had not been counted or verified in over three years,” maintains the corporate materials manager at a large producer of equipment for the semiconductor industry. “We did an audit and found our inventory accuracy at a dismal 60%.”

The parts today are all counted, with accuracy moving past the 90% mark and “climbing every day.” The key to this improvement, he says, is the training that was provided to the entire warehouse staff. “We taught them the intricacies of cycle counting and the impact accuracy has on the production floor and bottom line.”

Fixing the causes for errors promptly. “Our inventory accuracy was horrible,” relates the plant manager at a small manufacturer of industrial valves. “We typically kept too much of the wrong inventory. Today we have a daily cycle counting program, and we cycle through our entire inventory in about two weeks,” he states. “One thing we learned was to remain dedicated to fixing the problems that we find when we do a cycle count. So, each week we cor-

rect the problems we find, and the following week, our accuracy improves that much more.”

Slashing end-of-month inventories by 90% through vigorous cycle counting process. The business planning manager at a large maker of wireless electronics products implemented a cycle counting program as part of an internal finance reporting process.

“Our goal was to reduce the amount of end-of-month inventory that was at our forwarder,” he explains. “The sales were reversed for the products that were at the forwarder’s location at the end of the month. This situation pushed sales to make sure that the product was not just made, but that it also was shipped,” he details. “Since we began the cycle counting program, we’ve reduced our end-of-month inventory from an average \$3 million to about \$300,000, and it’s still in decline.”

Getting good cycle counting results requires commitment. “We looked at cycle counting a few years back, and we just didn’t get the results we thought we should,” explains the director of purchasing at a small producer of lighting fixtures. “The lesson we learned from that first attempt was that good cycle counting requires a committed and consistent work group, which we initially didn’t have.”

The purchasing director, who is now leading a renewed effort to implement cycle counting at the company, is focusing on selecting and educating the “right” staff before again introducing it at the plant level.

Cycle counting with assistance from bar coding and radio frequency (RF) technology. “To date, cycle counting has helped us determine the best way to control inventory,” maintains a purchasing manager at a large abattoir. “We implemented cycle counting with an inventory control system that includes bar coding and RF scanning equipment, and we are getting some great results.”

Annual inventory a thing of the past. Cycle counting at a midsize producer of hardware products is serving as a bridge between yesterday’s manual process and tomorrow’s automated system.

“We do random cycle counting of all inventory, and the use of RF/bar code technology has helped us eliminate our traditional year-end annual inventory practice last year,” the distribution center manager explains. “We’re now in the process of studying how to adapt RF/computer cycle counting into our operation.”

IT IS A MAJOR CHALLENGE BUT INVENTORY FORECASTS CAN BE MORE ACCURATE

Daily decisions for purchasing and manufacturing are all based directly or indirectly on forecasts. However, research indicates that forecast accuracy at the item level by month averages less than 62%. With this type of performance and top management pressure to optimize inventory, improve customer service, and better utilize resources, the only recourse is to develop more accurate forecasts.

Industry authority Ann K. Willis, CFPIM, CIRM, education and resource manager at ObTech, LLC (Mooresville, N.C.; ann.willis@obtech.com), puts this need into today's perspective. "A lot of emphasis has been placed on purchasing and customer service links in the supply chain," she explained at a recent Congress for Progress sponsored by the Mid-Atlantic chapters of the American Production and Inventory Control Society (APICS). "However, forecasting is often downplayed as having minor importance. In actuality, the forecast is the driver of the entire supply chain." Willis maintains that accuracy improvement begins with a sound forecasting process (see sidebar).

Toward a more accurate forecast. Experts and practitioners alike agree that forecasting is never easy. When accuracy is the goal, the challenge intensifies. Martin J. Mirsky, CFPIM, president of Supply Chain Systems, Inc. (Midland, Mich.; 517-923-3333), advises, "One axiom is not to try to forecast at a detail level more than is reasonable."

Meanwhile, demand management expert John R. Allen, CFPIM, CIRM, president of Applied Management Solutions, Ltd. (Chalfont, Pa.; 215-822-5878), says, "We want to work toward a perfect forecast. At minimum, we have to be perfect at the product family level, then work for perfection at the product level."

Similarly, Donald H. Sheldon, CFPIM, CIRM, vice president of Buker, Inc. (Oxford, N.Y.; 607-843-2510, ext. 52) explains, "In most businesses it should be recognized that forecasting at the SKU level will probably be inaccurate." Like Allen, he develops "product families and using breakpoints as forecast buckets."

Why greater customer involvement is necessary. "It is much easier to use the customer's information to determine future needs than to attempt to forecast what they will need without their input," counsels Willis. One technique she recommends is schedule sharing.

11 Steps to Building Credible Forecasting Process

To be effective, forecasts must provide proper and accurate information to all facets of the organization. The following policies and procedures will ensure that happens.

1. *Establish forecasting policies and procedures.* Address the following:
 - What items are included in the forecast?
 - When and how often is the forecast updated?
 - What horizons and time periods should be used?
 - How are statistical and judgmental considerations combined?
 - What functional area, or combination of areas, is responsible for the forecast, accuracy, and resultant inventory?
 - What key departments will review and agree upon the forecast?
 - Under what circumstances can the forecast be changed within the time fence?

2. *Determine what to forecast.* Analyze the bills of material to determine at which level the forecast should be done, remembering that the fewer the items, the more accurate the forecast is. Computer information systems that support customer-focused forecasting must have the capability to define and manage information at multiple levels of detail, from the strategic, down through market segments and product groups, and finally at the item level.

3. *Modularize options.* Forecast made-to-order assemblies and common components as separate items. Do not attempt to forecast every option available to a customer.

4. *Assign responsibility.* Accountability for providing and maintaining forecast data must be given to a specific individual or group, preferably someone with a vested interest in the forecast performance. The owner of the forecast should manage the process and track performance, merging input from all groups to prepare the forecast.

5. *Select forecasting tools and techniques.* These should be part of an overall system that allows for demand changes and supports the policies set by the organization. Use both qualitative (relying on judgment) and quantitative (relying on data) methods. Examples of quantitative methods are moving average, exponential smoothing, graphic methods, and trend projections. Examples of qualitative methods are market surveys, historical analogies, panels of experts, and the Delphi model. Also, it is critical to remember that a single forecasting approach may not be appropriate for everything being forecasted.

Different approaches and techniques are required for short- and long-term forecasts and for products in different phases of their life cycles.

6. *Determine how data are to be gathered and conditioned.* Conditioning or filtering points out problems such as missing data, extremely high or low points, and impacts of large one-time orders.

7. *Document assumptions.* The major assumptions that went into the development of the forecast should be documented so that they can be validated when the forecast performance is reviewed. Documenting assumptions, promotions made, and conditions during the period being reviewed makes it much easier to apply knowledge going forward. Review the history and the forecast as it exists. Apply what you know to that information. Why do your customers want the product? What phase of the life cycle is it in? Are there factors that may cause changes, such as weather, economic cycles, or whatever factors impact your particular business? The key is to use what you know about the future and the past to modify what history would tell you to do.

8. *Review items in a group if possible.* Patterns may begin to emerge that can be useful in reviewing exceptions and that will make it easier to define the true exceptions or actions to be taken.

9. *Analyze trends, seasonality, and promotional impact on a product line at the same time.* It is also helpful to think of yourself as a consumer during a promotional period. If I know that a product will be going on sale, I will not only delay purchasing but may buy more than I originally intended while the price is low.

10. *Measure the forecast.* You must establish measurements and set targets that measure the accuracy of each forecast and define steps for improvement.

11. *Monitor the forecast method.* Using tracking signals can help determine when to change methods of forecasting to one that will be more accurate. Most forecasting packages provide tools for this type of monitoring.

Source: Ann K. Willis, CFPIM, CIRM.

“Schedule sharing provides a way to actually assist the customer in accurately forecasting future demands while increasing the supplier’s future visibility and adaptability,” she details. The customer’s schedule becomes the supplier’s schedule, rendering the supplier simply an extension of the customer’s facility. Suppliers maintain regular communication with customer’s current inventory levels, desired minimum and maximum quantities, and production schedules. “This information determines future shipments required to reach optimum inventory levels,” Willis notes.

She also mentions distribution resource planning (DRP) as a tool. This time-phased logistics planning system uses techniques similar to those of schedule sharing in that it allows a company to substitute valid information for inventory. Willis also maintains, “The need for forecasting can be reduced, and even eliminated, as visibility is gained into customers’ true requirements.”

Once achieved, sustain forecast accuracy. “A forecast that is not tested for validity has little value,” states John C. Barry, CPIM, president of Modern Business Solutions, Inc. (Brookfield, Wisc.; jbarry@mbsi.com).

In addition, Sheldon believes that “part of the forecasting process is to confirm the plan and test it against risks. Eliminating this step puts the business at risk when decisions about inventory placement and customer service imperatives are not addressed.”

However, Willis warns, “The motive for measuring forecast accuracy should not be to point fingers at the forecaster.” She outlines the following for sustaining forecast accuracy:

- *Analyze the forecast error.* This requires more than just a review of past history, forecasts, and actual demand. The assumptions used to develop the forecast also are helpful in determining exactly why the forecast was incorrect.

- *Measure aggregate performance.* This evaluates how well actual orders matched the forecast for a particular product group. It can be useful for short-term decisions such as overtime or schedule changes. A continual pattern over several periods mandates analysis and review at a more detailed level.

- *Report exceptions when measuring at the item level.* This method will highlight those items that have mismatches. The numbers of each occurrence by type of exception, such as unusual demand, should be tracked. This will identify patterns for items or groups of items, which will be helpful in determining reasons for inaccuracies.

- *Measure the number of items that experience service level problems due to forecast error.* When tracked over time by forecast error, it will highlight those areas that need more observation, more input from sales, or tighter parameters.

**EXCLUSIVE SURVEY: INVENTORY ERROR
DETECTION, REMOVAL, MAJOR REASON FOR
SURGE IN CYCLE COUNTING**

Cycle counting continues to blossom as a best practice among managers of inventory. According to our latest reader survey, 41.4% of respondents have instituted cycle counting procedures during the past year. This is up from 32.7% a year ago and 29.6% three years ago. That's an impressive trend line.

Focus on rooting out the causes of inventory inaccuracy. Although the responses to a recent reader study continue to link cycle counting with greater inventory accuracy, the real advance is with the growing numbers of inventory management personnel who use cycle counting to get at the root causes of the inaccuracy in the first place. For instance:

- “We’ve been enhancing our cycle counting practice for the past three years,” explains an inventory control manager at a midsize maker of rubber products. “We’ve increased the quantity of products counted each day and zealously followed through on determining why there is an error. It’s been hard work—no doubt about it—but our inventory accuracy has greatly improved, and we no longer have to do a year-end physical,” she proclaims.
- “We are cycle counting to root out BOM errors and then fix them” reports a controller at a small producer of recreational boating products. “This eliminates future shortages and improves accuracy.”
- “Cycle counting has been our most successful venture, enabling us to pinpoint problem areas between full physicals,” an accounting manager at a small manufacturer of transportation equipment offers.

Applying the ABC approach to cycle counting. “We’ve been cycle counting for almost four years now,” reports the materials management manager at a large aircraft repair facility. “We use an ABC approach [see sidebar] and count the fast movers more often. This has permitted us to reduce stock on hand, provided we control and manage the usage rates, lead times, and safety stocks,” he explains.

No additional time is required to do the cycle counting. “We do cycle counting as part of the normal, daily job function; therefore, no additional costs are involved,” he maintains.

The Many Methodologies of Cycle Counting

Cycle counting uses a sampling technique and selects a small number of items to be counted each day. The following are methods of selecting part numbers for the sample:

- *ABC selection method.* This method focuses on maximizing benefits of accuracy while at the same time minimizing the effort and cost required. The ABC selection method usually carries a financial perspective that comes from classifying items into Class A, B, or C, based upon dollar/currency value.

For example, Class A items would consist of 10% of the inventory items which make up 60% of the dollar/currency value. Class B items would include the next 10% of the items that comprise 20% of the value. Class C items would be the remaining 80% of the items that are primarily of low dollar/currency value.

Under the ABC selection method, Class A items would be selected for counting perhaps monthly; Class B items, quarterly; and class C items, once or twice per year.

The ABC selection method is not always defined by currency value. Items may be reclassified based upon criticality, lead time, and storage space requirements, or some other factor. Whatever the perspective used, all items are classified and different sample sizes, count frequencies, and tolerance limits are applied to each class.

- *Reorder selection method.* This method selects the cycle count sample based on the need to replenish the item. When a reorder is required, it is anticipated that the on-hand quantity will be relatively low, making the physical count easier to take.

It is also reasoned that a small variation in actual count to computer balance during this time can interrupt production through unanticipated stock-outs.

- *Free counts method.* This method of cycle counting consists of allowing the stock area personnel to make “free” counts as the situation presents itself. Examples of free counts include counting as a replenishment lot is being received, counting when pulling the last item from a location, or counting all items in a location.

- *Other methods.* Items should be included in the count sample any time a condition implies that a problem exists and needs to be researched. Examples would include a computer balance that is negative or when there is a quantity on hand in the computer without a valid stock area location.

Source: Buker, Inc.

Spot checks validate cycle counting results. “We have enhanced our cycle counting procedures to the point where we now count A items only three times per year, B items twice, and C parts annually,” reports a materials services manager at a large builder of aircraft engine cases. “We also have spot checks from accounting to validate what we do on a weekly basis.”

Aggressive cycle counting for slow moving produce. The distribution director at a retail grocery concern explains, “In the fast-turning section of our warehouses, we conduct a daily wall-to-wall, while we have an aggressive cycle count program in other portions of the warehouse for slower-moving items.” According to the director, these actions, combined with having their buyers order on a just-in-time (JIT) basis and selling the inventory that they have in transit, have reduced inventory costs by \$20,000 per month.

Inventory accuracy soars into mid-90% level after only one year of cycle counting. “Our inventory accuracy was an embarrassment,” maintains an inventory control manager at a midsize producer of janitorial supplies. “About a year ago, we looked into and adopted cycle counting practices. We do a daily cycle count with our manufacturing employees and follow up with trained inventory cycle counters who focus on just the A and B items.”

New technology aids the cycle counting process. “When we implemented bar code scanning, it allowed us to do quick cycle counts,” notes a purchasing coordinator at a small producer of powder coatings. “This has given us more accurate inventory readouts and has allowed us to reduce our safety stock levels. It also has saved us many hours of doing daily visual counts.”

Error detection enhanced through cycle counting. A materials manager at a large cruise line explains, “Cycle counting on a weekly basis has greatly assisted our warehouse personnel in identifying problems with particular inventory items, such as packaging, units of measure, and item number confusion.” One problem that she discusses, unit of measure issues for stock, is being solved through bar code technology.

Cycle counting eliminates need for physical inventories. “We have been using the ABC cycle counting technique in our RF warehouse environment and improved our inventory accuracy to 99.2%,” maintains the inventory administrator at a large manufacturer of consumer products. “We’ve also been able

to eliminate costly and time-consuming physical inventories and reduce our machine downtime significantly.”

A by-product of cycle counting is the stocking of more appropriate levels of seasonal inventory. “Cycle counting, together with the use of improved forecasts and a statistically driven scheduling system, has given us the ideal solution,” he claims.

Introducing cycle counting practice in quest to eliminate excessive inventories. “There was a general lack of concern and support from upper management to stop ‘business as usual’ practices that resulted in excessive stock of on-hand finished goods,” acknowledges an inventory control coordinator at a small producer of electronic components.

“We’ve just begun to implement the ABC approach and cycle counting to try and reduce our inventory,” she explains. “Not only are we looking forward to improving our inventory record accuracy, but we also want to eliminate our biannual physical counts.”

HOW TO PUT TOGETHER AN INVENTORY ACCURACY INITIATIVE THAT WORKS

Despite widespread improvements, inventory accuracy remains an enigma to many managers. To others, it’s a quixotic challenge. *Inventory Reduction Report* readers repeatedly rank achieving greater inventory accuracy as one of their primary—and often their top—challenges.

Just how accurate should the inventory record really be? George J. Miller, president of PROACTION Management Consultants (Oak Park, Calif.; Gproaction@aol.com), says that “The conventional Class A ERP inventory accuracy threshold is said to be 95%-plus. However, I believe this is inadequate to run a world-class operation, because it means that one in every 20 items has a significant error, which may result in shortages, expediting, air freight expense, overtime, premium charges, overstocks, and the like.” Based on his experience, inventory accuracy should be 98+%, preferably 99+%.

Meanwhile, Thomas F. Ribar, CFPIM, president of Management Solutions International (Cedarburg, Wisc.; TFRibar@aol.com), declares, “Old paradigms reverberate through companies of all sizes and industries—achieving 98% inventory integrity is just impossible to do.” As a result, some never get started because it looks so difficult. However, agreeing with Miller, Ribar stresses that 98% inventory integrity is possible.

The cycle counting myth to inventory accuracy. To many, the application of cycle counting is tantamount to improving inventory accuracy. “While it is a very important item in the tool kit of the inventory or materials professional,” argues Miller, “cycle counting is mainly a measurement, diagnostic tool. Think of it as statistical process control for inventory accuracy.”

Ribar maintained at a recent Annual APICS International Conference, “Cycle counting allows you to fix the process of inventory control, not merely the on-hand balances. The sole purpose is to identify the root cause of the inventory integrity problems and then to fix them.” According to Ribar, cycle counting is the “final exam” of an eight-step process for achieving greater inventory integrity (see Figure II-6.1).

Creating an effective inventory accuracy program. In an exclusive interview Miller outlined the fundamentals of an effective inventory accuracy initiative. The major elements include the following:

- *Inventory accuracy measurement criteria.* This includes item/part number identification, quantity and unit of measure, location, and posting timeliness. Companies also measure related data, such as customer/contract number, configuration/revision letter, lot, serial number, grade, and expiration date.

“I have visited companies claiming to have 95%, 98%, or 99+% record accuracy that quickly shrinks to mid-double digits when we apply our uncompromising criteria objectively,” Miller argues. Sometimes companies have invalid criteria; sometimes they deceive themselves; and sometimes employees deceive them, unconsciously or unwittingly.

- *A clearly defined material and document flow.* Control and tracking points should be clearly identified. These should be marked out in the shop, and employees should be thoroughly indoctrinated.

- *Adequate facilities, space, storage, and material handling systems.* “Good housekeeping practices are a must,” he insists.

- *Effective policies and procedures.* These are required for material handling, storage, identification, packaging, labeling, data collection, counting, and transactions.

- *Training/certification/assessment program.* Include all people who handle or track inventory or are in a position to influence how well that works.

- *An ongoing assessment and diagnostic program.* This includes cycle counting. “Such programs may be administered in any one of several organizations in the company, as long as the manager in charge is sensitive to inventory

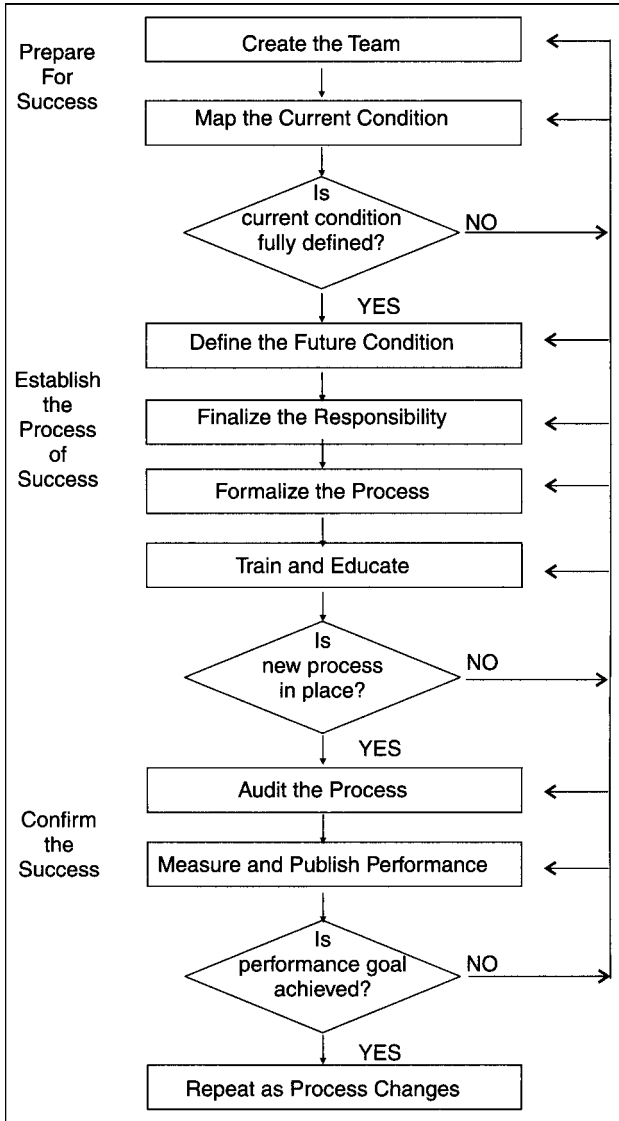


Figure II-6.1 An Eight-Step Process for Achieving Inventory Record Integrity

accuracy needs and earnestly dedicates the effort to the program,” Miller explains. “We believe that third-party oversight, by an internal or external audit group or an outside consultant, is needed to keep the program on track.”

- *An effective cut-off control and reconciliation procedure, including accounting for all transaction documents.* “Don’t dare even think about real cycle counting

until you get control of this,” he warns. “It is recommended, however, that you start early with a small control group to debug the process and begin error diagnostics. Expand to larger cycle count problems after you know what you’re doing.”

- *An inventory accuracy oversight group.* This group conducts periodic rigorous audits to ensure the integrity of the process. This might be the finance department, or an outside accounting firm or consultant.

- *Transaction control system.* Post transactions and provide inventory status to all departments that need it, preferably via on-line computer system. “Bar code and other automated data collection systems are desirable, if cost effective, but are by no means mandatory to run an accurate system,” Miller explains. Visual control systems, such as kanban, two-bin, and pallet squares can sometimes reduce or even eliminate the need for most transactions and an automated system, “in the proper circumstances.”

Miller observes, “Discipline is essential, day after day, year after year. This is not a one-time cleanup job that management can declare victory for and just go home. It requires that someone be at least a part-time ‘accuracy czar,’ and to keep the accuracy effort focused and permanent.”

Manage the risk factors to achieve inventory integrity. “Inventory integrity is truly a company project that involves many departments,” states Ribar.

Gerald L. Kilty, CPIM, CIRM, president of Quality Management Solutions, Inc. (Clearwater, Fla.), concurs. “Top management is responsible for setting policies as to inventory levels. Sales is responsible for preparing a forecast of demand that can be measured for accuracy. Purchasing is responsible for managing supplier lead times. Process design is responsible for reducing cycle time and the structure of the bill of materials. Reducing inventory and maintaining data accuracy is everybody’s job,” Kilty said at the APICS Conference.

That said, Ribar notes five most common risks that inhibit companies from achieving 98+% levels of inventory integrity:

1. *Senior management was never totally committed in the first place.* “They did not attend regular review meetings and did not deal directly with those that stood in the way of progress,” Ribar explains.

2. *The team did not have the necessary experience.* Consequently, the project was unable to be effective in a climate where resources are few and time is scarce.

3. *Time was never allocated for the project.* Establish the initial project priority by developing a compelling financial case for the project.

4. *Experience and know-how are not available on the team.* “If the inventory record integrity project team is comprised of at least 50% certified APICS professionals, the likelihood of success will increase by 100%,” he declares. If you cannot enlist certified professionals, then have an internal project manager who has accomplished the inventory record integrity feat in another division of your company, or at a previous company. Otherwise, consider some outside coaching assistance.

5. *Data lead to blame.* Measure and post quantitative metrics “to drive improvement instead of using it to point fingers and scold the guilty,” he argues. The published accuracy numbers need to be used to drive continuous improvement.

In fact, Miller warns, “Not everyone agrees that an inventory accuracy initiative is important and should be done. It does require a high degree of consensus on approach, designation of responsibilities, and ‘ownership.’” In extreme cases, “top management may need to step in to help change the culture and help oversee the changes.”

APICS EXPERTS OFFER IDEAS FOR IMPROVING FORECAST ACCURACY

“The forecast is wrong!” This is not an uncommon remark made or heard by inventory and materials managers at one time or another, especially when the inaccurate forecast directly contributes to stockouts or overly high inventory situations. To their credit, managers are making valiant attempts to correct the problem (see sidebar). For example, a recent reader poll finds that 28.2% of the respondents are now focusing on improving forecast accuracy. That’s a leap of almost eight points since a year earlier.

Several leading authorities and practitioner/experts focused their presentations on offering solutions to the forecasting problem at a recent Annual APICS International Conference. We excerpt three of the most aggressive solutions that were offered.

Schedule sharing overcomes weaknesses of forecasting. Mark K. Williams, CF-PIM, consulting manager at North Highland Company (Atlanta, Ga.)

Five Bonus Issues to Consider for Improving Your Forecast Accuracy

Leading authorities Terrell J. Harris, managing partner at Chicago Consulting (Chicago; tjharris@aol.com), and Nancy D. Killen, president of Bailey-Killen Associates (Cutchogue, N.Y.; nkillen@compuserve.com), addressing forecast accuracy at a recent Council of Logistics Management Annual Conference, answered the following questions:

- *Are forecasts adjusted for unusually high (or low) backlogs?* Actually, the backlog is dependent on fulfillment capabilities of the organization and is not dependent on the marketplace. Sometimes large backlogs are an indication that the forecast should decrease, especially when cancellations occur or phantom orders are placed.

- *Do returns impact the forecast, and should they?* Probably not, they agree, “especially if you’re forecasting shipments rather than net sales.” Nevertheless, some organizations and businesses recycle parts that normally invest heavily in forecasting returns and do so in a “very separate fashion.” Equipment manufacturers who rebuild some of their parts separately forecast that return logistics flow. “Combining these two forecasts is a very interesting exercise,” they note.

- *Does the forecast have to be in whole numbers?* Systems often force some forecasts to be in whole numbers, as they cannot deal in $\frac{1}{2}$, for example. “Yet what’s wrong with $\frac{1}{2}$ a unit per month?” asks Harris. “That’s one unit every two months, a pretty legitimate demand in some businesses.” Pareto’s law says that the vast majority of items are slow movers; so if you round a number like 1.5 to 2, 33% error is automatically introduced. If you round 0.6 to 1.0, a 67% error is introduced into the forecast by a system that deals only in whole numbers.

- *Is the forecast for the month dependent on the number of trading days?* Counting holidays, a month can have as few as 19 and as many as 23 trading days. That’s a 21% swing. “Most systems would kill for a 20% increase in forecasting accuracy,” Harris and Killen declare.

Similarly, look to ordering patterns within the week, they urge. For example, many organizations have a big demand on Monday, and few orders are placed on Friday. However, a month can have as few as three Mondays and as many as five. “So if Monday is your big day, accounting for the number of Mondays there are in a particular month can improve your forecast accuracy,” they advise.

- *Would it help to forecast more frequently?* There is very marginal gain by forecasting very, very frequently. In fact, they declare, sometime it leads to a worst forecast. According to Killen, “I think sometimes it gets confused with the gain associated with being able to record sales immediately and its impact on inventory, which is incredibly helpful.”

explains, “By sharing one’s schedule with the supplier, the opportunity to work with real demand is provided, not a forecast.”

He warns that you must first meet with your suppliers and advise them that you will be sharing information that is highly confidential. Have the supplier sign a confidentiality agreement to reinforce this goal. Once done, Williams outlines the following initiatives:

- Segregate the requirements by supplier. This will form the basis of the information that will be transmitted to the supplier.
- Determine how solid or fluid the quantities and items are within the company’s time fences. For example, if quantities are frozen within the first four weeks but subject to 25% to 50% swings from weeks four to eight, document this information so that it can be discussed with the supplier.
- Meet with the supplier to review how the information is structured. Keep in mind that manufacturing resource planning (MRP) may be a foreign concept to some of the suppliers, so in-depth training may be needed for them to understand how to use the information to help schedule their business.
- Guarantee that once an item is called for within the frozen time fence, it will be purchased. The most effective schedule-sharing agreements have this provision. Suppliers will not be nearly as reluctant to produce, and possibly customize, inventory for a customer that guarantees it will be purchased.
- Review seasonal trends and abnormal events with the supplier. This may include, but is not limited to, vacation shutdowns and special promotions. Obtain agreements about how these special events will be handled.
- Determine how often and in what form the schedule will be transmitted. Should it be sent daily, weekly, or monthly? Sent via mail, fax, electronic data interchange (EDI), or e-mail?

A process to verify a new customer’s forecast. Cynthia A. Neuhaus, CPIM, CIRM, field inventory manager at Grainger Industrial Supply, has developed several techniques that help her assess the validity of getting that first forecast from a new customer. Before doing anything, you must answer three questions:

- Do they have experience with the line; and is this simply a supplier change for them, or is it an entirely new line?

- Are there any differences in marketing approaches between your company and the new customer that would cause differences in product mix or seasonality?
- Is it a forecast of their intended purchases or sales to their own customers?

Neuhaus next tests the forecast she gets from a customer: “Take all their item forecasts in a product line or two, a few dozen items, or whatever number your resources allow, and add them up on a spreadsheet. Then calculate the percentage of contribution to the mix for each item. Select the same items from your records, and do the same thing.” If the percentage contribution to the mix for the customer forecast and your own experience are close, you can use it “pretty confidently,” she notes.

When there’s a difference and they have experience with the line, determine whether they have a market difference and whether that explains the situation. “For instance, if I were an automotive replacement parts manufacturer that served all types of vehicles, and my new customer was one that serviced just heavy trucks, that would explain the difference,” she allows.

“If the differences can’t be explained, I would use the customer forecast for the initial order only, because that’s what they think they need, and then throw it away.” Neuhaus asserts.

“If it is a new line for a new customer, I strongly recommend that you give them a forecast, rather than the other way around,” she shares. “Your company has experience, and who better to determine a valid stocking plan?”

Introducing demand flow leadership to manage the supply chain. Arne Brander, CPIM, partner at Bernd Remmers Consultants AG (Zug, Switzerland), and Tom F. Fischer, CPIM, supply chain manager at Ciba Specialty Chemicals, explain the focus of demand flow leadership is to manage the supply chain with the “best possible demand information, and to synchronize the supply flow.” It also aims to improve all parameters of the supply chain, such as lead times, lot sizes, and safety stocks.

“In the past, companies developed forecasts using distribution requirements planning, and the forecasts were confirmed by actual orders from the distribution centers,” they explain. “These requirements forecasts and orders were too often lumpy through lot sizes, lead times, and, above all, manual changes of the supply chain managers at the various distribution points.”

Demand flow leadership, the current thrust in Europe, involves the following:

- Develop forecasts using the best possible demand information. “Best possible demand information [finished goods] is end customer demand,” Brander and Fischer explain. This demand is summed and forms the basis for forecasting. In global supply chains, this means that the demand from several regions needs to be summed. Prerequisites include fixed date for month-end closing and EDI capabilities to transfer data into the central data warehouse. The summed data are used to develop an overall computer forecast that is verified manually.

- Replenish regional and local DCs using the push method. Establish optimal distribution inventory levels, which include safety stock and replenishment rules. “Push the products from the factory to the central warehouse and distribute to the local warehouses according to order point and fair share,” they describe.

- Synchronize the supply chain and create a flow. The forecast is converted to a master production schedule using gross to net explosion with lead-time offset. The master production schedule corresponds to the forecasts, considering that desired inventory changes and load/capacity are checked using rough-cut capacity planning. The best way to create a flow-like supply process using an ERP system is through the use of firmed planned orders. These orders can only be changed manually by the planner and should only be done when the forecast deviates outside defined limits and thus is systematically wrong or when major problems occur in the supply process.

Chapter II-7

Benchmarks

NEW STUDY BENCHMARKS BEST AND WORST PLANT-LEVEL INVENTORY PERFORMANCE

In this age of benchmarking, one of the most interesting and informative series for inventory performance is the PulseMark *Benchmarks for U.S. Manufacturing Productivity*. The most striking feature of this annual study is that the data refer to the performance within a single plant, rather than an aggregate for a business unit, division, or entire company.

Further, the inventory turnover benchmarks are segregated into individual segments, such as raw materials, work-in-process, and finished goods (see Figures II-7.1, II-7.2, and II-7.3). In fact, the series also measures obsolete inventory as a percent of net sales (see Figure II-7.4). Finally, the charts display the data according to the general type of manufacturing operation being performed at that facility (discrete, assemble-to-order, process, job shop, engineer-to-order, and repetitive).

The best performers keep getting better. With the release of the fourth annual PulseMark survey (produced by the National Association of Manufacturers, along with McGladrey & Pullen, LLP, and RSM McGladrey, Inc.), we caught up with Duane C. Oest, executive vice president of RSM McGladrey, Inc. (Schaumburg, Ill.; 847-413-6247; duane_oest@rsmi.com).

In the following exclusive, Oest, who has been an integral part of the PulseMark benchmark study since its inception, provides us with his insights into the observations, trends, and developments that he noticed from

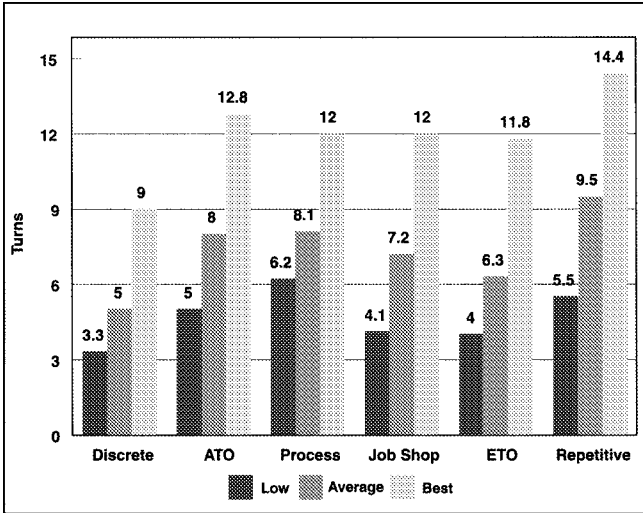


Figure II-7.1 Inventory Turns—Raw Materials

Source: Pulsemark 1999, Benchmarks for U.S. Manufacturing Productivity.

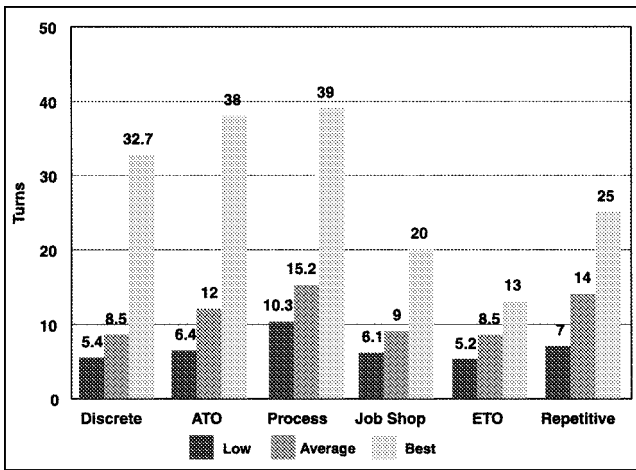


Figure II-7.2 Inventory Turns—Work in Process

reviewing the information provided by 25,000 companies with one or more manufacturing sites.

“The most apparent trend taking place is the establishment of a breakaway group of manufacturing companies,” Oest says. Over the life of the benchmark series they have ranked a balanced scorecard of operating and financial individual plant performance indicators across three performance categories:

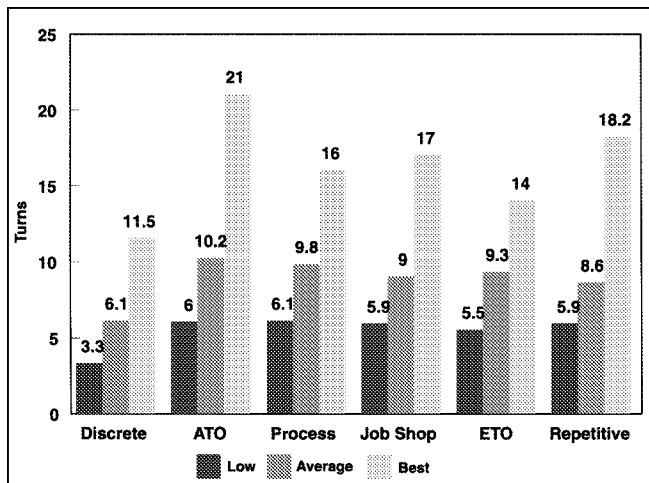


Figure II-7.3 Inventory Turns—Finished Goods

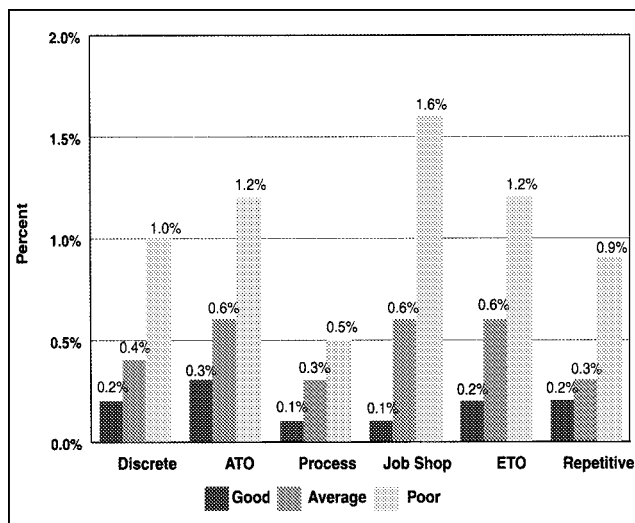


Figure II-7.4 Obsolete Inventory as a Percentage of Net Sales Provides Inventory Managers a Unique Benchmark

Source: Pulsemark 1999, *Benchmarks for U.S. Manufacturing Productivity*.

- Low performers (25th percentile)
- Average performers (50th percentile)
- High performers (75th percentile)

The three rankings are clear and easy to understand. However, the past two years have seen the emergence of dominant performers that rank in the 90th to 99th percentiles. “The reason for calling attention to the dominant performers is due to the magnitude of their performance,” he offers. As an example, he cites their inventory performance (see Table II-7.1).

What the top leaders are doing is simply astounding. “While inventory performance continues to be a problem for midlevel manufacturing companies, it appears that time spent focusing on business processes and systems has yielded sizable performance gains for the dominant performer,” Oest observes. “We have seen, across virtually all manufacturing types and industries, a select top 5% or 10% of our companies achieve consistent high performance.”

While the PulseMark data are confidential, the study team has spoken to many of the consistent top performers. What they have found is that “highly successful companies have simply focused on the key elements that align and enable their strategy.” As an example, one common theme is the greater interest in these companies of increasing shareholder value.

“Inventory can play a large part in driving that calculation,” Oest asserts. “Simply understanding their starting position and then focusing and tracking incremental improvement have paid dividends.”

The drivers that have the most impact on inventory performance and shareholder value. “Many firms still see inventory strictly as a converted form of cash and don’t see it as one of the largest uses of shareholder capital,” Oest details. Critical to the measurement of inventory and establishing processes and sys-

Table II-7.1 Leading-Edge Practitioners Have Raised the Bar with Their Inventory Turnover Performance

<i>Inventory class</i>	<i>25th Percentile</i>	<i>50th Percentile</i>	<i>75th Percentile</i>	<i>Dominant Performance</i>
Raw material	4.4	6.8	11.7	26.3
Work in process	6.4	11.4	26.8	47.1
Finished goods	5.3	8.7	16.4	41.6

Source: PulseMark, Benchmarks for U.S. Manufacturing Productivity.

tems is the understanding and ongoing measurement of raw material, work in progress (WIP), and finished goods.

“A total inventory turn number, while sufficient for financial purposes, gives operational management little direction if they want to drive better performance,” he insists. Oest reviews the inventory performance for each class and provides suggestions for corrective action.

Raw material inventory trend not encouraging. “Most manufacturers have shown little or no consistent improvement over the past four years,” he finds. “As e-commerce tools are developed and put in place, and supply chain processes are established and solidified, we expect significant improvement in this area.”

Currently, the 75th percentile performers have been steady or have had a slight decline in overall performance across all industry types. This year, he notes, repetitive manufacturers had the highest raw turns at 14.4. Generally, all 75th percentile manufacturers turn their raw material inventory about 12 times a year.

WIP inventory gap accelerates between “best” and “low” performers. WIP is highly contingent on the manufacturing process and the degree of integration used by the individual manufacturer. Overall, WIP shows slight improvement (5% to 7%) over the past four years. However, the gap between the performers in the 75th percentile and those in the 25th percentile continues to widen.

Currently, the best performers are outpacing their poorer counterparts by up to 400%. For the recent benchmark, the best of the best WIP performers are in process (39.0 turns) and assembly-to-order (38.0 turns) manufacturing. Generally, 75th percentile performance is in the range of 37 turns to 40 turns.

Finished goods inventory performance may already have peaked. Oest finds that most high-performance firms seem to have peaked and have actually indicated a slight drop in performance this year. “We need to keep in mind that over the past few years manufacturers have had their hands full with everything from Y2K to the increased use of stockout penalties in some supply chains and seem to have erred on the side of stocking inventory rather than risking customer problems,” Oest explains.

As more manufacturers adopt specific pieces of technology that allow better supply chain integration and adopt vendor managed inventory (VMI)

programs, there should be better performance in this area in the future. Also, he notes three basic trends that will help increase inventory turns:

- Internet auction sites have opened lines of communication and increased awareness about the availability of suppliers and products.
- Companies now engage in “instant” communication of production status across the Internet.
- Better supply chain alignment allows manufacturers to take better care of their critical customer by understanding current stock status and varying in-house production to actual customer need.

However, forces are also working against better inventory turns. One force is that customers now require a greater voice in product options and diversity. In addition, lot sizes continue to move lower, and overall lead times continue to shorten.

NEW INVENTORY BENCHMARKS SEPARATE PROFITABLE FROM UNPROFITABLE PERFORMERS

New inventory benchmarks derived from raw Internal Revenue Service data have been transformed into a set of ratios commonly used by the financial community and inventory managers alike.

Profitable versus unprofitable companies. The data are unique in that one set of benchmarks includes only those organizations that reported a profit for the year, whereas the other includes companies that suffered a loss. Splitting the data highlights performance ratios that distinguish successful from unsuccessful companies within each industry and allows you to see into which group your company practice falls.

Compare five critical inventory benchmarks. We have excerpted data from the latest edition of the *IRS Corporate Financial Ratios* (Schonfeld & Associates, Inc.; 847-948-8080), and we track more than 90 manufacturing sectors (see Table II-7.2). The benchmarks’ definitions and diagnostics include

- *Inventory to sales turnover.* Above-average inventory sales turnover can indicate that a firm is more efficient at managing its inventories than are its

Table II-7.2 Inventory Performance Data—Manufacturing Industry

	Inventory to Sales Turnover		Inventory to Cost of Goods Turnover		Days of Inventory		Inventory to Cost of Sales & Operations		Working Capital	
	Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss
All Manufacturing	11.07	7.24	8.19	6.00	32.98	50.42	0.12	0.17	107.96	125.12
Food & kindred	12.47	9.25	9.15	7.52	29.27	39.48	0.11	0.13	318.23	51.58
Meat	17.52	13.61	15.50	12.31	20.84	26.82	0.06	0.08	92.21	383.60
Dairy	15.45	20.77	12.64	18.48	23.63	17.57	0.08	0.05	134.65	785.85
Preserved fruit & vegetables	6.26	6.66	4.08	5.60	58.30	54.81	0.25	0.18	132.88	444.42
Grain mill	11.73	13.32	8.31	11.93	31.11	27.39	0.12	0.08	-100.60	235.14
Bakery	27.12	16.83	18.68	11.92	13.46	21.69	0.05	0.08	49.01	-298.20
Sugar & confectionery	8.69	6.65	6.06	5.22	41.99	54.90	0.16	0.19	197.87	882.49
Malt liquors & malt	17.95	19.86	9.28	11.72	20.34	18.38	0.11	0.09	197.87	-200.96
Alcoholic beverages	7.59	3.62	4.83	2.53	48.12	100.76	0.21	0.39	251.26	18.39
Bottled soft drinks/flavorings	24.27	16.62	16.09	13.67	15.04	21.96	0.06	0.07	-343.17	115.74
Other food & kindred	10.26	8.92	8.03	7.16	35.58	40.92	0.12	0.14	138.57	651.90
Tobacco manufacturers	8.39	4.67	3.75	3.56	43.49	78.10	0.27	0.28	-139.76	431.13
Textile mill	7.12	7.96	5.60	6.93	51.23	45.86	0.18	0.14	77.59	115.17
Weaving mills & textile finishing	7.16	6.92	5.62	5.97	50.95	52.77	0.18	0.17	77.98	83.85
Knitting mills	6.24	11.94	4.70	10.75	58.47	30.58	0.21	0.09	78.74	273.17
Other textile mill	7.35	7.59	5.84	6.53	49.69	48.10	0.17	0.15	77.07	133.52
Apparel & other textile	6.63	5.57	5.10	4.68	55.07	65.53	0.20	0.21	87.95	148.56
Men's & boys' clothing	6.08	4.93	4.57	4.18	60.03	74.06	0.22	0.24	82.58	147.41
Women's & children's clothing	6.85	5.88	5.39	5.09	53.31	62.12	0.19	0.20	100.65	210.01
Other apparel & accessories	6.74	4.95	5.21	4.02	54.14	73.76	0.19	0.25	92.29	85.21
Misc. fabricated textile	7.22	6.26	5.53	5.06	50.54	58.29	0.18	0.20	78.07	219.39

(continued)

Table II-7.2 (continued)

	Inventory to Sales Turnover		Inventory to Cost of Goods Turnover		Days of Inventory		Inventory to Cost of Sales & Operations		Working Capital	
	Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss
Lumber & wood	9.92	8.74	7.94	7.20	36.78	41.74	0.13	0.14	160.65	156.62
Logging, sawmills/planning mills	10.31	9.31	8.35	7.44	35.40	39.21	0.12	0.13	115.89	165.99
Millwork, plywood & related	9.25	7.81	7.38	6.73	39.45	46.72	0.14	0.15	2674.46	133.73
Other wood, including buildings/ mobile homes	10.67	8.62	8.44	7.26	34.22	42.34	0.12	0.14	70.35	172.00
Furniture & fixtures	9.06	7.34	6.56	5.87	40.29	49.76	0.15	0.17	56.88	153.78
Paper & allied	10.49	8.39	7.54	7.13	34.80	43.52	0.13	0.14	500.29	206.19
Pulp, paper & board mills	10.39	5.95	7.38	5.02	35.12	61.39	0.14	0.20	815.75	224.38
Other paper	10.60	10.96	7.73	9.35	34.44	33.29	0.13	0.11	345.78	189.94
Printing & publishing	19.42	13.86	11.75	9.25	18.80	26.33	0.09	0.11	37.92	49.08
Newspapers	42.35	153.89	22.08	93.46	8.62	2.37	0.05	0.01	27.68	33.94
Periodicals	28.54	35.91	16.43	22.22	12.79	10.16	0.06	0.04	47.01	-37.46
Books, greeting cards, miscellaneous publications	9.97	8.01	5.54	4.57	36.60	45.55	0.18	0.22	32.93	31.33
Commercial & other printing	20.13	17.42	14.24	13.21	18.14	20.96	0.07	0.08	52.11	88.38
Chemicals & allied	10.07	7.60	6.75	6.04	36.26	48.03	0.15	0.17	-3631.46	53.20
Industrial chemicals, plastics, & synthetics	9.99	7.39	7.25	5.93	36.54	49.36	0.14	0.17	1470.27	336.06
Drugs	9.27	9.90	5.27	8.08	39.39	36.88	0.19	0.12	656.39	19.24
Soap, cleaners, & toilet goods	14.51	6.27	10.23	4.32	25.15	58.26	0.10	0.23	-56.65	162.63
Paints & allied	7.72	9.18	5.15	6.48	47.28	39.76	0.19	0.15	83.30	39.00
Agriculture & other chemicals	7.58	4.65	5.45	3.74	48.16	78.32	0.18	0.27	97.81	192.19
Petroleum & coal	28.80	20.14	23.26	17.86	12.67	18.12	0.04	0.06	86.01	413.50
Petroleum refining	29.24	19.85	23.62	17.61	12.48	18.39	0.04	0.06	87.02	355.30

Other petroleum/coal products	11.17	31.90	9.01	27.45	32.67	11.44	0.11	0.04	58.69	-75.72
Rubber & misc. plastic	8.99	7.62	6.55	6.25	40.59	47.91	0.15	0.16	111.34	515.06
Plastics footwear, hose, belting	8.15	6.30	5.88	5.25	44.79	57.93	0.17	0.19	138.14	-1644.40
Misc. plastic	9.57	8.55	7.00	6.96	38.13	42.71	0.14	0.14	98.20	267.52
Leather	5.91	4.60	4.49	3.63	61.77	79.37	0.22	0.28	67.79	115.44
Footwear, except rubber	5.16	5.00	3.87	3.83	70.80	72.95	0.26	0.26	60.89	131.21
Other leather	7.14	4.10	5.51	3.39	51.14	88.99	0.18	0.30	83.14	100.59
Stone, clay, & glass	10.31	6.81	7.17	5.22	35.39	53.64	0.14	0.19	99.32	179.33
Glass	10.83	6.17	7.17	4.63	33.71	59.14	0.14	0.22	196.88	315.27
Cement, hydraulic	9.68	4.50	6.40	3.96	37.70	81.10	0.16	0.25	55.79	228.57
Concrete, gypsum, & plaster	13.83	14.42	10.06	11.70	26.39	25.32	0.10	0.09	59.54	140.03
Other nonmetallic mineral	7.11	5.07	5.08	3.80	51.35	72.04	0.20	0.26	143.78	110.82
Primary metal industries	8.14	8.33	6.58	7.01	44.86	43.83	0.15	0.14	79.29	115.74
Ferrous metal/misc. prim. metals	7.37	6.31	5.86	5.08	49.53	57.86	0.17	0.20	77.02	110.64
Nonferrous metal	8.82	14.07	7.22	12.49	41.39	25.94	0.14	0.08	81.43	133.24
Fabricated metal	8.97	7.85	6.68	6.54	40.68	46.50	0.15	0.15	70.85	253.52
Metal cans & shipping containers	10.61	7.24	8.62	6.18	34.41	50.45	0.12	0.16	43.91	-94.84
Cutlery/tools/hardware/screw machines/bolts	8.49	7.73	5.81	5.79	42.97	47.24	0.17	0.17	57.16	196.61
Plumbing, heating, except electric warm air	8.11	7.89	5.80	6.74	45.01	46.29	0.17	0.15	103.10	190.61
Fabricated structural metal	10.71	8.38	8.32	7.31	34.09	43.55	0.12	0.14	62.79	131.00
Metal forgings/stampings	9.76	7.70	7.48	6.59	37.40	47.43	0.13	0.15	87.63	199.94
Coating, engraving, allied services	23.35	14.20	15.92	11.08	15.63	25.71	0.06	0.09	48.61	225.47
Ordnance/access except vehicles/guided missiles	6.12	4.22	4.25	3.13	59.60	86.51	0.24	0.32	59.19	370.19
Misc. fab. metal products	7.99	8.27	5.97	6.74	45.68	44.13	0.17	0.15	76.29	97.87
Machinery, except electrical	8.53	6.68	6.40	5.62	42.78	54.65	0.16	0.18	67.13	98.06
Farm machinery	8.76	3.85	6.31	3.06	41.69	94.87	0.16	0.33	25.50	209.10
Construction & related machinery	7.87	4.89	6.23	4.08	46.36	74.67	0.16	0.25	152.38	208.40

(continued)

Table II-7.2 (continued)

	Inventory to Sales Turnover		Inventory to Cost of Goods Turnover		Days of Inventory		Inventory to Cost of Sales & Operations		Working Capital	
	Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss
Metalworking machinery	7.05	8.39	5.03	6.30	51.77	43.53	0.20	0.16	109.83	-1262.04
Special industry machinery	6.34	4.21	4.75	3.49	57.53	86.71	0.21	0.29	69.83	157.72
General industry machinery	7.08	4.90	5.10	3.95	51.58	74.47	0.20	0.25	119.60	188.73
Office/computing machines	11.04	10.28	8.36	9.03	33.07	35.51	0.12	0.11	49.24	54.50
Other machinery, except electrical	8.30	6.44	6.21	5.32	43.97	56.72	0.16	0.19	85.78	75.84
Electric/electronic equipment	9.85	7.34	7.18	6.23	37.05	49.70	0.14	0.16	80.14	81.67
Household appliances	8.89	6.96	7.09	5.96	41.03	52.44	0.14	0.17	127.00	81.09
Radio, TV/Communications equipment	9.43	6.00	6.83	4.99	38.70	60.83	0.15	0.20	65.23	88.24
Electronic components/access	9.73	8.53	7.29	7.39	37.52	42.80	0.14	0.14	49.37	75.36
Other electric equipment	10.42	6.81	7.23	5.58	35.02	53.62	0.14	0.18	3379.40	88.23
Motor vehicles & equipment	17.72	10.71	14.69	9.56	20.59	34.08	0.07	0.10	162.46	195.50
Transportation equipment, except motor vehicles	7.62	2.49	6.02	2.19	47.88	146.62	0.17	0.46	92.24	-135.88
Aircraft, guided missiles/parts	7.59	2.26	5.96	2.00	48.08	161.76	0.17	0.50	98.05	-126.20
Ship/boat building & repair	6.42	5.11	5.24	4.17	56.85	71.45	0.19	0.24	64.15	-150.05
Other transportation equipment, except motor vehicles	8.87	6.30	7.15	5.44	41.16	57.97	0.14	0.18	85.51	185.35
Instruments/related equipment	8.02	4.67	5.74	3.69	45.50	78.21	0.17	0.27	63.66	57.49
Scientific instruments/measuring devices/clocks	7.93	4.56	6.16	3.69	46.01	80.12	0.16	0.27	66.68	81.28
Medical & ophthalmic goods	6.65	4.72	4.40	3.72	54.85	77.03	0.23	0.27	59.37	39.00
Photographic equipment & supplies	15.16	4.73	9.81	3.65	24.07	77.17	0.10	0.27	69.87	171.35
Misc. manufacturing	7.95	6.20	5.50	4.69	45.92	58.87	0.18	0.21	67.97	91.81

Source: IRS Corporate Financial Ratios, Schonfeld & Associates.

competitors. However, if a company's sales growth is high at the same time that its inventory turns are high, it may not be carrying enough inventory to meet customer demands; in reality, it is losing sales. Low turnover reflects overstocking, optimistic sales forecasts, obsolescence, or the failure to write off unsalable merchandise. Examine the underlying causes for low inventory turns. Correcting them can help increase liquidity and working capital.

- *Inventory to cost of goods turnover.* Computed by dividing cost of sales and operations by inventory, this is a measure of the value of inventories held in relation to the costs of production. If the turnover ratio is above average, a firm may be an inefficient producer or purchaser of goods. Or it may be very efficient at managing the flow of raw materials and finished goods to customers. Therefore, it is advisable to examine this ratio against the company's gross profit margin. The well-managed company has high margins and high inventory turns.

- *Days of inventory.* A low days figure might indicate that a firm does not have sufficient resources to meet fluctuations in demand and therefore cannot fill customer orders on a timely basis. If higher than industry norms, this benchmark can indicate that the company has poor inventory controls or problems with sales forecasting problems or that it is carrying obsolete inventory.

- *Inventory to cost of sales and operations.* This is the inverse of the inventory to cost of goods ratio. If lower than the industry average, it may indicate that the company is more efficient at managing its resources, especially if its profit margins are above industry norms. However, if it is lower in both areas, the company may be losing sales and operating inefficiently by not maintaining enough finished goods inventory to meet demand. Or it may not have enough raw materials inventory to schedule production efficiently.

- *Inventory to working capital.* This is a measure of liquidity. A low ratio indicates high liquidity, which creditors prefer. The lower the ratio, the greater the protection for current creditors.

EXCLUSIVE SURVEY: WHY MANAGERS PREFER INVENTORY TURNS TO DAYS-ON-HAND AS METRIC

Which should be the official performance measurement, turns or days supply? The debate continues to simmer just below the boiling point among inventory managers. A recent *Inventory Reduction Report* reader survey finds

that slightly more than half of all respondents (50.9%) opt for inventory turns as their metric of choice. The remainder choose days-on-hand (32.3%) or use both measures routinely (16.8%).

Among inventory management in companies with fewer than 500 employees, the preferred methodology is clear. By an almost two-to-one ratio, inventory turns (55.2%) outweighs days-on-hand (29.5%). However, in larger organizations (see Figure II-7.5) the preference is not as distinct. Here, inventory turns (42.9%) shades days-on-hand (37.5%), as “both” scores with an almost solid 20% of the survey respondents.

Many readers shared the “why” and “where” for their preferred performance metric. The following excerpts provide some insights and practices that you may want to consider for your own operation.

Why the majority prefers inventory turns. Most of the reasons for using inventory turns carried common responses, ranging from “it’s simple; everybody understands it,” to “it’s the preference of our CFO,” to “my bonus is determined by this metric.” Many cite it as an industry standard and preferred benchmarking tool. We found these thoughtful comments among the responses:

- “It is a benchmark our material director as well as finance can use to gauge material flow,” cites a material control director at a small manufacturer of custom electronic devices.
- “We use inventory turns as a gauge against our material handling expense and indirect labor,” says a warehouse supervisor at a midsize manufacturer of construction equipment.
- “Inventory turns are the ongoing measurement as they have value content for us,” maintains an inventory coach at a midsize contract manufacturer.
- “It helps me to be proactive instead of reactive, therefore having on the shelf what my customer wants to buy,” offers a purchasing agent at a small maker of parts for restaurant equipment.
- “With our products changing quarterly, inventory turns give us a better idea of volatility and viability,” explains a logistics manager at a major producer of gaming machines.
- “Our orders are cyclical, as we may ship the same amount in one week compared to a month, so turns better gauge our performance,” explains a materials manager at a large personal products maker.

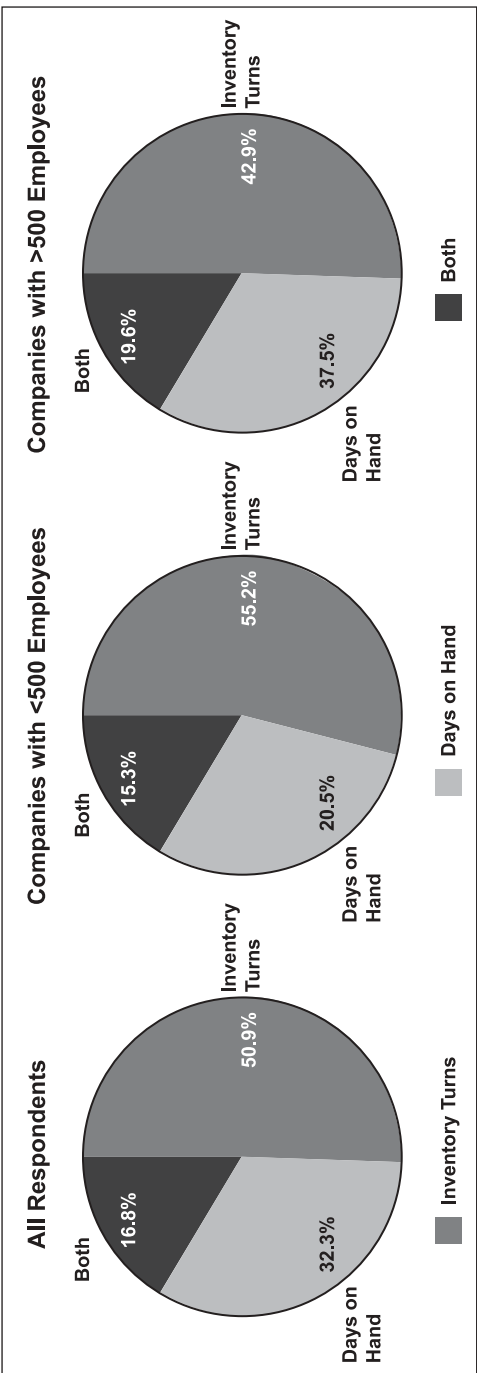


Figure II-7.5 Inventory Turn Ratio Remains Preferred Performance Measure

Source: 2000 IRR Reader Survey.

- “Inventory turns give us a better indication of trends for forecast,” notes a purchasing manager at a supplier of engraved products to promotion companies.

- “It helps with our slotting of products within the warehouse,” mentions a warehouse manager at a large personal care products manufacturer.

Days-on-hand practitioners relate their arguments. There are also many common themes for why inventory management prefers the days-on-hand metric. Many say that it is easier to understand because it relates to stock availability to meet customer demand. Others claim that it is easier to communicate to the workforce. For some, it is how corporate management grades them on working capital. For many, it is a good monitoring device. Other meaningful responses include the following:

- “Days-on-hand gives us a better picture of where we stand on any given day, and it enables us to manage our inventory costs much better,” says an inventory control manager at a major hospital.

- “Our industry has long lead times with many imported SKUs, and days-on-hand are more easily computed against lead times,” states a vice president of operations at a midsize maker of ceramic tile.

- “We measure cash-to-cash cycle time in days, so inventory in days matches this,” reports the operations director at a large producer of data storage and printing consumables.

- “We’re highly affected by seasonal demand, and we improved our inventory position since focusing on days versus the number of annual turns,” relates a supply chain manager at a large producer of consumer/industrial products.

- “Days-on-hand concurs with how our suppliers, who consign raw materials, measure inventory performance; it also relates more closely to flow manufacturing concepts,” explains the materials manager at a flexible packaging manufacturer.

- “Our supply chain operates in days, so it’s easier to compare performance,” shares a materials manager at a major producer of medical devices.

Solid core of inventory management professionals finds both metrics necessary. Those who indicated that they routinely use both metrics had their own reasons for doing so. This group shares their innovative practices:

- “Both are required to ascertain the impact on ordering and planning philosophy [just-in-time, MRP, DRP], and we use ABC classification to more tightly manage usage rates, lead times, and safety stocks by line item or SKU,” relays the president of a small manufacturer.
- “We use both to better track inventory movement by plant location and inventory classification,” offers the division purchasing manager at a major producer of bronze memorials.
- “We use turns for financial reporting and for standard corporate reports; we also use days because it is more understandable for factory personnel,” describes a supply chain director at a major manufacturer of temperature monitoring devices, regulators, and controllers.
- “For raw materials we use days of inventory; for finished goods, it’s inventory turns,” reports a distribution manager at a large maker of heating, ventilating, and air-conditioning equipment.
- “It makes more sense to us to use inventory turns for our MRO, while we prefer days of supply measures for our raw materials inventory,” maintains a purchasing team leader at a large pulp and paper manufacturer.
- “We use inventory turnover as a monthly report, but we rely on days-on-hand as a day-to-day tool,” shares a division materials manager at a mid-size fuel tank maker for the automotive industry.
- “I look at both in order to accurately measure our inventory performance,” asserts a purchasing manager at a small aerospace maintenance facility.

FOUR LOGISTICS PROS REVEAL SECRETS TO BENCHMARKING INVENTORY MANAGEMENT

In the current metrics frenzy, the focus of most discussion and action is on the “measure of the day.” Unfortunately, this approach generates streams of short-term data, but not much in long-term solutions. More emphasis should be given to the philosophy and development of the measurement process itself. In essence, ask, “What do we want to know, and what are we going to do when we find out about it?”

Industry leaders craft and apply successful metrics. For instance, Baldrige award winner Stephen H. Woodward, vice president of logistics and purchasing at Armstrong World Industries, Inc., Worldwide Building Products

Operations (Lancaster, Penn.; shwoodward@armstrong.com) believes, “Without an effective, well-defined, and communicated strategy, it is difficult to set the ‘right’ type of measurement.” Further, he wants the feedback “quickly enough so the people receiving the metrics can initiate actions to correct the problems that have been uncovered.”

Alan L. Milliken, CFPIM, CIRM, manager of supply chain projects at BASF Corporation (Mount Olive, N.J.; millika@basf.com), explains, “We’re looking for measurement processes, and not just a list of measurements.” To achieve this, he outlines some primary factors that performance metrics should provide. They should

- *Set expectations.* “We align our metrics within the organization and link them to our customers’ and shareholders’ expectations,” he explained at the Proven Performance Metrics in Logistics Conference (sponsored by the Institute for International Research; New York).

- *Control.* The applied metrics should enable self-evaluation and facilitate control of linked performance.

- *Identify opportunities.* “We look to the metrics to quantify the gaps between performance and target, which then facilitates the development of our action plans,” he says.

Create a framework to judge measurements. “There are many standards by which we judge performance measures, but the idea is to create the criteria first, before you just throw the individual metrics out there,” maintains J. Paul Dittmann, vice president of global logistics at Whirlpool Corp. (St. Joseph, Mich.; john_p_dittmann@email.whirlpool.com).

One judgment factor he particularly recommends is integration economy. “That’s really our challenge in the supply chain, because trying to get all of the functions operating as a process can be difficult,” he notes. See the sidebar for other criteria.

Top management participation critical. “It is essential to keep top management committed to the initiative,” insists Milliken. At BASF, for instance, the following tactics ensure that management’s attention is not diverted from the metrics initiative:

- *Integrate operational metrics into financial reporting.* “You don’t want to have one book for operational results and a separate one for financials; that gives the impression that operational results aren’t important,” he argues.

Ways to Evaluate Performance Measures

Criterion and description:

Validity captures the events and activities being measured and controls for any exogenous factors.

Robustness is interpreted similarly by the users and is comparable across time, location, and organization.

Usefulness is readily understandable by the decision maker and provides a guide for action to be taken.

Integration economy includes all relevant aspects of the process and promotes coordination across functions and divisions.

Compatibility means that the benefits of using the metric outweigh the costs of data collection, analysis, and reporting.

Level of detail provides a sufficient degree of granularity or aggregation for the user.

Behavioral soundness means that the metric minimizes incentives for counter-productive acts or game playing and that it is presented in a useful form.

Source: J. Paul Dittmann.

- *Include “Performance Review” time on all staff-level meeting agendas.* “We do not want periodic meetings to discuss performance measurements; it’s the worst thing in the world to have a separate meeting,” Milliken insists. “By integrating it into routine staff meetings, it sends a message that this is just as important as anything else on that group VP’s plate.”

- *Incorporate high-level metrics into management’s compensation objectives.* “If it doesn’t hit you in the pocket, it’s just not as important,” he notes. “Since 1998 we’ve been successful in having several non-financial measures, such as on-time delivery performance, begin to impact the pay of our group vice presidents.”

- *Include resources for the measurement process as line items in the annual budgeting process.* “We have shown that measurements consume resources. No matter how good a job we do, or how much we may restructure, we need resources. So, it now gets done,” he says.

Performance measures should reflect corporate strategy. Before Whirlpool instituted its metrics program, “we took a step back and asked, ‘What’s

really important to us?” Dittmann commented. “We found it was four things.” He listed them as customer service, cost, working capital, and cycle time.

“If that’s what’s really important to us, certainly our measures have to capture those elements,” he explains. “We then set up a series of overarching principles for our supply chain measures. This is what we’re going to measure by, or evaluate them by.” Among the factors are the following:

- The measures must be common globally. “We want the same supply chain measures in all regions of the world,” Dittmann describes. “They would not be used punitively, but to establish a framework from which we can create a dialogue and share best practices.”

- They must be interlinked to avoid suboptimization. If a measure for inventory is established, there would be an offsetting metric on customer service. “We don’t want to suboptimize one at the expense of the other,” he explains.

- Measures must have an external link to economic value-added (EVA). “We’ve discovered economic value-added is a measure that is the most direct link to stock price growth,” he explains. “Basically, it combines into one measure the balance sheet and income statement so you’re not only looking at one dimension (income) without considering the assets you’ve had to employ to generate that income,” Dittmann details.

- Metrics must be fully communicated and understood throughout the organization. Dittmann and the others insist on this. “Unless that’s the case, it’s all a waste of time,” Dittmann states. “Linkage is assurance that when we meet our nonfinancial goals, our strategic and financial goals are met as well.”

U.S. HIGH-TECH SECTOR OUTDOES WORLD IN INVENTORY PERFORMANCE

Over the past two decades inventory reduction performance in the U.S. high-tech sector has been rather impressive. According to the recent study from Pittiglio Rabin Todd & McGrath (PRTM), a management consulting firm for technology-based industries, these industries nearly doubled their

inventory turns from 2.5 to 4.8. “Some firms, such as Apple and Dell, now operate with six and eight days of inventory, about 61 turns and 46 turns, respectively,” observes Jeffrey Berg, PRTM director (Stamford, Conn.; 203-353-0600).

But progress has stalled during the past five years. PRTM manager Rich Fredricksen (Stamford) concludes, “There has been no substantial progress in inventory-turn performance in the past five years, with the notable exception of European companies.” While the U.S. technology sector’s 4.8 inventory turns (the latest available data) are nearly a quarter-turn improvement from the prior year, “the sector has otherwise shown flat performance since 1993,” he observes in *PRTM’s Insight* (see Figure II-7.6). The Japanese sector has followed a very similar trend: again, a nearly quarter-turn improvement year-to-year, but a flat performance since 1994.

Recent U.S. performance in asset turnover is alarming. The U.S. high-tech sector managed 1.2 turns in 1993 (see Figure II-7.7) and has been in decline ever since. “This is in both absolute terms and relative to Europe,” Fredricksen notes. “Continued improvements in European inventory management, such as a 20 day reduction in cash-to-cash cycle time [see Figure II-7.8] since 1993, demonstrates an increasing awareness of the effects of inventory performance on overall profitability.” Figure II-7.9 reports changes in inventory as a proportion of revenue.

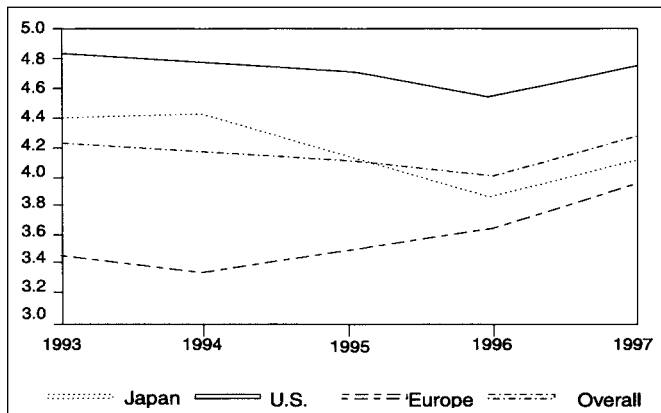


Figure II-7.6 Inventory Turns

Source: PRTM’s *Insight*.

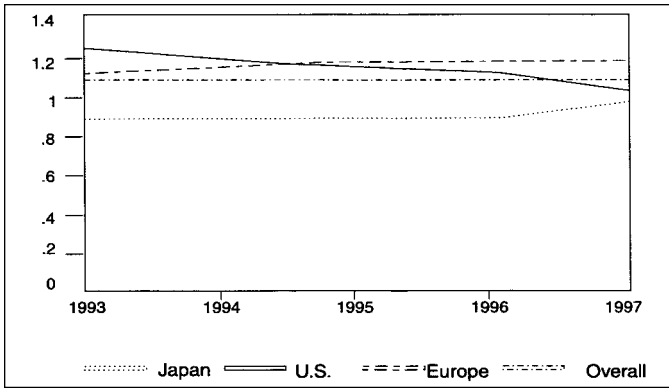


Figure II-7.7 Asset Turnover

Source: PRRM's Insight.

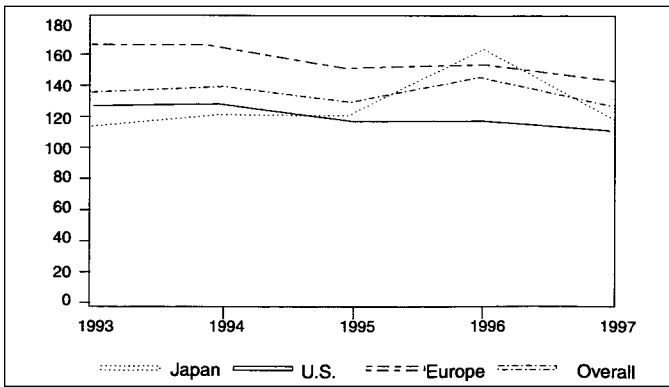


Figure II-7.8 Cash-to-Cash Cycle Time

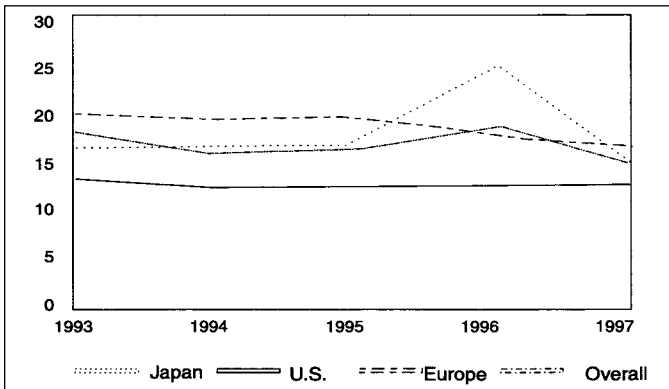


Figure II-7.9 Inventory as a Percentage of Revenue

Sector-by-Sector Analysis

Fredricksen highlights four specific segments to provide additional insight into their supply chain and inventory performance. The analysis also includes a number of lessons to be learned.

Computer sector continues impressive progress. This sector's impressive business growth was accompanied by continued improvement in the sector's inventory management. Inventory turns increased to 7.6, "capping five years of steady gains," he notes. Inventory as a percentage of revenue also declined for the fifth straight year, from 13% to 7.6%.

Europe's computer sector experienced a year of negative growth. However, it responded with improvements in inventory turns, asset turnover, inventory as a percentage of revenue, and cash-to-cash cycle time. The community reported improvements in cash-to-cash cycle time (112.9 to 90.3 days) and inventory turns (5.3 to 6.9).

Fredricksen observes, "The segment's leadership in inventory performance can be attributed to the speed of price erosion and to short product life cycles. Inventory has a large impact on costs of goods sold and, therefore, must be closely managed to ensure profitability. Industry-wide improvements in supplier management initiatives, such as consumption-based replenishment and pure JIT methodologies, have driven this performance."

Aerospace and defense inventory performance suffers through sector's restructuring. The U.S. aerospace and defense sector was unable to combine its revenue growth with substantial improvements in inventory management. Inventory turns did increase (from 4.4 to 4.8), and inventory as a percentage of revenue did decrease (15.2% to 14.9%). However, the sector's inventory performance did not otherwise improve.

In Europe, the sector had similar results. Inventory turns increased (2.1 to 2.2), but all other measures remained flat. Fredricksen notes, "A high level of mergers and consolidations has focused the industry on defining or reconfiguring supply chains as opposed to improving supply chain performance. Until the industry finishes its restructuring, there is little reason to expect significant improvement in overall inventory performance."

Telecommunications sets the pace for delaying inventory ownership. The U.S. telecommunications industry had a strong revenue increase (15.7%) over

earlier near-zero growth. It also continued its steady improvement in inventory as a percentage of revenue (from 11.7% to 11.3%).

Cash-to-cash cycle time improved from 146.2 days to 144.2 days. However, it is noteworthy that the industry's annual average over the five-year period was 140.6 days.

Inventory turns reached 4.4, up from 4.0 and close to the five-year high of 4.5. Assets turns slid to a five-year low, as the segment continues to invest in infrastructure and new technology.

Europe's telecommunications sector broke out of its lethargic growth with an impressive 15.2% revenue improvement. This growth saw inventory turns increase from 3.3 to 3.9 and cash-to-cash cycle time slide from 171.1 to 151.2 days. However, asset turns remained level (1.1).

Fredricksen states, "Telecommunications has increased its use of contract manufacturing and electronic component parts suppliers, causing inventory ownership to be delayed as much as possible and enhancing inventory performance of the industry. "The low and medium range of the segment is becoming more commodity-like and modular. This has increased inventory commonality and reduced associated costs.

Pharmaceuticals and chemicals focus on better supply chain performance. The U.S. pharmaceuticals and chemicals sector continued its solid revenue growth performance. The sector improved its inventory turns (3.2 to 3.8). It reduced its cash-to-cash cycle (159.1 to 132.3 days) to a five-year best, from a five-year high in one year. The sector also improved its inventory as a percentage of revenue performance in each of the five years, moving from 14.6% to 12.5%. However, the sector's high capital requirements pushed down asset turns to 0.9 last year.

Fredricksen explains, "High margins and high capital requirements have traditionally focused this industry on inventory supply availability. At these high margins, the impact of a stockout outweighs major initiatives to improve inventory performance to date. However, the improved performance could indicate an emerging awareness of the need to focus on improving supply chain performance."

Integrated supply chains and enterprise resource planning (ERP) installations to boost high-tech's turns beyond 5.0. Meanwhile, Berg reflects on the first wave of ERP implementations that are entering into the high-tech industry: "We see these companies returning to the business process reengineering activities

they abandoned in favor of decreasing time to implement their ERP systems.”

When these implementations are behind them, he foresees “the typical company in the PRTM inventory study being able to achieve 5.0 inventory turns within the next two years,” while more will achieve the present inventory turns posted by Dell and Apple.

Chapter II-8

New Inventory Management Products, Services, and Ideas

Rules for developing a safety stock policy. “Most companies have safety stock; however, few have a safety stock policy,” maintains Robert A. Abair, CPIM, president, Robert Abair Associates, Inc. (Northboro, Mass.). A formal safety stock philosophy is needed for all major components and product lines, he advised at a recent American Production and Inventory Control Society (APICS) Annual International Conference (www.apics.org). Following is an example of safety stock business rules that he proposed: A items, 2 weeks safety stock; B items, 4 to 6 weeks safety stock; and C items, 10+ weeks safety stock. “Safety stock should be primarily established based on customer demand instability as well as purchasing and manufacturing reliability and response times,” Abair adds. Additional factors that also should be considered when setting safety stock levels include the parent item’s inventory class (ABC); criticality of end use; location of customer; ease of manufacturing; warehouse space; safety/hazardous material; design of the product life; and spare parts usage (warranty work, repair).

Electronic transactions with public warehouses to soar. “To achieve connectivity, those business partners who store, transport, label, sort and provide a wide variety of value-added services must be wired into the connectivity web,” says Bernard J. La Londe of the Ohio State University (Columbus, Ohio; Lalonde.3@osu.edu) and Terrance Pohlen of the University of North Florida (Jacksonville, Fla.; Tpohlen@unf.edu). According to a poll of Council of Logistics Management (CLM) members (*The Ohio State University 2000 Survey of*

Career Patterns in Logistics) respondents say that almost 70% of the transactions between their firm and its third-party warehouse partners will be electronic (50% via the Internet, 18% through electronic data interchange) in 2004.

On declaring a kanban card amnesty day. Apparently there is a problem concerning the discipline, or lack of it, in handling kanban cards, states the *Lean Manufacturing Advisor*. Not realizing how important the cards are in the replenishment system, employees tend to overlook, misplace, or forget about them. As part of a retraining effort, organizations are holding kanban card amnesty days. No punishment is involved, but employees are encouraged to deposit the “misplaced” cards in a box placed in a break room, cafeteria, or an out-of-the-way area in the shop.

Supply-Chain Council announces release of SCOR Version 4.0. A significant change in this new release is the inclusion of Return as a Level 1 process. The expansion to include return activities will extend the scope of the model into the area of postdelivery customer support. Version 4.0 does not contain the process elements below Level 1 for Return. The Council plans to validate Level 2 and 3 processes, the associated metrics, best practices, and features and document these results in Version 5.0. Version 4.0 (www.supplychain.org) also completes the changes in the area of services and major revisions to the Enable elements (formerly Infrastructure).

Ten ways to reduce inventory costs. Consulting firm Herbert W. Davis (Fort Lee, N.J.; www.hwdco.com) recommends looking at the following options: (1) Identify obsolete inventory, sell it, and take steps to avoid making more; (2) identify slow-moving inventory and centralize it to one or two locations; (3) identify obsolete inventory; (4) periodically conduct a formal slotting analysis to save labor and space costs of carrying inventory; (5) adjust safety stock levels often to support fill rates by class of products; (6) audit and update lead times, lot sizes, and economic order quantities (EOQs) in your inventory planning system; (7) improve returns processing to reclaim or dispose of returned merchandise as soon as possible; (8) implement a plant shipping option to bypass the warehouse network where economical; (9) store more common product in bulk, boxing and labeling at the distribution center (DC) just prior to shipment; and (10) conduct a geographic analysis of sales by item to focus on managing regional and seasonal items.

Look before leaping to an Internet hosting provider. A primary question that inventory managers should ask while considering an Internet hosting

solution/provider is whether the host is an expert in your business and application. “There are applications that do not warrant critical consideration, such as accounting, because they are dictated by a standard set of operating principles,” offers Luc Ringuette, CEO of HotStatus Enterprises, Inc. (Mission Viejo, Calif.; 95926luc-ringuette@msn.com). Applications such as inventory control systems or warehouse management systems (WMSs) are a different matter, however. The reason is that there are no generally accepted operational principles, no standard rule for doing the operation, and everyone has their own unique method, he detailed at a recent CLM Annual Conference. Therefore, he advises, “It is important that you and the host provider match philosophies. So, get to know the people you’re going to be working with, and make sure they have expertise in your specific application and business.”

IristaVision releases a Web-based application that provides users a consolidated view of inventory. IristaVision (irista; Milwaukee; www.irista.com) provides supply chain visibility over the fulfillment network by using open standards-based extensible markup language (XML). The Web-based application provides a consolidated view of inventory, orders, and shipments moving between suppliers, inventory storage locations, partners, and customers. Its capabilities include a rules-based order parsing/sourcing logic that provides customer service from the most cost-effective locations.

New reconfigured CPIM courseware available. APICS’s newly reconfigured Certified in Production Inventory Management (CPIM) courseware incorporates an integrated business process orientation rather than focusing solely on individual techniques. The new CPIM program consists of the following courses: basics of supply chain management, master planning of resources, detailed scheduling and planning, execution and control of operations, and strategic management of resources. References and study material for the new CPIM are now available. New references are listed on the APICS Web site (www.apics.org/certification). For specific ordering information, contact APICS: 703-354-8851 or 800-444-2742.

MicroAnalytics releases OptiSite for Windows. OptiSite for Windows (MicroAnalytics; Arlington, Va.; www.bestroutes.com) is a full-featured distribution planning and site location model. Given a user’s supply and demand points, it suggests optimum number and location of DCs and best use of current products, as well as which suppliers to use and where and how many to stock.

10 guiding principles for logistics outsourcing. “Adherence to 10 basic rules will go a long way toward ensuring a successful and mutually beneficial outsourcing relationship,” Clifford F. Lynch, executive vice president of Continental Group (Memphis, Tenn.; cliff@continental-traffic.com) counseled at the CLM Annual Conference titled redefininglogistics.com. Lynch, author of the widely acclaimed *Logistics Outsourcing: A Management Guide*, lists the following rules: (1) Develop a strategy for outsourcing; (2) establish a rigorous provider selection process; (3) clearly define your expectations; (4) develop a good contract; (5) establish sound policies and procedures; (6) identify and avoid potential friction points; (7) communicate effectively with your logistics provider; (8) measure performance and communicate results; (9) motivate and reward providers, and (10) be a good partner. The latest research book is available from the Council of Logistics Management, 2805 Butterfield Road, Suite 200, Oak Brook, IL 60523; 630-574-0985; fax, 630-574-0989; clmadmin@clm1.org; www.clm1.org. Price: \$35 for CLM members, \$70 for nonmembers.

Vertex introduces Stradivari packaged warehouse management system. A complete solution from Vertex Interactive, Inc. (Clifton, N.J.; www.vertex-interactive.com) for middle-market distribution and warehouse facilities streamlines management of receiving, putaway, inventory, cycle counting, picking, shipping, and other areas of warehouse operation. It also provides audit trails and accountability to minimize on-hand inventory, reduce labor, and provide real-time visibility into warehouse operations. The Stradivari WMS is completely configurable without programming, and it is also an Open Systems Interconnect solution, ensuring connectivity to a broad range of host systems and applications. The solution can be Web-enabled with Vertex’s middleware to provide an integrated e-business supply chain platform.

Dick Armstrong provides another valuable resource: an evaluation of logistics Web sites. *Who’s Who in Logistics Websites? Armstrong’s Guide to Internet Transportation and Supply Chain Management Solutions* profiles more than 130 companies in-depth and grades the individual Web sites on an A to F scale. In this confusion-relieving resource, Armstrong classifies each as real or start-up. Price: \$195 (hardcopy), or \$495 (hardcopy and CD). Contact: Richard Armstrong, Armstrong & Associates, Inc., 321 South Forrest Street, Stoughton, WI 53589; 800-525-3915; fax, 608-873-5509; Dick@3PLogistics.com; www.3PLogistics.com.

Manhattan Associates launches infolink. The Internet solution links retailers and suppliers to provide real-time retail supply chain visibility. Infolink (Manhattan Associates, Inc.; Atlanta, Ga.; www.manh.com) addresses the dynamic needs of collaborative commerce and ensures compliance with evolving industry standards, including GNX(SM), WWRS, and UCCnet. Infolink helps retailers achieve improved stock positions, fewer markdowns, and buyer efficiencies.

J. D. Edwards announces OneWorld Xe collaborative commerce enabler. The company's (www.jdedwards.com) new extended enterprise product boasts of some 300 Internet-ready applications. Specific to *Inventory Reduction Report* readers, among the 300 Internet-ready applications and hundreds of preintegrated applications delivered by partner relationships, solutions include advanced planning, inventory management, vendor-managed inventory, container management, bulk stock management, advanced stock valuation, and warehouse management. OneWorld Xe, with capabilities enhanced via J. D. Edwards' eXtended Process Integration engine, allows customers to use open, flexible, and interoperable technologies that foster communication and commerce among suppliers and customers across their extended supply chain.

Users of automatic replenishment generally meeting their goals. Users of automatic replenishment programs, on a scale of one (not effective) to seven (extremely effective), give high marks for achieving improved customer service (5.47), fewer stockouts (5.33), and improved reliability of deliveries (5.15). According to Patricia J. Daugherty of the University of Oklahoma (Norman; pdaugher@ou.edu), moderate ratings were given to achieving faster inventory turns (4.94), reducing inventory (4.79), and reducing overstocks (4.77). Receiving the lowest ratings are reducing costs (4.56), handling (4.50), product damage (4.46), and discounting (3.96). "I would be surprised if the survey respondents told me they did a great job reducing cost and of improving customer service," she expressed at the CLM Annual Conference. "You're not going to accomplish both instantaneously."

Kewill brings additional enterprise resource planning (ERP) content to Kewill.Net. Kewill Systems PLC (Marlborough, Mass.; www.kewill.com) has extended the functionality of its Kewill.Net business portal with Kewill.View. This solution provides MAX and JobBOSS ERP users with on-line supply chain

visibility from the manufacturing status of orders and stock to the physical delivery of goods. This added visibility enables Kewill's small- and medium-size enterprise customer base to increase operational efficiency and provide more timely and reliable order fulfillment without investment in e-commerce infrastructure such as firewalls and other complex security mechanisms.

The one-minute quiz to a federal tax deduction. Do you have excess, nonmoving inventory? Do you have returns, canceled orders, seconds, slow sellers, or discontinued models, styles, and colors? Your organization can earn a federal tax deduction by donating them to charity. Contact: National Association for the Exchange of Industrial Resources; 800-289-4551; www.naeir.org.

Provia releases order visibility exchange tool. ViaView (Provia Software; Grand Rapids, Mich.; www.provia.com) enables users to reduce inventory throughout their supply chain while maintaining high order fill rates. The product collects real-time information from a user's fulfillment applications, including warehouse management, transportation management, small parcel shipping, yard management, and other systems. Users, their partners, and customers use ViaView to monitor real-time orders, shipments, and inventory availability via the Internet. They can be instantly notified when a selected fulfillment event does or does not happen, eliminating safety stocks and excess inventory caused by lack of real-time inventory and order information.

Interlink Technologies announces WHSe-LINK Release 4.0. Warehouse management system WHSe-LINK 4.0 (Interlink Technologies; Maumee, Ohio; www.interlinktech.com) embraces e-commerce with Web-enablement and directs enterprise-wide warehouse operations using real-time radio frequency-based (RF-based) technology. Other new features include scalable allocation processes, easily maintained item attributes between multiple buildings, and an integrated program that enables users to configure compliance labels and systems.

Sustainable competitive advantage is a mirage. "Today's businesses must invest in technology and attitudes that let them change their business models within six months" states AMR Research (Boston; www.amrresearch.com) in an advisory. They developed a list of areas that companies need to evaluate as e-business tools take hold of their industry. Of interest to *Inventory Reduction Report* readers are the following:

1. *Sales channels.* New mechanisms for getting product to market demand that companies reevaluate how sales channels are managed, particularly third-party distribution channels.

2. *Quick payback.* Currently important are the speed with which an application can start paying benefits and how much of the company, customers, and suppliers the application handles or allows a user to monitor. A number of leading-edge applications are designed to be available only as Web-based services.

3. *Outsourcing.* The notion of outsourcing entire business processes with the in-house staffs that support them is a reality. Some previously unaffordable but very strategic business functions, such as specialized supply chain and logistics planning, are now available on a rental basis.

Space-age ID systems, or bar codes with an attitude. They are permanent, scannable, and sometimes invisible. They are matrix symbols, first studied for use by NASA to help track space shuttle components. The matrix symbol is capable of storing 100 times as much information as a bar code can, in the same amount of space. The symbol is a small, square-shaped mark resembling a checkerboard. Unlike a bar code, which is scanned using a laser beam, the symbol is captured by a charged-coupled device, a solid-state chip that turns light into electric signals. NASA's Marshall Space Flight Center formed an alliance with the developer of the Data Matrix symbol, CiMatrix (Canton, Mass.), to develop commercial applications for NASA's marking technologies. CiMatrix's Symbology Research Center has applied readable symbols on more than 80 materials, including metal, plastics, glass, paper, fabric, and ceramics. The technology is the method of choice for direct-part marking in automotive, health, semiconductor, aircraft, and electronic industries. NASA is soliciting partners to develop handheld devices to read these invisible markings.

WebPLAN unveils e-supply chain solution. WebPLAN Xtream Server (webPLAN Inc.; Kanata, Ontario, Canada; www.webplan.com) is anXML platform that allows manufacturers and their business-to-business (B2B) customers and suppliers to automate data sharing for faster collaboration. With webPLAN Xtream Server, systems at different sites can exchange information over the Internet. Unlike expensive and complex electronic data interchange (EDI) systems, webPLAN Xtream Server automates system-to-system data. WebPLAN Xtream Server is a flexible, open solution that is easy to deploy and manage.

What does that inventory-turn benchmark really mean? If a firm achieves a level of turnover that falls short of competitive benchmarks, it does not necessarily mean that the firm should work feverishly to reduce inventory, assures a research report titled *Warehouse Inventory Turnover* (Warehousing Education and Research Council; Oak Brook, Ill.; www.werc.org). Before management takes action after comparing inventory turns, “it is imperative that they examine all the underlying factors correlated to the inventory turnover results,” advises the report’s author, Thomas W. Speh, director of the Warehousing Research Center at Miami University (Oxford, Ohio; spehtw@muohio.edu). “Turns should always be evaluated in light of important customer requirements,” he recommends.

Supply chains must become more compressed. One finding from an executive roundtable facilitated by Tompkins Associates is that as customers expect greater speed, supply chains must become more compressed and flexible. Main concerns include finding suitable software, integrating third-party information, invoicing via the Internet, and working with overseas suppliers.

Supply chain simulation software analyzes inventory strategies. SimChain (Micro-Analytics; Arlington, Va.; www.bestroutes.com is the North American distributor) evaluates strategic and tactical aspects of entire supply chains, as it analyzes logistics networks structures, inventory strategies, control policies, and fluctuations in material flows and demand. Interactive map and automatic updating features allow users to see the results of adjustments in the model.

Picking rules to change for e-commerce. “Companies that do not have an ‘each’ picking environment, and only usually pick cases or full pallets, will see a dramatic impact when picking for e-commerce,” maintains Michael Wohlwend, director of strategic alliances at Catalyst International, Inc. (Milwaukee; mwohlwend@catalystwms.com). He advises that you take the “eaches” and “put them off in a separate area and pick only eaches from there.” At Distribution/Computer Seminar (C. S. Report, Inc.; Uwchland, Pa; www.logistar.com), he recommended initially storing three days of A (top 20% of your SKUs) items, three weeks of B items, and three months of C items when setting up the “each” pick area, to minimize replenishment.

Take ownership of your new software. “As we were implementing our MRP II [manufacturing resource planning] systems, we were told by responsible software vendors and consultants that it was critical that we take ownership

of our systems,” maintains Robert E. Beecy Jr., CFPIM, CIRM, CPM, senior director of planning and customer requirements at Dan River Apparel Fabrics. “We took that message seriously, but for some reason we have forgotten that lesson with supply chain management software and take on legions of outside people who are responsible for all facets of the new system,” he explained at a recent Annual APICS International Conference. “When these individuals finally go away, all your expertise leaves with them,” he warns. “Make sure you have persons within your organization who take on the new software and are not afraid of the client-server attributes that make up the backbone of these systems,” Beecy strongly advises.

Oliver Wight announces 90-day sales and operations planning (S&OP) program. Drawing on its experience, Oliver Wight (New London, N.H.; 800-258-3862; info@ollie.com; www.ollie.com) has developed a program to jump-start a S&OP program that will generate results within 90 days. Clients also receive the Oliver Wight S&OP Template software tool.

When outsourcing, do not give up the brain trust. “We find it very important for us to keep the people who are going to make the strategic decisions on our strategic direction and not to outsource these pieces,” explains Eileen Long, vice president and general manager of service design operations at Global Network Services, Unisys (Blue Bell, Pa.; eileen.long@unisys.com). “We’re asked constantly by high-tech companies to do things like materials planning for them, to take total control of their networks.” At INTERLOG (Worldwide Business Research; New York; www.wbresearch.com) she expressed, “I personally believe this is wrong, for any company to allow the strategic area of their business to be outsourced. If you take and outsource your brain trust, you’re taking a large risk,” she emphasizes.

Manhattan Associates releases PkMS 2000R1. The new release of the PkMS advanced fulfillment system features enhanced multiclient warehouse/company/division functionality, Web inquiries, e-fulfillment order routing features, less-than-truckload freight rating, and rate shopping. PkMS 2000R1 (Manhattan Associates; Atlanta, Ga.; www.manh.com) supports the generation of multilingual documentation, including packing slips, bills of lading, shipment manifests, and commercial invoices to enable centralized distribution into other countries. A fully integrated Order Allocation/Router module with the 2000R1 release directs pick tickets to warehouses based on geography, inventory availability, and customer specific rules. Customers can

query order and inventory status via Web browser over the Internet. E-mail notification has also been integrated.

Design the warehouse for fast inventory turns. Authority Kenneth B. Ackerman, president of the K. B. Ackerman Company (Columbus, Ohio; kackerman@ameritech.net) notes that key goals in warehousing today are to reduce order cycle time and operate at higher inventory velocity. “For a cross-dock or fast-turn operation, receiving and shipping doors should be adjacent to each other,” he recommends in the *Journal of Business Logistics*. “Doors one through eight might be used for receiving in the morning and for shipping in the afternoon, or the odd-numbered doors used for receiving and the even-numbered for shipping,” he advises. “Such an arrangement will facilitate cross docking by allowing goods that come in one door to go out through an adjacent door. The concept of dedicated doors for receiving or shipping is obsolete,” Ackerman declares.

Business Intelligence Portal for e-intelligence. American Software (Atlanta, Ga.; www.amsoftware.com) announced its fully Web-based ERP solution now includes a customizable Business Intelligence Portal that provides secured role-based views of key performance indicators (KPIs). The portal is a knowledge management system throughout the supply chain, measuring KPIs versus yearly, monthly, or daily goals and identifying trends that could affect overall company strategy. The Business Intelligence Portal is accessed via the Internet and provides a proactive management tool to identify and analyze performance variants. The user can drill down to necessary detail to analyze individual data as compared to specific goals on a graphic screen.

WebPLAN releases e-business demand management solution. DemandIT (webPLAN Inc.; Kanata, Ontario; www.webplan.com), a Web-based, collaborative demand management solution, enables manufacturers to model future market conditions more accurately and proactively formulate strategic plans to prepare for them. DemandIT integrates data from multiple, disparate sources into a single model. Another feature of the demand management solution is webPLAN’s unique Flex technology that automatically makes adjustments for forecast error.

Cost of logistics increases to 7.34% of sales revenue. Herbert W. Davis and Company (Fort Lee, N.J.; www.hwdco.com) found in their latest survey that the cost of logistics (transportation, warehousing, order entry/customer

service, administration, and inventory carrying cost) rose 2.21% in 1999 compared to a reduction of 4.30% in 1998. Since 1980, the report explains, “Costs for the three principal cost elements (transportation, warehousing, and inventory) have been changing relative to each other.” The 1999 study shows much higher costs for warehousing (1.84% of sales). Transportation (3.24%) and inventory carrying cost (1.52%) both declined. “This shift points to the need for reconfiguring the logistics system, as optimum warehouse configuration occurs when warehousing and inventory costs are about equal to transportation,” it concludes.

Enhanced collaboration a feature of XA Release 6.0. MAPICS, Inc. (Alpharetta, Ga.; www.mapics.com), announced the release of XA 6.0, the latest version of its AS/400 Extended Enterprise Application. The release offers manufacturers additional Internet functionality to help them collaborate more efficiently with partners in their supply chain. XA Release 6.0 includes enhancements to the product’s FoundationWeRX family of tools, one of which is materials management, a Client Architecture application that streamlines the warehouse data and physical inventory/cycle counting business processes. It improves the productivity and accuracy of receipt of materials and services through inspection, stocking, vendor returns, and debit memos, while minimizing data entry on receipt transactions and ensuring that receipts are expedited immediately.

Focus to continue on maintenance of logistics relationships despite Internet. “In business-to-business e-commerce, we expect to see even stronger and deeper relationships as suppliers, transportation carriers, and logistics service providers become Web-enabled,” maintains Robert V. Delaney, vice president of Cass Information Systems (Brighton, Mo.; cass@cassinfo.com). “We believe that companies will continue to try to work with fewer suppliers and service providers, not more,” he offered in his *Annual State of Logistics Report*.

Radcliffe Systems launches new warehousing information portal. Warehouse managers and others can register to access warehousing information that is specific to their interests. ROC WMS software users (Radcliffe Systems Inc.; Willowdale, Ontario; www.radsystems.com) can access manuals, frequently asked questions, and release notes online.

Survey finds S&OP widely adopted, but results disappointing. More than three-fourths of surveyed companies have adopted S&OP, according to Oliver

Wight (New London, N.H.). However, only 27% judge it to be very effective. Although 87% say that new product introductions are included in their S&OP process, only 70% use it for other projects and initiatives. About half use formal demand and supply planning meetings as a part of their S&OP processes. Survey results are available from www.ollie.com or by calling 800-258-3862.

Kewill introduces MAX Data Collection. MAX Data Collection (Kewill Systems PLC; Foster City, Calif.; www.kewill.com), a new bar code data collection solution, is designed for small and midsize manufacturing enterprises. MAX Data Collection supports 18 ERP transactions with real-time validation and processing using either fixed mount or RF devices. The product supports parts under lot or serial control and is available at prices starting at \$7,500.

Guidelines to improve inventory record accuracy. Burton A. Schaffer, managing principal at Tompkins Associates Inc. (Allentown, Pa.; bschaffer@tompkinsinc.com) recommends (1) establishing a climate of high expectations; (2) measuring record accuracy frequently; (3) reporting results for all to see; (4) using accuracy checks to search for and correct causes of errors; and (5) rewarding improvements and maintenance of high levels of performance. Further, at Distribution/Computer Seminar (C. S. Report Inc.; Uwchland, Pa.; www.logistar.com) he advised establishing formal standard operating procedures for inventory transactions so that all know how information is to be communicated, who is to initiate communication, from whom and to whom information should flow, and when information flow is expected to take place.

There is no such thing as "virtual" inventory. In a new study (*Demystifying e-Fulfillment*), analyst Chris J. Newton of AMR Research (Boston; www.amrresearch.com) explains, "Until we can make physical items materialize out of thin air, there will always be a need to store goods to meet demand." While Internet retailers may impress Wall Street and their venture capital investors by "retreating beyond the physical world, the truth is that there is nothing virtual about e-fulfillment," he declares. "The Internet has enabled information about products to move at the speed of light, but the products themselves still need to be handled physically," Newton maintains. "Products require warehouse space; people for picking, packing, shipping; and delivery vehicles for transport. Pulling together an efficient fulfillment process does not happen by chance."

QAD enterprise applications to feature kanban sizing, yield calculation. QAD (Carpinteria, Calif.; www.qad.com) announced that its customer-driven Electronics and Industrial Development Group (EIDG) will focus efforts on creating industry-specific and e-business functionality into QAD applications. The next release of QAD enterprise applications, available later this year, will feature Internet-enabled electronics and industrial applications with kanban sizing and calculation of yield. These applications will streamline inventory and parts planning. Future EIDG projects include enhancements for e-commerce, available-to-promise enforcement, flow manufacturing with kanban, and reserved inventory in multinational integrated supply chains. The EIDG consists of QAD product development executives and representatives from leading companies across the electronics and industrial sectors.

Avoiding the pitfalls of WMS selection. “Be wary of the WMS vendor who attempts to convince you to adjust your operations to fit its software solution,” advises Sedlak Management Consultants, Inc. (Richfield, Ohio; www.jasedlak.com). A software solution is only valuable if it addresses your business needs, they remind. “Don’t select software that will require major modifications, as changes tend to be costly, risky, and time-consuming,” they warn. The advisory also notes, “Make no assumptions about software functionality. Make sure your interpretation of required functionality matches the vendor’s interpretation.” The management consultant firm recommends that you insist on a written document outlining functionality and operational requirements and business objectives.

Excess, obsolete inventory can be a source for a federal tax deduction. Corporations can earn a federal income tax deduction by donating their excess, nonmoving inventory to charity, according to the National Association for the Exchange of Industrial Resources (NAEIR). The deduction is available under Section 170 (e)(3) of the U.S. Internal Revenue Code. A free guide is available that includes step-by-step instructions on the donation process, plus a formula for calculating a company’s potential tax savings. The guide is available from NAEIR, 560 McClure Street, Galesburg, IL 61401; 800-289-4551; fax, 309-343-0862; www.naeir.org; jez@naeir.com.

What’s that inventory really costing you? “To determine your cost to carry inventory, meet with finance and agree on your company’s annual costs, as a percentage of inventory dollars, for your critical factors,” advises Mary Lu

Harding, CPM, CPIM, principal at Harding & Associates (Lincoln, Vt.; Harding@Sover.Net). Among the factors she includes in calculating the inventory carrying costs are (1) the cost of money, (2) the cost of taxes and insurance, (3) occupancy cost of the facility (per square foot), (4) obsolescence reserve. In addition, at a recent National Association of Purchasing Management (NAPM) Annual International Purchasing Conference, she explained, "Calculate or estimate costs associated with personnel, capital equipment, and secondary quality costs [how often material is reinspected after being stored]." Also, estimate the costs associated with the maintenance of computers and databases. "Estimate what percentage of that is devoted to inventory [the largest and most active database], and include both hardware and software costs," Harding advises.

Radcliffe Systems launches PARTner Program. The developer of WMSs has introduced the Radcliffe PARTner Program that draws on the combined talents of leading software, consulting, and hardware organizations to ensure that clients have access to a multitude of knowledge and support to provide effective warehouse solutions. The PARTner Program offers solutions, services, and support to build a common vision of supply chain connectivity. Information: Radcliffe Systems, Inc., 200 Consumers Road, Suite 305, Willowdale, Ontario M2J 4R4, Canada; 416-493-3844; fax, 416-493-1616; www.radcliffesystems.com.

Supply Chain Synthesis—a step beyond supply chain management. No Boundaries: Moving Beyond Supply Chain Management introduces and explains Supply Chain Synthesis as an environment in which there are no link-optimizing boundaries. "The synthesis melts the links of the chain into a continuous flow that is focused not on a particular link, but on the ultimate customer," explains author James A. Tompkins, president and founder of Tompkins Associates (Raleigh, N.C.; www.tompkinsinc.com). The book describes opportunities and the eight core competencies of Supply Chain Synthesis and provides instructions on how to design a supply chain without boundaries. Price \$24.95. Contact Tompkins Client Relations at 800-789-1257.

MAPICS presents Point.Man Extended Enterprise Edition. MAPICS, Inc. (Atlanta, Ga.; www.mapics.com), announced the controlled delivery of Point.Man Extended Enterprise Edition, which enables customers, suppliers, distributors, and partners to collaborate via the Internet. It allows

companies to provide secure information access and transaction capabilities throughout their entire value chains. The Point.Man Extended Enterprise Edition goes beyond simple Web-enablement as it addresses the collaboration, transaction, data integrity, and real-time information needs of current e-business and e-service models. Its extensive personalization capabilities allow manufacturers to provide easy-to-use, browser-based access to information views and transactions customized to fit the needs of individual partners, customers, and employees.

DispenseSource automated inventory cabinet tightens grip on inventory control. The DispenseSource Smart Inventory System (DispenseSource, Inc.; Rancho Santa Margarita, Calif.; www.dispensource.com) introduces its Web-based automated inventory cabinet that contains office supplies and consumable inventory. Users enter a password to gain access to the point-of-use system and remove their items. Analytical and financial reports can be viewed online or interfaced with ERP system. Managers can access individual, department, and branch usage information.

Performance measures are essential for small companies, too. “Performance measures are often thought of as a nuisance or a burden,” charges Glenn W. Malstrom, CFPIM, materials manager at Trans/Air Manufacturing (Red Lion, Pa.; GCMalstrom@aol.com). “This view is both shortsighted and potentially damaging.” In fact, the Trans/Air Value Chain performance measurements include forecasting accuracy, inventory turnover, on-time delivery, warranty response time, installation quality, and manufacturing productivity. “Our performance measures identify trends, foster teamwork, and are easy to understand,” he revealed at Congress for Progress, sponsored by the Mid-Atlantic chapters of APICS.

Radcliffe Systems releases WMS ROC v8.02. Improvements have been made in ROC version 8.02 that increase the usability of the desktop program. For example, Pick Planning and Load Planning have been simplified through the reduction of multiple screens. In v8.02 users have several tabbed options on one screen. A major enhancement, Task Prioritizing, assigns and prioritizes tasks or work sets to individual employees. Task Interleaving allows the employee to switch between linked tasks, saving travel time in the warehouse. Work Order Functions, a third enhancement, is designed to handle raw material and WIP better. Radcliffe Systems (Willowdale, On-

tario; www.RadcliffeSystems.com) offers ROC via an Application Service Provider model.

Rid excess inventory via online bartering. BigVine.com (Redwood Shores, Calif.) has in beta release its Internet barter marketplace (www.bigvine.com) that enables businesses to trade their excess goods and capacity for items that their companies need. BigVine.com's exchange is based on Trade Dollars that allow members to engage in transactions beyond one-on-one barter. After registering, members can sell goods and services with customized listings, buy goods or services with Trade Dollars, browse and search the categories of listings, and monitor their member account activity. BigVine.com also announced an agreement with American Express that includes a significant equity and strategic marketing investment. It also has invited its more than two million small business card members to join BigVine.com.

Obtaining benchmarks via the Internet. Manufacturers wanting to know how their performance measures up to their peers can now do so in just minutes using a free financial benchmarking service, BenchmarkReport.com (www.BenchmarkReport.com). It enables manufacturers to compare their financial performance against a relevant peer group, in real time on the Web, as often as they would like. Among the key performance measures are inventory turns and operating, liquidity and leverage ratios. The limited number of financial data points are compared against that company's peer group as determined by Standard Industrial Classification (SIC) codes and annual revenue. The site is cosponsored by Fourth Shift Corp. (www.fs.com) and Grant Thornton (www.grantthornton.com).

New, updated resource tells all about third-party logistics providers. Purchase and merger activity, as well as migration to e-systems, is changing the growing third-party logistics industry. The eighth edition of *Who's Who in Logistics? Armstrong's Guide to Third Party Logistics Services Providers* reviews and analyzes the upheaval of the past year in a comprehensive State of Third-Party Logistics Report. The guide also contains detailed profiles of nearly 100 traditional and e-commerce third-party logistics providers along with comments and case studies. Published in two volumes, it is priced at \$245 (hardcopy only) or \$695 (hardcopy and diskette). Contact: Richard D. Armstrong, president, Armstrong & Associates, Inc., 321 South Forrest Street, Stoughton, WI 53589; 800-525-3915; fax, 608-873-5509; www.3PLogistics.com.

WMS systems that are within your budget. “There’s a perception among warehouse managers that cutting-edge WMS systems are beyond their reach economically,” maintains Carl Brewer, president of Integrated Warehousing Solutions (Oakbrook Terrace, Ill.; www.iws-irms.com). “That’s bunk,” he commented at a press conference at Distribution/Computer Expo. “Application Service Providers, or ASPs, virtually eliminate the financial and technological barriers that appear so daunting. Providers, such as our company, keep their proprietary WMS software on their own host servers, then sell access to individual companies on a pennies-per-transaction basis,” he explains. The warehouse is able to access leading-edge applications through the Internet without an intensive capital commitment, and the cost-per-transaction can be built into the contracts signed with their shipper customers.

Blinco Systems announces 3RDWAVE4.com. The synchronized supply chain execution software joins front-end sales to back-end fulfillment functions. With 3RDWAVE4.com (Blinco Systems Inc.; Toronto; www.blinco.com) companies have full data integration and complete inventory visibility. Designed for dot-com companies, the software handles product sales order and customer service, planning and sourcing, inbound logistics management, inventory control, event track-and-trace, allocation of goods, and financial management. Additionally, Blinco announced three Web-based components. The new modules are Request for Quotation management, Inbound Logistics management, and Non-Asset-Based Manufacturing control. All Web applications are designed to work independently yet are fully integrated with 3RDWAVE current client/server technology modules to deliver global pipeline visibility at the SKU level.

Supply-Chain Council releases SCOR Version 3.1. The two major changes in SCOR 3.1 (Supply-Chain Council, Pittsburgh; www.supply-chain.org), infrastructure and services, have been developed asynchronously. The Source section of Version 3.1 more completely addresses services in this release, while the Plan, Make, and Deliver sections more completely address infrastructure. Version 4.0 is planned for release this summer.

WMS application requirements changing. WMS application suite applications have concentrated on the more basic warehousing functions. Emerging application suites represent sophisticated warehousing functions that incorporate increased automation and system networking. Meanwhile, labor man-

agement and cross-docking application suites are mostly at the discussion stage by end users, according to the white paper, *The North American Market for Warehouse Management Systems, Software, and Systems Integration Services* (Venture Development Corporation; Natick, Mass.; www.vdc-corp.com).

ISolve.com launches Web site for excess inventory and idle assets. Newly formed iSolve.com has launched an e-commerce B2B marketplace for buyers and sellers of surplus inventory, underutilized assets and excess capacity. The site (www.isolve.com) offers buyers and sellers the ability to negotiate and close deals anonymously online. The organization has a team of expert merchandisers with both a vertical and horizontal industry expertise, as well as a range of services that result in “attractive price points, repackaging alternatives, settlement options, and worry-free logistics management.” ISolve.com will guarantee an offer on any goods listed on its site that have not been sold within 30 days.

HK Systems creates third-party logistics center of excellence. This center of excellence is a vertically integrated organization focused on assembling and delivering tailored supply chain solutions for the third-party logistics market. HK Systems’ (www.hksystems.com) supply chain solution components address the needs of third-party logistics and lead logistics providers and include support for inventory ownership facilitating multiclient, multisite inventory and warehouse management. The solution also includes Web-enabled order management, transportation planning and execution, and sophisticated contract-based billing on a supply chain execution collaboration backbone.

New range of scheduling solutions introduced by Preactor. Preactor’s (www.preactor.com) new scalable family of scheduling solutions is designed for small and midtier manufacturers. The entry-level product Preactor Lite+ is the first of three finite capacity scheduling options and is a stand-alone, fixed-configuration, interactive graphical scheduler. The Preactor 200 FCS offers additional functionality including sequence-dependent changeover matrices, transfer batching, and lot splitting. Preactor 300 FCS is the premier FCS solution. It is a multiconstraint system that provides process batch functionality, selection of labor based on defined skills, and complex assembly control. The flagship of the range is Preactor APS, an advanced scheduling package that handles multiple constraints, material control, and complex rules to minimize WIP and job lateness with preferred sequencing to

minimize changeover times and deal with wandering bottlenecks. These rules can be customized.

JobsInLogistics.com debuts recruiting Web site. JobsInLogistics.com, an online job search and recruiting company, has launched the first national online recruiting Web site designed and marketed exclusively for the logistics profession. The proprietary, state-of-the-art Web site (www.jobsinlogistics.com) allows employers/recruiters to post job openings and identify qualified logistics candidates while empowering job seekers to find logistics career opportunities.

Future-focused warehouses subject of new Tompkins monograph. Journey to Warehousing Excellence establishes 20 principles for moving your warehouse from its current performance to excellence. It also includes a 94-question healthy warehouse assessment. The 20 principles of excellence will help direct your warehouse to the next level by discussing issues such as operations planning, third-party/outsourcing, the supply chain network, WMS, and leadership. The warehouse assessment survey provides you with a view of your current status and helps establish priorities for improvement. Price \$7.95. Contact: Client Relations, Tompkins Associates, 2809 Millbrook Road, Suite 200, Raleigh, NC 27604; 800-789-1257; www.tompkinsinc.com.

Efinity releases version 2 of hosted supply chain solution. Efinity, Inc. (www.efinity.com), a provider of supply chain collaboration solutions, announced the release of version 2 of their Web-hosted application. Newly expanded functionality includes vendor managed inventory (VMI) and the ability to manage complex relationships such as third-party trading partners and fulfillment houses. Enhanced collaboration tools, dynamic customer reports, and improved connectivity for users of legacy internal applications and EDI are also included in the upgrade. The newly upgraded VMI module provides separate, specialized tools that speed and simplify Web-hosted VMI transactions. Companies wanting to complement their internal systems with Efinity's integrated supply chain collaboration and VMI solutions are provided XML-based connectors that automatically and securely exchange data with Efinity's site.

AutoPalletP3 for case-picking operations. AutoPalletP3, a new WMS component, makes case picking more productive, reduces unsalables, and increases transportation efficiency. It is ideally suited where cases are picked to pallets.

AutoPalletP3 (Warehouse Optimization; info@AutoPalletP3.com) can run either as a part of the WMS or on a stand-alone PC. It uses item master data and user-configurable rules to divide the order into pallet quantities that meet each user's quality, ergonomics, and productivity standards.

Oliver Wight introduces "Rescue ERP" program. This program is designed to help a company improve its return on investment (ROI) and get the most out of its ERP system—fast. In as little as one week, Oliver Wight consultants can complete an assessment and present conclusions and an implementation plan. Contact the Oliver Wight organization at 800-258-3862 info@ollie.com.

With inventory it really is all about service and investment. “The most important aspects of any inventory are the service it provides and the capital it requires,” argues Terrell J. Harris, managing partner, Chicago Consulting (Chicago; 312-346-5080; tjharris1@aol.com). “As inventory managers, I can't imagine anything more important to work on than service and capital, as these two elements are inexplicably linked to one another,” he expressed at the CLM Annual Conference. “It almost doesn't matter to say ‘we provide 98% service.’ What does matter is 98% service and \$5 million worth of inventory.” Service and capital are linked to one another very closely, and they need to be managed together, according to Harris.

QAD offers new lot management system functionality for inventory management. QAD (Carpinteria, Calif.; 805-684-6614; www.qad.com) announced the availability of Lot Management System (LMS) v2.4, an improved version of its integrated Advanced Materials Management System. LMS v2.4 is designed to help process-based manufacturers meet inventory management and regulatory requirements in preparation for e-commerce. The LMS Attribute Validation functionality enables users to specify acceptable values for a particular item/product line and helps manage the regulatory requirements of the Food and Drug Administration, U.S. Department of Agriculture, and Hazard Analysis and Critical Control Point (HACCP). Other new features include distribution management; MFG/PRO compliance module support providing predefinition of lot numbers; work order allocation, pick, and issue; user-definable sales order allocation; multiple units of measure enhancements; and quality enhancements including audit reports.

Valuable new resource describes capabilities of e-fulfillment organizations. “There is some overlap between traditional third-party logistics companies and

e-fulfillment providers,” reports Richard D. Armstrong, president of Armstrong & Associates, Inc. To help users identify the best e-fulfillment providers, the renowned expert on outsourcing has compiled and published *Who's Who in e-Commerce Fulfillment? Armstrong's Guide to e-Fulfillment Services Providers*. The impressive resource contains detailed information on 60 companies and lists over 100. Comparative information is provided on service capabilities, company sizes, key personnel, software, and customers. Case studies are included. The 170-page guide costs \$225 for hardcopy or \$495 for the hardcopy and diskette. Contact: Armstrong & Associates, Inc. 321 South Forrest Street, Stoughton, WI 53589; 800-525-3915; fax, 608-873-5509; Dick@3PLLogistics.com; www.3PLLogistics.com.

National Association of Wholesaler-Distributors (NAW) releases new guide to managing distribution firms. Distribution Management in the New Economy: A Blueprint for Success explains how the four elements of the value equation (quality, price, life-cycle cost, and the “hassle factor”) can be used by wholesale distribution managers to improve their businesses. Price: \$63 (direct members); \$76 (members of NAW member associations); and \$86 (non-members); plus \$5.50 shipping and handling. Contact: National Association of Wholesaler-Distributors Publications, 1725 K Street NW, Department T, Washington, DC 20006; 202-872-0885; fax, 202-785-0586; www.nawpubs.org; pubs@nawd.org.

How inventory managers can assist financial auditors. The auditor's work revolves around certain financial statement assertions (existence or occurrence, completeness, rights and obligations, and valuations or allocations). For inventory, it means that the inventory as reported in the financial statements exists and is complete. Hence the importance of the annual year-end inventory observation by the auditors, maintains Steve Erickson, CPA, partner at Whittlesey and Hadley (Hartford, Conn.). Inventory managers can smooth the audit process, he advises in the *APICS Small Manufacturing SIG Quarterly*, by following just three steps. First, communicate. “Within two weeks of the observation day, you should have all of the details firming and reconfirmed with your auditors,” he suggests. Next, clean up all inventory areas. Shipping and receiving areas should have minimal inventory. Anything not to be counted must be segregated from that which will be counted. Backup for why items are not counted should be readily available. Third, provide documentation. “Have a map of your shop floor available, and a written strategy for controlling each of the areas where inventory or

WIP is located and written instructions for the counters. Also, he recommends making copies of the shipping and receiving records for the previous five days leading up to the physical inventory for the auditor's records.

Highly functional, low-cost WMS now available. HK Systems, Inc. (Milwaukee; www.hksystems.com), introduced its Stockmaster/Express warehouse management solution, featuring a turnkey WMS solution with an installed price of as low as \$99,000. This is a solution for small warehousing operations, Internet-fulfillment and start-up companies looking for the latest technology, RF-driven operations, real-time inventory control, and ease of implementation and integration. The system provides advanced functionality including receiving, directed putaways, picking, pack, load, and ship. Personnel can be directed via paper or full RF instructions.

What CPFR is all about, via the Web. Syncra Systems, Inc. (Cambridge, Mass.; www.syncrasystems.com), keeps adding new resources to its Web site to help inventory managers move toward successful collaborative planning, forecasting, and replenishment (CPFR) adoption. They have recently added a series of overviews that explain the key aspects of CPFR. The latest, by Syncra's CTO Matt Johnson, discusses the CPFR opportunity and how it modifies today's planning and forecasting processes. It is a great article for learning about key concepts of CPFR.

Prescient introduces Internet-based solution Prescient XEi. The next generation of the Prescient XE suite (Prescient Systems; www.prescientsystems.com), Prescient XEi, is an Internet-based solution designed to support today's e-commerce business requirements such as collaboration, e-fulfillment, and the need for global visibility across the supply chain. The solutions in the new suite, available during the second quarter, include Demand Planning, APS Workbench, Advanced Scheduling, and Collaboration Engine.

SAP, PMG alliance provides companies with supply chain benchmarks. SAP America, Inc. (www.sap.com) and the Performance Measurement Group, LLC (PMG; www.pmgbenchmarking.com), a subsidiary of Pittiglio Rabin Todd & McGrath (PRTM), formed a strategic alliance that provides SAP customers with key performance indicators and metrics of supply chain operations. SAP customers can participate in miniassessments with PMG or become part of its two-year study. The PMG Supply Chain Management Benchmarking Series covers the supply chain processes of planning,

sourcing, manufacturing, and delivering products and yields results on a quarterly basis.

CPFR raises the bar beyond VMI-style collaboration. Greg Girard, senior analyst at AMR Research (Boston; ggirard@amrresearch.com) notes, “Collaborative planning, forecasting, and replenishment is the only approach that includes both demand-side and supply-side activities within a single framework.” Although it is still more of a “direction than a definitive standard practice, it is approaching the point of accelerating market adoption,” he writes in *How Can We Collaborate? Let Me Count the Ways*, a recent AMR Research report. For this to occur, Girard observes, “Manufacturers and retailers first need to change the scope and rules of collaboration and extend the technology footprint of the applications and technologies they use to collaborate.” Both have found CPFR programs difficult to adopt, he acknowledges. “They take more commitment from both parties, require each to divulge more information, and are harder to set up in required changes in information systems, business processes, and corporate culture.” However, “CPFR pilots now justify their efforts.”

Sixty minutes to size up a warehouse. If you have only 60 minutes to evaluate a warehouse, the first priority is to look at housekeeping, advises Kenneth B. Ackerman, president of the K. B. Ackerman Company (Columbus, Ohio; 614-488-3165). “If trash is found on the floor, ask who retrieves it and disposes of it. If damage is found, find out about procedures for dealing with it,” he offers in *Warehousing Profitably: A Manager's Guide*. Another pointer for the one-hour evaluation is that space utilization is another indicator of management. “Always look up,” he notes. See how much of the practical pile height is actually in use. Find out whether racking systems are designed to use all of the available space and whether all lift trucks have masts high enough to reach the highest rack position. Also, look at the locator system and see if it works.

When suppliers should manage the inventory in a supply chain. Educator/consultant Lowell M. Hoffman of Global Sourcing Solutions (Chapel Hill, N.C.; lmhglobal@compuserve.com) tells *Inventory Reduction Report*, “The supply chain process should be mapped to fully understand where critical management decisions can best be made to achieve jointly developed objectives.” An integrated set of performance measures can then be established, and the best supply chain member, who should be managing and reporting

success, can be selected. As an example, he offers, "In a long-lead-time raw material, it is the supplier that should manage the entire supply chain, including the customer's inventory and in-plant service levels. Data should be fed to the supplier for monthly tracking and reporting of supply chain inventory turns, service, and quality metrics."

Emerging trends for the new "successful" warehouse. "Warehouses will remain vital in supply chain synthesis," says Brian Hudock, managing principal at Tompkins Associates (Raleigh, N.C.). For future success they must (1) focus on the customer, (2) compress operations and time, (3) introduce continuous flow, (4) begin cross docking, (5) use electronic transactions, (6) offer customized warehousing, (7) advocate third-party warehousing, (8) adapt to incredible shrinking order, (9) automate, and (10) consider the human element.

American Software introduces Flow Manufacturing for Windows NT. The Windows NT release of Flow Manufacturing streamlines the user interface through an easy-to-use, graphical management view. The system uses drop-and-drag features to simplify line design, demand smoothing, and "what-if" analysis, while its visual user interface renders rapid system navigation to provide information. Flow Manufacturing automates demand-based manufacturing to existing ERP and e-business applications and operates in a stand-alone environment. Flow for NT can be integrated with American Software's (www.amssoftware.com) e-Intelligence ERP suite.

Correction: Free videos tell all about demand management. *Profiting from Supply Chain Strategies* is a three-part instructional video series that covers the principles of forecasting, distribution planning, VMI, and S&OP. The tapes provide the theories behind demand management and illustrate them through detailed examples and case studies. For a complimentary copy, contact Penni M. Oelschlaeger, client services manager, Modern Business Solutions, Inc., 250 Bishop's Way, Suite 102, Brookfield, WI 53005; 800-394-3700 X31; fax, 262-821-0282; poelschlaeger@mbsi.com.

NAW moves to Internet to solve excess inventory problem. The NAW has entered into a strategic alliance with TradeOut.com to provide wholesaler-distributors with an effective and efficient way to dispose of excess inventory and idle business assets using the Internet. TradeOut.com is an online marketplace for B2B excess and obsolete inventory across a variety of product

categories, including industrial equipment. Those interested in buying or selling excess inventory on the Internet and learning how they can participate in the NAW/TradeOut.com program should visit www.tradeout.com/naw.

Executive Masters in International Logistics available from Georgia Tech. High-potential logistics professionals are prepared for the responsibilities and challenges of building and managing a global supply chain. Participants develop technical skills for modeling the global chain and harnessing information technology (IT) while refining their financial and strategic perspectives. Coursework is delivered in a series of five two-week residences spread over an 18-month period. Contact: EMIL, The Logistics Institute, Georgia Institute of Technology, Atlanta, GA 30332; 404-894-2300; fax, 404-894-2301; EMIL@isye.gatech.edu; www.tli.gatech.edu/EMIL.

Radcliffe's newest WMS version offers an ASP model. The technical structure of ROC 8 supports Web browsers and enables customers to access ROC via the Internet. Radcliffe Systems, Inc. (Willowdale, Ontario; www.radsystems.com), with its new WMS release now offers ROC via an ASP model, whereby Radcliffe hosts the WMS application and data on a special server farm. Customers make no commitment to a capital expenditure because Radcliffe buys the server and supplies the entire system for one monthly usage fee. A new functionality includes a new approach to picking and loading trailers.

Benchmarking warehouse operations is not a fad. Nearly 60% of the respondents to a survey by the Warehousing Education and Research Council (WERC) indicate that their companies currently use benchmarking, and 50% plan to expand benchmarking activities in the next two years. Three of five respondents benchmark by comparing internal operations, whereas only a few companies take an external focus to benchmarking warehouse operations. *Benchmarking Warehouse Operations* is available to WERC members for \$5.00 and to nonmembers for \$10.00, plus \$4.00 shipping and handling, through WERC, 1100 Jorie Boulevard, Suite 170, Oak Brook, IL 60523; 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; www.werc.org.

Third-party logistics continues to grow. Leading authority Richard Armstrong, president of Armstrong & Associates (Stoughton, Wisc.; www.3PLogistics.com) expects overall growth of third-party logistics services to continue in the 15% to 20% range for up to four more years. However, he notes, "Many

Fortune 500 companies have not outsourced warehouse and inventory management functions that are not parts of their core competencies.”

New survey finds applications of flow manufacturing can double inventory turns. *Becoming Demand Driven: The Foundation for e-Business Leadership*, a new market research report, indicates that “while significant progress has been made in fulfillment practices, even the best-in-class market leaders are a long way from having the right strategies in place for e-business success.” The study covers the four phases of becoming demand driven, from plant-focused strategies, such as lean and flow manufacturing and the use of advanced planning and scheduling (APS), to extending these strategies to the virtual enterprise of supply chain trading partners. Among the findings were that those primarily using APS have better success with market growth and achieving number-one or number-two positions. The report also includes first pass yields and reveals increasing capacity 20% to 30% with the same resources and perfect order fulfillment. Flow practitioners have superior results in bringing cycle items within order lead times and producing to daily demand rates; they also saw productivity improvements of 10% to 20%, greater cash flow, higher gross margins, production cycle times reduced by 50%, and doubling inventory turns. Information: Industry Directions, Inc., 6 Broad Street, Newburyport, MA 01950; 508-362-3480; report@industrydirections.com; www.industrydirections.com. Price of report: \$1,000.

Inventory managers must remain knowledgeable and conversant about new technology. Consultant/educator Gary A. Landis, president of G. A. Landis Associates (Pell City, Ala.; 205-884-4112), advises, “Don’t think that you have to react to every single new software change, every new innovation, every upgrade, every revision that comes on the market. But be knowledgeable and conversant regarding new systems,” he maintained at the APICS International Conference. “Pick and choose only those functions that are going to benefit you. If you try to keep up with every new advancement, you’ll either go crazy or bankrupt.”

Full CPFR functionality over the Internet. SyncUp Hosting Service provides all the functionality of Syncra Ct, the CPFR-compliant supply chain collaboration solution, via the Internet and a Web browser. It allows manufacturers and retailers to realize the benefits of CPFR without installing new equipment, upgrading infrastructure, or hiring new IT staff. It follows an ASP business model that provides access to the Syncra Ct application in a data center

managed by Syncra Systems (www.syncrasystems.com) and its hosting partner, Consonus Inc. Customers pay a flat monthly fee that includes all software licensing and fees, server and database resources, networking bandwidth and connectivity, customer support, and initial training and consulting.

Just-in-time (JIT) not practical in a process manufacturing environment. Kenneth B. Ackerman, president of K. B. Ackerman Company (Columbus, Ohio; kenackerman@ameritech.net) declared at a recent Annual Conference of the CLM, “JIT goes out the window when you have a continuous process.” He explains, “Where you can never turn the mill off, where product is rolling out of the plant 24/7, you have to stage the in-bound materials to keep that line supplied, so it never gets shut down.” In addition, he reminds, “There is also the significant challenge in finding warehouse space and balancing the supply of space to the constant surge of material coming off the line, especially when people are not buying the product.”

Majure Data announces RF Navigator version 11.0. RF Navigator v11.0 (Majure Data; www.majuredata.com) has been redesigned to incorporate advanced warehouse management functionality with browser-based technology. The Web-enabled front-end architecture release also offers advanced interface capabilities and more robust distribution functionality.

WMS needs to be part of a closed loop of information systems. Having real-time information on the activities within its walls is no longer sufficient for the DC, maintains Chris Newton of AMR Research, Inc. (Boston; www.amrresearch.com). Instead, the WMS running the DC needs to be part of a closed loop of information systems that feed and receive real-time information to and from the order management system, transportation management system, inventory management system, and supply chain planning applications. Such a closed loop enables DC operators to manage orders, inventory, and assets optimally, he explains in the report *Warehousing Isn't Just about Storage Anymore*. “Without access to such information, the DC’s ability to handle merge-in-transit, flow-through, cross docking, and light manufacturing is greatly reduced,” Newton charges.

Safety stock levels decline directly with reductions in forecast errors. “A reduction in forecast error yields a linear reduction in safety stock to achieve any given level of service,” states John A. Estep, CFPIM, president of E/Step Software Inc. (Tieton, Wash.; www.EstepSoftware.com). This means that a 25% re-

duction in forecast error yields a 25% reduction in safety stock. To improve the forecast error, he suggests in a white paper (*The Right Service at the Right Price: Your Competitive Edge*), “forecast each item on the calendar most appropriate for that item.” In the fast food business, for example, this can mean forecasting weekly, biweekly, and in some cases, daily. For the service parts environment, it could be bimonthly, quarterly, semiannually, or annually.

3RDWAVE SCE software available as Web-based application. The latest enhancements to 3RDWAVE Synchronized Supply Chain Execution software (Blinco Inc., Toronto; www.blinco.com) delivers e-business and e-commerce capability via intranet or extranet. Designed as a suite of integrated modules (such as planning and sourcing, inbound logistics management, inventory control, and event track-and-trace), the software runs on all popular mainframe and midrange systems under NT 4.0, Unix, and OS400 operating systems.

CLM releases research study on logistics personnel. *The Growth and Development of Logistics Personnel* describes competencies, job requirements, and training needs for 22 logistics job families ranging from the warehouse floor to the executive suite. This valuable resource explains how operating- and executive-level jobs in logistics are changing and taking on new tasks, while inventory control, purchasing, and customer service are diminishing as distinct functions as they become part of the larger supply chain organization. Cost: \$35 for CLM members; \$70 for nonmembers. Contact: Publications Department, Council of Logistics Management, 2805 Butterfield Road, Suite 200, Oak Brook, IL 60523; 630-574-0985; fax, 630-574-0989.

The advance ship notice (ASN), done correctly, is invaluable tool. The value of a properly created ASN is in its representation of the actual content of a shipment right down to the exact quantity and SKU level. Therefore, it should be based on what is placed in a trailer or rail car and closed out when the doors are sealed, according to Hank Lavery, vice president of logistics solutions at Sterling Commerce (Dublin, Ohio; hank_lavery@stercomm.com). “Many times, the ASN is created from the shipping system,” he explained at a recent Annual Conference of the CLM. “Yet, in loading a trailer or other carrier, what’s on a packing list sometimes doesn’t get packed due to size, space, or other limitations; therefore, the ASN sent is not fully updated,” he claims. It is best to create the ASN when the carrier is ready to leave the dock.

Logistics software survey now available from CLM. The CLM has released its annual Logistics Software survey. Conducted by Accenture (formerly Andersen Consulting), it has detailed information on over 1,000 software packages of interest to logistics personnel. Individual data sheets are provided for each software package. The survey is only available on CD-ROM, which requires a Windows system to access the information. The search engines can be accessed by vendor, software, function, or keyboard. Cost: \$75 for CLM members; \$100 for others. Contact: Publications Department, Council of Logistics Management, 2805 Butterfield Road, Suite 200, Oak Brook, IL 60523; 630-574-0985.

Define your warehouse customers by level of activity. “The fundamental challenge of the warehouse is to provide enough flexibility to be customer-driven,” maintains Patty Godin of Tompkins Associates, Inc. (Raleigh, N.C.; www.tompkins.com). One way to remain flexible is to define customers in terms of what they bring to the company revenue. “A customer who buys \$50 worth of product each year should be treated differently from the customer who buys \$50,000 worth of product annually and the customer who buys \$50 every three years,” she explains. Separating customers into tiers enables companies to fashion customer satisfaction accordingly. “The management of accounts by a tier system provides companies with enough information to know the customer, serve the customer, and satisfy the customer,” Godin asserts.

Database of best practice inventory management strategies now available from IOMA. IOMA’s new ManagementLibrary.com Web site is comprised of proprietary information from its 48+ specialized publications. It includes articles and information on survey data, case studies, analyses, and benchmarks, as well as practical how-to advice. You can personalize your needs using the Data Finds You feature, which keeps an eye out for the kind of articles you are looking for and notifies you by e-mail of its search. Individual articles maybe purchased by Visa or MasterCard (and soon American Express) for \$3 each. If you require more than six articles, consider the one-month unlimited use subscription for \$19.95. Free registration is available at www.ManagementLibrary.com.

New survey finds inventory turn improvement mixed. “A substantial proportion of companies reported modest improvements, anchored by 21% reporting no improvements in inventory turnover and 15% reporting 3% to 5% im-

provements,” reports *Global Supply Chain Benchmarking and Best Practices Study—Phase II* (KPMG LLP, in collaboration with the Massachusetts Institute of Technology). Approximately 15% reported turn improvements over 20%. Further, improvements in finished goods inventory turns were the “most pronounced,” while WIP inventory turns also saw improvement. The area in which performance improvements seem to be the least dramatic is raw materials. “Since finished goods typically account for the largest portion of inventory investment, it’s an obvious area of focus,” the report offers, but adds that “WIP and raw materials are potential areas for achieving better asset management.”

Finally, a resource to help you select logistics software. Who’s Who in Logistics Software? Armstrong’s Guide to Supply Chain Management Systems provides in-depth analyses of major logistics software companies and their supply chain management capabilities. From the author of the highly authoritative guide to third-party logistics services providers, this new reference provides inventory managers and logisticians with a fresh visibility into supply chain software systems. The guide features information on prices, product descriptions, specifications, and detailed functionality and includes a review of customers and case studies. The guide is priced at \$149 for hardcopy and \$199 with disk. Contact: Richard Armstrong, Armstrong & Associates, Inc., 321 South Forrest Street, Stoughton, WI 53589; 800-525-3915; Dick@3Plogistics.com.

Warehouse BOSS updated for e-commerce, traditional distribution. InterBiz Supply Chain Group’s (<http://interBiz.cai.com>) newest release of Warehouse BOSS addresses the shift in warehousing and logistics requirements resulting from the proliferation of e-commerce outlets. In addition to the increased flexibility in the selection and shipping processing of order fulfillment, the latest release provides enhancements to help companies organize their warehouse space more effectively. For instance, Location Capacity Manager helps reduce the number of partially filled warehouse locations. Co-mingling allows mixed SKUs to be stored in the same location, and Proactive Replenishment Planning enables warehouse and logistics operations to proactively generate, modify, and commit replenishment plans based on user-defined inventory levels.

Excess inventory for charity helps reduce taxes. A free guide is available to businesses to help them determine how much they are overpaying the IRS. The

answer can be found in the value of excess, nonmoving inventory. When merchandise is donated to charity, it can be worth a federal income tax donation, sometimes as much as two times the donated products' cost. Contact: National Association for the Exchange of Industrial Resources; 800-289-4551.

Automation and inventory reduction. "A good automated system can cut your inventory level substantially," claims Mike Torch, senior vice president of TransTech Consulting (Columbus, Ohio). However, technology cannot do it alone. The following suggestions from *WERCsheet* together with technology can help keep your material flowing with effective inventory management: (1) Perform location audits every 90 to 180 days to prevent improper location of items; (2) count critical items frequently to avoid stockouts and establish a system that flags low quantities of important, fast-moving items; (3) eliminate incoming inspections by perfecting receiving practices; and (4) require delivery appointments and ASNs to ensure an audit trail.

MainBoss Mobile Inventory Application software for users who perform physical counts. Desktop Innovations, Inc. (Kitchener, Ontario, Canada; 800-563-0894; www.mainboss.com) has released the first in a series of MainBoss Mobile Applications available free from the MainBoss Web site. MainBoss Mobile Inventory Application allows users to perform physical counts and is designed to work with a Palm III or Palm III units equipped with a bar code scanner from Symbol Technologies. It is designed to be used either as a companion application to MainBoss 2.6 maintenance software or as a stand-alone application. For example, when used as a stand-alone application, the entire inventory database is uploaded from a PC to a Palm III, where the inventory application is used to obtain correct inventory counts. After counting or verifying all the inventory counts in the database, the database is downloaded to the PC with the correct counts.

Warehousing services remain a favorite application for logistics outsourcing. Among the activities outsourced most frequently to logistics service providers are outbound transportation (62.9%), warehousing (62.9%), freight bill auditing/payment (53.2%), and inbound transportation (48.9%), according to *Third Party Logistics Services: Views from the Customers* (University of Tennessee, Exel Logistics, and Ernst & Young). By contrast, those activities outsourced less frequently include order entry/order processing (3.8%), cus-

tomter service (6.5%), and inventory management (9.1%). Based on future outsourcing plans, among the activities for which companies plan to increase outsourcing most are freight consolidation/distribution (19.9%), warehousing (16.1%), cross docking (12.4%), and information technology (10.8%). "The presence of cross docking and information technology lends support to the notion that priorities for future outsourcing are related to current perceptions of the direction in which supply chain changes are moving," the research study concludes.

USFreightways launches eLogistics business unit. USFreightways (Rosemont, Ill.; www.usfreightways.com) started USF eLogistics, a business unit designed to fulfill the logistics needs of online businesses to the consumer marketplace. USF eLogistics will utilize i2's Transportation Manager and USF's state-of-the-art WMSs integrated with the Internet to provide consumers with real-time information. This means consumers will have instant access to inventory, actual shipping costs, and order tracking.

Pallet and container solutions online. The National Wooden Pallet and Container Association's Web site (www.nwpc.com) contains information about pallet design and construction standards and quality assurance programs. A pallet audit is posted on the site to help users accurately determine their pallet performance requirements. The site also includes information about how to comply with USDA requirements on solid wood packaging imported into the United States and about association publications.

What ROI targets can you expect from a WMS? A WMS can reduce the amount of safety stock required by some 25% to 60% of total safety stock, and the time spent searching for stock can be cut between 50% to 90% of the current time spent. That is the type of ROI that you can anticipate from an investment in a WMS, maintains Jim Coker, vice president of logistics product strategy at MK Group (Atlanta, Ga.; cokja01@cai.com). Other ROI potentials he cited at the Distribution/Computer Seminar East (C. S. Report, Inc.; Uwchland, Pa.; 610-458-6410) include a 50% to 90% reduction in the cost to process shipping errors, a 20% to 50% reduction in overtime hours, and the complete elimination of annual physical inventories.

HK Systems announces third-party logistics provider (3PL) solution series. The focused software application solution set offers sophisticated 3PL distribution management, Web-enabled order entry and supply chain visibility,

advanced inventory and order management, warehouse management, and transportation management. The 3PL Solution Series exploits functionality across three application areas. The Enterprise/WMS module offers the ability to track and manage multiowner inventory, provides a consolidated view of all client/customer activity, and has the flexibility to handle multiple clients in a single warehouse. The Enterprise/OMS module enables multi-customer, multiclient management and “any-to-any” sourcing and distribution. The Enterprise/TMS module offers advanced planning, shipping consolidation, and freight audit. For information: HK Systems, Inc. 2855 S. James Drive, New Berlin, WI 53151; www.hksystems.com.

On making the inventory/service-level tradeoff. Leading authority Marshall L. Fisher of the Wharton School of the University of Pennsylvania (Philadelphia; 215-898-7721) explains that the application of three strategies helps to determine accurately the optimum inventory required to deliver a specific fill rate/service level. At the International Conference on Product Development and the Supply Chain (Management Roundtable; Waltham, Mass.; 781-891-8080; www.ManagementRoundtable.com), he presented them as

1. *Accurate forecasts.* “Improve forecasts by getting better data on demand drivers and by developing models to extract insights from the data,” he explains.

2. *Responsive supply.* “Increase supply responsiveness by reducing lead time and minimum batch size,” Fisher advises.

3. *Optimized inventory.* “Employ planning models to derive optimal inventory position based on the margin of error around the forecast and on the cost of too much or too little inventory,” he details.

Updated third-party warehouse resource available. *1999-2001 Directory*, from Affiliated Warehouse (www.awco.com), lists their third-party warehouse clients. The directory includes contact names and locations, a description of rail siding, and trucking equipment and special services offered and highlights freezer, hazardous material, and foreign warehouses. Free from Jim McBride, Affiliated Warehouse Company, Inc., P.O. Box 295, Hazlet, NJ 07730; 732-739-2323; fax, 732-939-4154.

CLM releases new research study on twenty-first century logistics. *21st Century Logistics: Making Supply Chain Integration a Reality* presents a framework to

help managers recognize and overcome the common obstacles that undermine both internal and external integration of value-added logistical operations. This research-based book focuses on the why the work of logistics is fundamental to supply chain success. Its contribution is an updated and more comprehensive framework for achieving effective logistics change management. The study, prepared by researchers at Michigan State University, uses a continuing dialogue of Charlie Change and his hypothetical company, Spartan Enterprises, to help describe each area of supply chain integration. The dialogue illustrates how logistical performance can most often be significantly improved. The research team also provides many examples to illustrate a particular point or practice. Enclosed with the book is a compact disc that contains an assessment diagnostic and comparative benchmark data. Cost: \$35 for CLM members, \$70 for nonmembers. Contact: Publications Department, Council of Logistics Management, 2805 Butterfield Road, Suite #200, Oak Brook, IL 60523; 630-574-0985; fax, 630-574-0989; www.clm1.org.

Do not clutter your WMS with a myriad of noncritical administrative tasks. That is the admonition from WMS guru John M. Hill of Cypress Associates (Watsonville, Calif.; jhill835@aol.com). “A warehouse management system is not a historical archiving system; nor is it designed to grind out lengthy reports, graphs, charts, and other documents,” he insisted at Distribution/Computer Seminar East. “It is an execution system, and as such, its primary mission is the management of facility resources, work and material flow to maximize the efficiency of moving materials to market.” Although the WMS will generate data required for activity profiling, performance measurements, and the like, Hill strongly recommends that “data manipulation for analysis is best accomplished off-line on a PC or host system.”

CFOs paying stricter attention to inventory. A basic approach to cost control—stricter inventory monitoring—is now the most common tactic that companies employ to maximize their cash flows. According to a recent survey of 1,600 CFOs, 71% say they control inventory more strictly to lift their cash flows. According to *Institutional Investor*, 85% of CFOs also try to raise operating managers’ awareness of the importance of cash flow; another 51% have also focused their efforts with lower-level, nonmanagement employees.

What has happened to warehouse “blocking and tackling” issues? Warehousing expert Ken Ackerman, president of the Ackerman Company (Columbus,

Ohio; 614-488-3165), notes, “Warehousing and logistics management today is focused on supply chain management, alliance building, or other strategic initiatives. Not enough is devoted to issues such as finding good employees, reducing order cycle time, controlling damage, or reducing error rate.” In *Ackerman Warehousing Forum*, he emphasizes, “Corporate strategy is lots of fun, but we should never take our eyes off quality and reliability, the ‘blocking and tackling’ issues in warehousing.”

InterBiz Supply Chain Group launches advanced scheduling solution. Quick Response Engine 2.1 manages independent demands, such as customer orders, synchronized materials requirements and production load to capacity, and shop floor scheduling. It is designed to improve customer service levels through better scheduling, shorter lead times, and improved capacity utilization. Contact: interBiz Supply Chain Group, a business unit of Computer Associates, 516-342-5224; info@cai.com; www.cai.com.

Improving effectiveness of inventory performance metrics. “Once the performance measurement system is in place, audit it to ensure its effectiveness,” suggests Ann K. Willis, CFPIM, CIRM, operations and education manager at ObTech (Newton, Mass.). At *Congress for Progress* (Mid-Atlantic Chapters of APICS), she advised using the following evaluation factors:

1. Measurements must be based on readily and continuously available data and must be usable at all levels.
2. Measurements should be easy to change as needs change.
3. Measurements must focus on improvement and corrective action, rather than monitoring or control.
4. Measurements should always be expressed as a positive, rather than as a negative.

Develop a supply chain-wide inventory strategy. “There is too much inventory in the supply chain, and it costs an enormous amount,” charges Richard Wilkins, director of sales and marketing at Robocom Systems International Inc. (Massapequa, N.Y.; rick@robocom.com). “Replace inventory with information for multiple levels of decision making,” he advised at Distribution/Computer Seminar (C. S. Report, Inc.; Uwchland, Pa.; 800-338-4112). “Also, design the supply chain structure as a strategic effort, not a tactical one, and use it as a positioning strategy,” he recommends.

Integrated inventory planning for improved forecasts. “Integrated inventory planning is the most critical, but often the most insufficient, component of a good forecasting system,” pronounces John A. Estep, CFPIM, president of E/Step Software Inc. (Tieton, Wash.; 509-678-5900). “A forecast is not a number, but a range.” For example, he writes in *IIE Solutions*, suppose the forecast for a period is 2,000 units plus another 250 for safety stock to achieve 98% service. According to Estep, “safety stock should be computed from service target, forecast error, error distribution, replenishment frequency, and lead time, among other things.” It should not be a fixed-time-supply guess, which often yields the “frustrating” combination of high inventory and low service. His advice: “Select a software package that enables you to specify the service target while it then computes the inventory required for each item. Or if you specify the inventory, and then let the system compute the service, that inventory level will deliver.”

Learn-at-home inventory management. *Basic Techniques of Inventory Management* provides a solid, user-level understanding of the subject and doubles as an aid for the APICS inventory management certification exam. List price: \$227 (\$45 prepayment discount available). For information, contact APICS Professional Reference Program, MGI Management Institute, 244 Westchester Avenue, White Plains, NY 10604; 800-932-0191; fax, 914-428-0773.

Advice on successfully implementing a WMS. *WMS Implementation: Not for the Impatient or Faint of Heart*, teaches that WMS implementation can be accomplished successfully by knowing (1) what steps to take in the beginning; (2) what to expect after you take those steps, and (3) how to handle the bumps in the road. A free copy of the monograph is available from Tompkins Associates Inc., 2809 Millbrook Road, Raleigh, NC 27616; 919-876-3667; fax, 919-872-9666; www.tompkinsinc.com.

How to avoid safety stock when scrap/yield is not as planned. “The MRP process is very unfriendly to yield/scrap other than the planned value,” notes Don Frank, president of D. N. Frank, Inc. (Florham Park, N.J.; 973-377-6782). “If the yield is greater than planned, there is excess inventory; if it is less, MRP will—usually too late—set up a new requirement,” he explains. A sensible way to deal with unplanned yield/scrap is to use safety stock, but with a proviso, Frank insists. “This only should be used if the schedule will be disrupted when the yield/scrap is different from the planned value,” he advises. “If, however, lot sizes are sufficiently large to bridge more than one

master schedule requirement and/or lead times are short, no yield/scrap action may be needed,” Frank explains.

Pity the poor, ignored bar code label. “I’ve noticed that one of the most vital pieces to the warehouse management puzzle seems to get the least attention—the bar code label,” argues Nancy Rouse, marketing coordinator at Logmatix, Inc. Since the bar code label, among other things, is critical to ensuring that your inventory is correct, she advises the following in *Outlook* (Materials Handling and Management Society; 704-522-8644): (1) Paper labels will not hold up under humid, dusty conditions; (2) direct thermal labels cannot be used in heat or sunlight; (3) not all labels stick in cold temperatures; and (4) a retroreflective label is necessary for long-range scanning. “Get samples to test, and make the label large enough for your bar code,” Rouse recommends.

Another truth about inventory: an asset, or expense. While inventory is listed as an asset, it can affect cash flow in a negative manner, asserts expert Michael Harding of Harding Associates (Bristol, Vt.). “Inventory, in reality, is not an asset but a potential asset,” he insists. “This inventory does not become an asset until there is a customer order for that item.” He cites the example of obsolete inventory. Accountants recognize the material as unusable but are reluctant to write it off because that will diminish the book value of the organization. They tend to wait for a “good” quarter, which may be years away, to write the inventory off. “In any event,” he argues in *NAPM Info-Edge*, “the asset becomes a non-value-added expense with the stroke of a pen and overhead increases during the holding period.”

What are top executives’ primary concerns about inventory? According to a recent *Inventory Reduction Report* survey, readers say that their bosses are most worried about (1) managing inventory levels (25.7%), (2) inventory carrying costs (22.5%), and (3) improving inventory turns (9.6%).

Global logistics software makes inventory “visible.” Honda Trading America Corporation has installed 3rdWAVE global logistics software (Blinco Systems Inc.; Toronto) to ensure that its manufacturing operations are fully supplied. The software provides Honda with real-time visibility of inventory into and through processing centers and subassembly operations. Honda now can plan and execute inventory demand planning with its customers and mill sites.

Trade-offs must be considered when implementing point-of-use inventory. “These involve considerations of the amount of stock, its location or locations, and ease of supply,” reports Rajan Suri (*Quick Response Manufacturing*; Productivity Press; Portland, Ore.). Other guidelines he offers include the following: (1) For parts that are unique to one cell, place bins right in the cell that use each particular part. (2) For shared parts, further analysis is needed. High-volume parts justify placing bins in each cell. For medium-volume parts, place them in a common location that is reasonably accessible to all the cells, or select a location nearest the higher usage cell. (3) For parts that both are low-volume and are used sporadically by a number of different cells, Suri does not advise point-of-use storage. Use a traditional centralized stockroom in this case.

Careers in Logistics a great reference. Updated and filled with current information on skills, salaries, and career paths for 17 typical logistics positions, *Careers in Logistics* is a valuable resource for introducing high school and college students to the profession. The 36-page booklet has specifics on career options, education and training requirements, and more. Contact Andrea Manning, communications coordinator, Council of Logistics Management, 2805 Butterfield Road, Suite 200, Oak Brook, IL 60523; 630-574-0985; fax, 630-574-0989.

Contingency planning in the warehouse is essential. “Warehouse management must develop contingency plans for each area that would be impaired, crippled, or devastated in the event of a crisis,” declares Mike Halsey, project director at Tompkins Associates (Raleigh, N.C.). With the increased reliance on computerized data for inventory information, it is recommended that contingencies be in place for possible hard drive and network crashes. “Back-ups of staff computers should be performed regularly, if not daily,” says Halsey. “Networks should be backed up on tape in the same manner.” Back-up programs should (1) perform the functions automatically to ensure consistency, (2) alert managers to unsaved files, and (3) ignore files that have not been revised since the last back-up, he advises.

New software enhances supply chain inventory management functions. PRMS 9.0 (Acacia Technologies, a division of Computer Associates International, Inc.; Lisle, Ill.), an ERP solution with extensive supply chain management capabilities, contains new enhancements, including VMI and consignment inventory functionalities. Also new is the purchasing receipts in-transit inventory feature, which allows tracking of items received at inbound

consolidation points, but which will incur considerable delays in transport to the stockroom. For information, visit Acacia's Web site at www.acaciatech.com or call 800-523-5260.

Improve warehouse storage productivity through better inventory management. "Better inventory management can reduce the amount of product kept in storage and at the same time facilitate a layout which is more effective without making large investments in equipment," maintains leading authority Kenneth B. Ackerman, president of the Ackerman Company (Columbus, Ohio). "Every warehouse manager should identify and kill off the FISH [first in, still here], or the dead items that exist in nearly every inventory." Furthermore, he adds, "When your inventory management system identifies which items move fastest, you can create a storage layout to reduce travel time by placing fast-moving items close to the floor and to the door."

Distributors to get message on how to sharpen core competencies. *Facing the Forces of Change*, the report from Arthur Andersen and the Distribution Research and Education Foundation, finds that the combined effects of trends in e-commerce, supply chain integration, strategic alliances, and globalization are changing the business environment for wholesaler-distributors. Besides an explanation of the "threats facing the industry," the report contains guidance on how wholesale distribution firms can combat these attacks. The report is available as book (\$140/copy, direct member), video (\$180), or as a set (\$342). Contact: NAW Publications, 1725 K Street, NW, Department T, Washington, DC 20006; fax, 202-785-0586.

New demands on transportation suppliers to increase visibility of in-transit inventory. Buyers often need visibility to in-transit inventory levels to determine whether they can support either a production schedule change or additional product promotions, according to a new white paper, *Transportation Management*. Therefore, customers are "demanding" additional information from their suppliers to increase visibility to in-transit inventories through EDI, advance ship notices, and product tracking capabilities. For a copy, write Carolyn S. Morgan, marketing manager, PricewaterhouseCoopers LLP, 400 Northridge Road, Suite 1000, Atlanta, GA 30350; 770-643-5100; fax, 770-643-5200.

Inventory turn measurement more meaningful when based on individual categories. By focusing on specific inventory categories, attention is brought to those

areas that need attention. "This visibility is not readily apparent with the total inventory turnover measurement," declare Terry W. Campbell, CPIM, executive director; Craig Hagen, manager of planning and logistics; and Jerry Tomaz, manager of material control, TVCOM International. The meaningful categories, they explained at the 40th Annual International Conference of APICS will be different for each company. At TVCOM, for instance, the categories include finished goods, WIP, components, subcontracted assemblies, and engineering inventories. "Subcontracted assemblies are separated from components to focus on supply chain differences," they offer.

Outsourcing inventory management responsibilities still emphasizes cost savings. Authority Richard D. Armstrong, president of Armstrong & Associates (Stoughton, Wis.; 608-873-8929), observes, "Although we continue to point to broader issues in regard to outsourcing, our experience indicates that decision makers of third-party logistics customers emphasize cost savings." As an example of the savings potential in reduced inventory and carrying costs, he reports that it is in the range of 7% to 10%. Another interesting finding in his *State on Contract Logistics Report* is that most companies (74%) who outsource logistics functions use a single third-party provider. Only 3% use more than five third-party logistics providers.

Latest version of Warehouse BOSS expands RF, tracking capabilities. The WMS Warehouse BOSS 6.0, with its enhanced RF receiving capabilities, promises to streamline the receiving process. Also, through resource reporting and activity tracking, it defines tasks, tracks tasks being performed, tracks the amount of time spent performing the tasks, and determines the quantity of work completed. The new version also has proactive replenishment planning, which provides the ability to generate, modify, and commit replenishment plans outside of pick planning. For information, contact Acacia Technologies, a division of Computer Associates International, Inc., 2400 Cabot Drive, Lisle, IL 60532; 800-523-5260.

Supply-Chain Council releases new version of SCOR. The Supply Chain Operations Reference model (SCOR), release 3, continues the evolution in developing a standard for supply chain management. "If we want to assure ourselves the toolkit that SCOR provides will enable users to describe virtually any supply chain and across different industries, we must continue to explore a broad range of performance issues and integration practices," explained

William Helming, director of PRTM (Weston, Mass.; bhelming@fcg.prtm.com). Release 3 eliminates process and discrete redundancies in Level 2 of the Make model element. Also, the software provider information has been removed from SCOR due to the difficulty of keeping it current. However, the model will still list best practices and software features that will enable that best practice. Release 3 also includes an enhanced glossary, complete with metrics definitions. For information, contact Bill Hakanson, executive director, Supply-Chain Council, Inc., 303 Freeport Road, Pittsburgh, PA 15215; 412-781-3255; fax, 412-781-2871; bill@hakanson.com; www.supply-chain.org.

Warehouse ISO certification via the Internet. Members of the International Warehouse Logistics Association (Park Ridge, Ill.; 847-292-1891; logistx@aol.com) are becoming ISO certified in one year or less at nearly 80% below traditional cost. This first-ever Internet-based certification program includes not only document preparation, implementation, and training but also certification and reaudits for two consecutive years, advises Mike Jenkins, president and CEO, of the association. For information, contact Kevin McNulty at X230.

The inventory contained within the total pipeline is important. Noted supply chain authority James E. Morehouse, vice president of A. T. Kearney Inc. (Chicago; 312-223-6500), questions a company's competitive strategy that calls for cutting its inventories incrementally and increasing their inventory turns from, say, seven to 10, or from 10 to 15. "The turns of the typical total pipeline inventory, from Mother Earth to the ultimate consumer, are about one per year, and that's what counts," he emphasized at a recent Annual Conference of the CLM. "That's where the economy is. It isn't what we do in our own company alone that counts; it's what the whole supply chain does together," he explained in the keynote. "Unfortunately, many of the suggested programs simply move inventory to somebody else in the supply chain, and that 'solution' is not going to change your fundamental competitive position in the next century," Morehouse warns. "The real breakthrough is to put an end to inventory."

Online information about pallet and containers. The National Wooden Pallet and Container Association's Web site (www.nwpc.com) features a continuously updated roster of pallet, container, and reel providers. The information includes contact information, a listing of products and services offered, and hotlinks to individual company Web sites.

Collaboration must be both internal and external for best inventory management. Troy E. Carbaugh, regional director of Logility Inc. (Rosemont, Ill.; 847-292-2106), wants to correct a misconception about total collaboration. “A lot of the experts, and some practitioners, talk of total collaboration as extending/sharing information to the customers and suppliers,” he told a Supply Chain Forum (Institute for International Research). “Without first taking care of your internal organization, and only going after the external partners, you’re just going to have a big black hole that’s going to suck up a lot of resources and inventory,” he declares. “You have to have one system that’ll allow you do one-number planning.”

New software offers end-to-end visibility of inventory throughout supply chain. Energy DeliveryNet.com, from Descartes Systems Group Inc. (Waterloo, Ontario; www.descartes.com), is a Web-based delivery management system to monitor and track the flow of products throughout entire supply chains. Descartes officials note that this is the “first community-shared software application allowing all shippers, customers, suppliers, manufacturers, carriers, freight forwarders, and other trading partners to have real-time visibility of where products are in the supply chain via traditional Web browsers.” The Energy DeliveryNet.com software suite allows each of its customers to create a collaborative supply chain network via the Internet.

Can you justify an investment in APS software? “Putting aside sophisticated optimization algorithms for a moment, the simplest APS implementations will yield faster planning made more accurate by simultaneous consideration of material and plant capacities,” assures John Bermudez, group director of supply chain management at AMR Research (Boston; 617-542-6600). Will this yield enough benefits to pay for APS? he queries in “Supply Chain Planning” in *The Report on Supply Chain Management* (AMR Research). “Keep in mind not all APS products cost millions of dollars. There are many APS products available in the \$100K to \$500K price range.” While this is expensive, he analyzes, “A typical manufacturer with \$100M in sales with four inventory turns would only need a 3% reduction in inventory to achieve a one-year payback on a \$500K APS investment.”

BOM accuracy critical when analyzing inventory levels. “The accuracy of your bills of material is an important factor to consider when analyzing inventory levels,” maintains Ron Pachura, manager of national manufacturing and wholesale/distribution practice at McGladrey & Pullen LLP (Schaumburg,

Ill.; rpachura@mcgladrey.com). He offers inventory managers the following guides in *IIE Solutions*: (1) How often are BOMs reviewed and updated? (2) Are BOMs accurate; do they contain an engineer's concept of the product from several years ago, or do they reflect the actual parts and subassemblies that are used on the shop floor? (3) Are quantities per assembly and units of measure identified within BOMs? (4) Has the purchasing lead time been entered into the item master for each purchased item? (5) Is scrap or shrinkage factored into the yields? "Bills created using 100% yields are almost always incorrect, resulting in shortages or overage due to inaccurate use of parts," Pachura details.

Logistics Software resource available. The CLM has released its annual *Logistics Software* survey on CD-ROM, its new and only format. It includes details on more than 1,200 software packages. Individual data sheets detail such items as system name, functions provided, distinguishing characteristics, databases, installation history, frequency of major updates and new releases, price, and maintenance fee. Cost: \$75.00 for CLM members; \$100 for non-members. For information, or to order, contact Publications Department, Council of Logistics Management, 2805 Butterfield Road, Suite 200; Oak Brook, IL 60523; 630-574-0985.

Watch the fine print when suppliers agree to hold your inventory. "When examined closely, many JIT delivery systems involve nothing more than relocating inventory from the purchaser to the next company upstream," argue Frank Haluch, CPM, Haluch and Associates (Trumbull, Conn.; 203-268-1005), and Robert J. Trent, Lehigh University (Bethlehem, Pa.; 610-758-4952). These pseudo-JIT systems do not come without cost. "When surveyed, suppliers have reported that they charge price adders to compensate for holding a purchaser's inventory," they said at an Annual International Purchasing Conference of the National Association of Purchasing Management. "By working together, the buyer and seller may identify the true cost of holding inventory and develop a better approach for managing inventory investment. This approach could very well involve joint efforts to create a true lean supply chain," they explain.

Encourage safe handling of pallets. A training video titled *Pallets Move the World . . . With Your Help* explains and demonstrates proper pallet handling practices, helping you to reduce your risk exposure to lawsuits. Cost: \$29.95. Contact: The National Wooden Pallet and Container Association, 1800

North Kent Street, Suite 911, Arlington, VA 22209; 703-527-7667; fax, 703-527-7717; palletmbr@aol.com; www.nwpc.com.

Customer input really drives inventory management success. Organizations that succeed in inventory management do not follow a magic formula for stocking appropriate amounts of inventory. Instead, they actively solicit information from their customers and salespeople, according to findings from a recent inventory benchmarking study. “Successful organizations measure customer service level on a regular, ongoing basis,” according to Linda Mullinix, project manager for the study. “Best practice companies in the study also consider turnover a less important measure of inventory performance than customer service level or return on investment.” The final report from the study, *Inventory Management: Enhancing Profits by Controlling Distribution*, is available from American Productivity and Quality Center, 123 North Post Oak Lane, Houston, TX 77024; 713-681-4020; fax, 713-681-8578; www.apqc.org. Price: \$185 for members of APQC’s International Benchmarking Clearinghouse; \$395 for nonmembers.

MIT offers masters in Logistics program. The nine-month on-site graduate program leads to a masters of engineering degree in logistics and emphasizes information technology and quantitative analysis. For information, contact Sydney Miller at 617-253-8069 or sydney@mit.edu.

The changing role of the warehouse now better defined. A new research report outlines how emerging roles are based on traditional roles and skills, information, and expertise found in the warehouse. *The Changing Role of Warehousing* stresses that warehouse needs are now evaluated based on total supply chain. It also pictures the “successful” warehouse based on responses from the participants. For information, contact Warehousing Education and Research Council, 1100 Jorie Boulevard, Suite 170, Oak Brook, IL 60521; 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; www.werc.org. Price: \$15 for WERC members; \$30 for nonmembers.

Avoid uncertainty and stop building inventory. “When a supply chain manager is uncertain, he’s going to build inventory as a defense mechanism,” charges Peter Stiles, senior vice president of product strategies at EXE Technologies (Dallas; 972-233-3761). A solution he proposes is to build an information focal point. “Take all of the documents from all the various sources used to manage the supply chain and concentrate them in one place,” he explained

at a Distribution/Computer Seminar East (C. S. Report, Inc.; Uwchland, Pa.). “The idea is to provide visibility throughout the supply chain, enabling the supply chain manager to see inventory in all states, and inventory in transit, as well as standing inventory. Then the manager can better monitor activity against plan and send alerts if it’s not working according to plan,” he asserts.

New software accelerates collaboration. Quick Win, from Syncra Software (Cambridge, Mass.; 617-218-4316; www.syncra.com), aligns a company and up to five of its trading partners around common objectives, links them together with collaboration technology, and guides them through the exchange of forecasts, exception management, and the actions required to achieve significant benefit to their business. The accelerated pilot process is divided into four steps and can be accomplished in as few as 100 days. The solution complies with new CPFR guidelines.

Free resource explains bar coding. *How to Unlock the Power of Your ERP System*, a 48-page handbook, shows how bar coding can activate even better results from ERP systems. It describes the bottom-line benefits of bar coding in production, stores, shipping, and receiving at a company that represents a composite of numerous bar coding/ERP installations. The handbook also provides tips on managing a project. Contact: Gordon Graham, vice president, marketing, Connectware Solutions Inc., 438 St. Pierre, Suite 201, Montreal, Quebec H2Y 2M5; 514-287-1854 ext. 129; gordon@connectware.ca; www.connectware.ca.

Include the less visible costs to determine true cost of carrying inventory. Most calculations of inventory carrying costs include the “visible” costs, such as interest rate of money; taxes; insurance; space, occupancy, and utilities; equipment (movement and storage); and scrap and obsolescence. According to Bill Poole, CPIM, president of Purchasing & Planning Solutions (Rochester, N.Y.; BillPoole@aol.com), there are “additional less visible costs that cannot be ignored to get a truer picture of inventory carrying cost.” At an MRO Cost Management Strategies Conference (Institute of International Research; New York), he identified them as personnel (planners, analysts, warehousemen); transactions (counting, moving, retrieving, issuing, reconciling); reinspection (return of defective material); and rework, handling damage, and loss.

Inventory management headed for outsourcing in the near future? According to the 1998 Third-Party Logistics survey (Exel Logistics, University of Tennessee, and Ernst & Young LLP), there is a “suggestion” that inventory management will be among the areas to which firms will increasingly turn for outsourced logistics services. The 8.9% response contrasts with the “likeliest” activities for future outsourcing of freight consolidation/distribution (18.7%), inbound transportation (13.8%), traffic management (13.0%), and warehousing (12.2%). Further, those organizations using third-party logistics providers for cross-docking services surged from 21.7% to 30.9%, emphasizing the need for smooth-flowing logistics in the supply chain.

Are you cycle counting, and just correcting the count? “That’s the wrong idea,” asserts authority Terry Lunn, CFPIM, CIRM, Terry Lunn Enterprises (Big Canoe, Ga.; 706-268-3975). “The most important work in cycle counting is to correct the cause of error,” he declared at an APICS International Conference. “Companies able to reduce their inventory have a cycle counting process in place that consistently attacks the causes of errors and improves the process.”

New software promises inventory reduction within supply chain. Distribution Planning Model (DPM) is a strategic and tactical planning tool for supply chain planning processes in manufacturing and distribution environments. It provides support for the rolling decision cycle involving service policy definition, commercial forecasting, stock planning, and inventory management processes throughout the supply chain. By using analytical techniques and high processing power, DPM supports both strategic and tactical planning from the same database. It is also equipped with special interactive functions for monitoring activities, what-if analyses, and decision support. Contact: Marco Vucenovich, Red Leaf Soft Inc., 18 Painted Rock Avenue, Richmond Hill, Ontario, Canada L4S 1R6; 905-780-9722; redleaf@shaw.wave.ca.

An informed resource on warehousing slotting. *Maximizing Your Resources through Warehouse Slotting*, a 32-page monograph, provides complete details on the practice of slotting within the warehouse, a guide for getting started, and an introduction to different slotting strategies. Some of the advantages of proper slotting include reduced picking and replenishment labor requirements; reduced response time and improved flow; increased picking

accuracy; increased palletizing productivity; and deferred capital expansion. For a free copy, contact Client Relations, Tompkins Associates, 2809 Millbrook Road, Raleigh, NC 27604; 800-789-1257.

WMS 5.0 released with enhanced functionality. The Somerset Division of Celerity Solutions, Inc., has unveiled the newest version of its warehouse management software, WMS 5.0. Among the enhancements are seamless integration with Oracle applications; advanced cartonization algorithms; expected and blind receipts capability; opportunistic cross docking; and shop floor and assembly tracking. These allow users to increase inventory accuracy, improve inventory visibility, and respond in real time to customer demands. For information, contact Celerity Solutions, Inc., 18301 Von Karman Avenue, Irvine, CA 92612; 949-260-0600; fax, 949-260-0610.

Supply Chain Council sanctioned by American National Standards Institute (ANSI). The Supply-Chain Council has been sanctioned as a standards developing organization by the American National Standards Institute in anticipation of seeking ANSI approval of the SCOR model.

Advanced planning and scheduling systems can help reduce inventory. Inventory reduction has long been the classic justification for a new planning system, including MRP, ERP, and now APS, argues John Bermudez, group director of supply chain management at AMR Research, Inc. (Boston; jbermudez@admfg.com). Although no specific function in APS reduces inventory, he explains in *The Report on Supply Chain Management* ("Supply Chain Planning: Where Do You Start?"), it can help (1) reduce inventory carried to cover long-term planned horizons and planning cycle periods; (2) reduce just-in-case inventory with more precise, synchronized material planning; (3) shorten manufacturing cycle time by synchronizing material arrivals with resource availability; (4) improve inventory deployment throughout the supply chain; and (5) more accurately match safety stock to customer service level requirements.

Global supply chain tune-up via the Web. The diagnostics tool Supply Chain Value Assessment uses the Internet to clarify options and decisions about procurement, manufacturing, product development, and distribution. Developed by Accenture (formerly Andersen Consulting; www.ac.com), it helps companies "quickly and efficiently" weigh the costs and benefits of crucial supply chain issues, such as transportation outsourcing versus fleet

ownership, or investing in building on top of legacy IT systems versus installing customized warehouse management software. It is a structured methodology that does not lead to preordained solutions devoid of process or strategy.

New APICS dictionary now available. *APICS Dictionary* is regarded as the standard compilation of the terms and definitions that shape the profession. The updated version contains the most current definitions of terms within the APICS body of knowledge. To order a copy, contact APICS Customer Service, 800-444-2742; 703-237-8344; www.apics.org.

Turn problem inventory into a tax deduction. A free conversion kit explains how to obtain a federal tax deduction from your excess, obsolete, and slow-moving inventory. For information, call National Association for the Exchange of Industrial Resources, 800-289-4551.

Creating "tight" specifications to deter product theft. Bruce Cutler, director of logistics operations at Compaq Computer Corporation (Houston; 281-514-1453), recommends developing a series of pallet specifications to avoid product damage and theft, yet maintaining pallet integrity and facilitating flow through the channel. "Our complete pallet specifications serve multiple purposes," he explained at the Proven Performance Metrics in Logistics conference. The detailed specs are to (1) ease receipt at the customer site through dimensional control, (2) deter theft by specifying proper wrapping and banding procedures to make carton removal difficult, and (3) avoid product/package damage through the establishment of stacking standards.

Is safety stock your Trojan horse? Safety stock may be necessary and beneficial if strategically planned for the right reasons, according to Dave Garwood, president of R. D. Garwood, Inc. (Marietta, Ga.; www.rdgarwood.com). "It is more often misunderstood, deceptive, and disastrous," he charges. When the safety stock parameter (pieces, days, or level of kanban signal) is increased in a planning stage, he explains, "additional material or product does not automatically pop up in the warehouse; nor is there a padlocked box in the warehouse with this minimum inventory." It takes more capacity in the supply chain to make more and, thus, increase buffer inventory or safety stock. "It takes valid schedules, due dates that are the real need dates, and meeting them 100% on time to ensure the right items are produced. More planned safety stock will not overcome the root causes of

shortages—lack of capacity or invalid schedules,” Garwood offers. “Beware of increasing safety stock—it just may be a Trojan horse.”

WMS troubleshooting guide a real time saver. “A warehouse management system troubleshooting guide explains the possible cause, simple diagnostic tests, and recommended solutions,” explains Catherine Cooper of the Progress Group (Albuquerque). “It provides quick reference to common problems with bar code scanners, terminals, software, and other elements of the system.” Many WMS implementations do not have one because implementation teams generally do not have the time or resources to create them, she explains in *IIR Solutions*. However, she recommends, “The daunting task is accomplished by designating a spiral notebook as the troubleshooting guide at the beginning of the project. Team members should then be encouraged to record, in simple language, frequently encountered problems and how they were resolved.” The guide then exists as a living document, being updated on an ongoing basis.

Better inventory management through improved supplier relations. Wholesalers are developing better relationships with their suppliers to “guarantee a smoother flow of product through the distribution pipeline,” according to a survey by *The Distributor's and Wholesaler's Advisor*. The top factors the respondents selected as having the greatest influence on how they manage their inventories include (1) better relations with suppliers (29%), (2) upgrading inventory management system (29%), and (3) upgrading automated purchasing system (14%). Customer orders via EDI (2%) and customers' demand for JIT deliveries (5%) trail.

What is your boss's biggest inventory management concern? According to an *Inventory Reduction Report* reader study, 35.6% of the respondents identified it as reducing inventory levels by a wide margin. Lagging behind in second place is inventory accuracy (18.1%), followed by inventory carrying costs (17.4%), with inventory turns (9.4%) trailing.

What to do about slow-moving inventory under a consignment agreement. A key element in a successful consignment relationship is to keep the inventory moving, affirms Mark K. Williams, consulting manager at North Highland Company (Atlanta, Ga.). “Developing inventory turn goals, by individual product or by product group, can uncover slow-moving items that are inappropriate for consignment,” he told a recent APICS Annual International

Conference. During negotiations, it is important to determine which party will monitor inventory turnover and how slow-moving goods will be handled, he advised. Agreement should be reached about whether they will be returned to the supplier or purchased by the customer and removed from the consigned inventory. "Through careful negotiation, consignment can work not only for the customer but also for the supplier," Williams expressed.

Total system inventory drives integrated supply chain excellence. "Inventory breeds at disconnects in the supply chain," claims J. Paul Dittman, vice president of global logistics at Whirlpool Corporation (St. Joseph, Mich.; john_p_dittman@email.whirlpool.com). "When measuring inventory, go beyond the boundaries of your company to your suppliers' and customers' inventory and really look at the total system to gain a perspective on how seamless your supply chain really is," he advised at the Proven Performance Metrics in Logistics Conference (Institute for International Research; New York). "The better the supply chain is operating as a process, certainly the less inventory will then have to be in the chain."

Top WMS vendor requirement defined. At Distribution/Computer Seminar East (C. S. Report; Uwchland, Pa.), Dan Trew, product manager at Catalyst International, Inc. (Milwaukee), identified investment protection as the top WMS vendor requirement. The system should be flexible, parameter-driven, and hardware independent and should receive periodic software upgrades.

Inventory managers can benefit from activity-based costing. "By associating cost to the activity, a clear relationship can be established between sources of activity demanded and related costs," explains Robert Olsen, project manager at Tompkins Associates (Raleigh, N.C.). incurred, what is initiating the costs, and where to apply efforts to curb inflationary costs. "This can be of particular value in tracking new products and logistics costs," he maintains.

New software synchronizes forecasting and replenishment processes. Prescient Systems (Fort Washington, Pa.; 215-836-5161; www.prescientsystems.com) announced Collaboration Engine as an addition to its Prescient XE suite. The software enables users to add value to trading relationships by synchronizing forecasting and replenishment planning processes with their trading partners. Collaboration Engine allows users to view product forecast plans

over the Internet, private networks, or dial-up connections. It is Web-enabled and fully compliant with the Voluntary Inter-industry Commerce Standards Organization's CPFR guidelines.

Where to start reviewing inventory for obsolescence. "At the receiving dock," answers Asbury R. Lockett, CPIM, Washington Manufacturing Services. The object, he suggests in APICS's *Performance Advantage*, is to review those items most likely to be unused if brought in when there are insufficient requirements. "In an ABC inventory coding system, you may want to initially limit the review to A items," he explains. Other criteria may include (1) inventory used on products with decreasing demand, (2) inventory subject to supplier improvements, (3) inventory with limited shelf life, (4) parts easily damaged by frequent handling, and (5) unique parts used only by particular customers.

New report from NAW explores potential of electronic commerce. Practical continuous replenishment programs and truly interactive Web commerce will combine to shock the entire distribution channel into creating a new business model. That is the message from *Electronic Commerce for Distribution Channels*, a report commissioned by the Distribution Research and Education Foundation. It contains case studies, interviews, and a clear explanation of why EDI-based continuous replenishment programs have failed but are now poised to deliver breakthroughs in lower costs and added value. It probes the future of interactive Web commerce and how organizations will invent new channel roles that go far beyond a simple Web catalog that enables online orders. Price: \$88 for NAW direct members; \$110 for members of NAW member associations; and \$126 for nonmembers; plus \$5.50 shipping and handling. Contact: National Association of Wholesaler-Distributors, 1725 K St. NW, Department T, Washington, DC 20006; 202-872-0885; fax, 202-785-0586; epubs@nawd.org.

Supply chains should provide better service on items that cost less. "Rarely does an item's cost influence its safety stock," argues Terry Harris, managing partner at Chicago Consulting (Chicago; 312-346-5080). "Even the newest, presumably most advanced enterprise-wide systems use the same traditional techniques embedded in virtually all inventory management systems." This means that if two items are otherwise the same, the \$1 item will be stocked the same as will the \$1,000 item. "This approach is very costly and results in lower service and lost customers," he maintains. As an example of how cus-

tomers respond to out-of-stock situations, he cites the following: Would you be more or less satisfied to find out that your mechanic kept your car because he was out of a \$10 radiator cap or because he was out of a \$1,000 engine block? According to Harris, "We can achieve higher availability by having better service on less costly items. And since the capital we have to invest in inventory is limited, we can achieve that higher availability by having better service on the less expensive items."

Successful warehouses continue to focus on inventory reduction practices. Inventory reduction is a primary goal of supply chain management, concludes *The Changing Role of Warehousing* (Warehousing Education and Research Council; Oak Brook, Ill.; 630-990-0001). In the future, however, space will be important, but storage will not, according to warehouse managers who were interviewed. "Organizations will do whatever they can to reduce costly inventory, limit forecast errors, and increase inventory velocity," believes Arnold Maltz, director of research at the WERC.

Uncertainty builds inventory in supply chains. "Uncertainty of both kinds, supply and demand, manifests itself physically in the form of inventories," declare John M. Burnham, CFPIM, and R. Nat Natarajan, CPIM, CIRM, both of Tennessee Tech, and Gerald W. Bapst, CFPIM, CIRM, of the Logistics Management Institute. The key to reducing inventory in the system is to identify the underlying sources of uncertainty and substitute information for inventory, they told an APICS Annual International Conference. Even though companies are making strategic investments in information technology, they observe, and even though "the principle is quite simple, it still requires the measurement of uncertainties in the supply chain and relating them to inventories."

Resource for benchmarking supply chain performance now available. Management consultant Pittiglio Rabin Todd & McGrath (Waltham, Mass.; www.prtm.com) has formed a subsidiary, the Performance Measurement Group, LLC, to offer the first online benchmarking subscription series to measure companies' supply chain measurement. Participants will be provided with confidential, customized benchmarking analysis online, 24 hours a day. The Supply Chain Management Benchmarking Series is mapped to the SCOR model. Contact Keith Belton, CEO of the Performance Measurement Group: 781-647-2800; kbelton@prtm.com.

Access WMS designed for midsize companies. Majure Data (Roswell, Ga.; 770-587-3054; www.majure.com) has released its AccessWMS warehouse management system. It is designed for midsize companies wanting to leverage their resources and for larger companies interested in installing a pilot WMS system before committing to a multiple-site installation. AccessWMS includes an in-depth implementation study, comprehensive project management, complete system testing and configuration, training, and installation of Majure Data's RF Navigator software package and related hardware.

Checklist of CPFR guidelines available from Syncra. The requirements for a CPFR deployment are as wide in scope as are its benefits within the extended supply chain. Working from the CPFR Guidelines, Syncra Software (Cambridge, Mass.) has created a comprehensive requirements checklist to help users define and assess all of the requirements of CPFR. It also provides a ranking of CPFR requirements and helps to generate a software product's rating score. The checklist is available in an Excel 97 spreadsheet format (with automatic product scoring) and in PDF format. Download from www.syncra.com/products/checklist.html.

New study explores what motivates hourly warehouse workers. *A Guide to Effective Motivation and Retention Programs in the Warehouse* focuses on what works to motivate and retain hourly warehouse workers. According to the report, effectively managing the hourly warehouse workforce requires warehouse management to know not only what they want from associates, but also what associates want from their jobs. Copies (\$40 for nonmembers, or \$20 for WERC members, plus \$4.00 shipping and handling) are available from Warehousing Education and Research Council, 1100 Jorie Boulevard, Suite 170, Oak Brook, IL 60523; 630-990-0001; fax, 630-990-0256; wercoffice@werc.org; www.werc.org.

Six steps of a successful third-party provider selection process. According to Charles A. Watts, John Carroll University (Cleveland), at Congress for Progress (Mid-Atlantic Chapters of APICS), success is improved by (1) getting a third party provider's assistance in developing requirements; (2) keeping the request for proposal open for the general improvements you want, but not how you want these areas addressed; (3) making sure you have narrowed the list to two to three providers by the request for proposal (RFP) stage; (4) making sure the RFP includes current conditions and some indication of how things will change in the future; (5) giving the third-party provider

plenty of time to respond to the proposal (a minimum of two weeks); and (6) finding out who the third party's project leader will be during start-up and on-going operation.

CPFR checklist now on your browser. Now you can use the CPFR checklist in your Web browser. The checklist, which helps you rank the CPFR requirements according to your needs and then score the products based on their ability to meet your chosen requirements, can be downloaded from www.syncra.com/products/checklist.html.

Cycle counting can be done in the process industry, too. Robert A. Stahl, CPIM, of the R. A. Stahl Company (Attleboro, Mass.; 508-226-0477), explains, "Traditional control group cycle counting is typically done by many items and/or locations. In the process industry, since there are few items/locations, it is more often done on one location [tank] for a category of vessels." The single tank is counted on a daily basis until all causes of inaccuracy have been identified and eliminated. The solutions are then replicated to the balance of the tanks (vessels) in that category. "Similarly, there are few items/locations on which to do random cycle counting," he explained at Congress for Progress (Mid-Atlantic Chapters of APICS). "It is therefore done on a daily basis, but the statistical inference about accuracy is derived from a rolling average over a relatively large period of time—one or two months—rather than on each daily/weekly count," Stahl advises.

New software helps distributors track vendor consigned inventory. TakeStock 3.00.01 offers new features that include tracking manufacturer's representative activities, supporting multicurrency and importing activities, and managing vendor consigned inventory. The software enables distributors to reduce supply chain costs by allowing them to track consigned stock to and from their warehouses. For information, contact Software Solutions, Inc. (Duluth, Ga.; www.sofsol.com).

Logistics Management Center offers curriculum leading to logistics certification. The Logistics Management Center provides principle-based practical education in logistics and supply chain management. Upon completion of all nine courses, the participant will become a Certified Logistics Management Professional (CLMP). Among the courses, offered twice a year, are logistics and supply chain strategy; logistics performance, cost, and value measures; inventory planning and management; third-party logistics; and logistics and

warehouse management systems. Edward H. Frazelle serves as the Center's executive director. Contact: Wendy Sager, LMC Conference Manager, Logistics Management Center, 1100 Superior Avenue, Cleveland, OH 44114; 216-931-9556; fax, 216-931-9795; www.logisticsedu.com.

Midsized manufacturers use Internet for supply chain functions. More than half (58%) of all midsized manufacturers use the Internet to share information with customers and suppliers, according to a survey by Grant Thornton LLP (Chicago; 312-856-0001). While 19% of the respondents say they currently use the Internet for VMI, 31% plan to use it for VMI and 27% for lot tracking during the next two years. Manufacturers are considering not only how the Internet can be used to improve their supply chains but also how other processes can speed the flow of product to customer. One technique being used is supply chain optimization, which focuses on making tradeoffs among operational costs and inventory, delivery reliability and response time, and service to the customer to meet business objectives.

Time-to-benefit becomes the telling parameter for WMS installations. Richard Wilkins, director of sales and marketing at Robocom Systems International Inc. (Massapequa, N.Y.; rick@robocom.com), observes, "Customers are looking for faster, more assured implementation of warehouse management systems as they want to reduce their risk and shorten the time-to-benefit. However, they also must recognize that due to staff turnover their system's usefulness of application degrades by about 20% per year." His recommendation: "Have the system manufacturer return periodically to retrain and refine operator practices to achieve maximum performance."

SeeChain supply chain performance measurement suite debuts. Five applications are included in the SeeChain suite to allow inventory managers and executives to see and collaborate across the supply chain. SeeChain Unfinished Inventory measures the inventory levels of raw materials and semifinished goods in stock so that potential inventory shortages can be avoided. It also allows organizations to measure the value of excess inventory in the supply chain. SeeChain Finished Goods measures the inventory levels of finished goods in stock and the value of excess inventory in warehouses and DCs. SeeChain Demand Accuracy measures the accuracy of the sales forecast compared to actual sales. The applications can span multiple applications and enterprises. The software complements existing investments in supply chain

planning and enterprise applications, such as i2 Technology, Manugistics, Oracle, and SAP. Contact: VIT, 20045 Stevens Creek Boulevard, Suite 2F, Cupertino, CA 95014; 408-255-9512; 408-255-2283; www.vit.com; info@vit.com.

For WMS applications, bid software and hardware separately. That is the practical advice from John Seidl, partner at Deloitte Consulting (Atlanta, Ga.; jseidl@dtus.com). “A lot of people, when they’re out bidding warehouse management systems, will ask the potential vendors to quote the hardware and software together,” he explained at Distribution/Computer Seminar (C. S. Report, Inc.; Uwchland, Pa.; 610-458-6410). “It might be convenient for you to source all your needs from a single point, but it may not be the best deal financially,” he warns. The reason: “What vendors will do in bidding the system is notoriously underbid the hardware. It gives their bottom-line number the appearance of looking smaller,” he explains. “As a rule of thumb, if we have them bid the hardware, we bid it separate, or we don’t consider it when we do the financial analysis of the different bids.”

EXE introduces Exceed Work Order. A customer-selectable upgrade to the kitting and assembly logic available in EXE’s WMS family, the Work Order component is specifically designed to meet the growing demands placed upon DCs to perform complex labor and assembly operations. The product also can support the disassembly of existing product, breaking it into its component parts. It extends the capabilities to DCs to support multilevel bills of materials, definition of work centers, and development of operational routing. It is designed to integrate with EXceed WMS. Contact: EXE Technologies, Inc., 8787 Stemmons Freeway, Dallas, TX 75247; 214-775-6000; fax, 214-775-6080; www.exe.com.

Promote inventory performance measurements. “When you do performance measurement, make it big. Display it all over and use the power of peer pressure and pride to your advantage,” Michael A. Jacobi, vice president of Buker, Inc. (Gurnee, Ill.; mjacobi@buker.com), strongly advises. “If it is important, then permanently display the inventory performance metrics in prominent places, like the stockroom,” he recommended at Congress for Progress (Mid-Atlantic Chapters of APICS). “If you make a big deal about it, people will try hard, too. It’s remarkable what happens when you put a manager’s name right alongside the performance number and hang it on a wall.”

WebPLAN unveils e-commerce product. WebPLAN eSupply-Chain is a suite of native Web applications that enable manufacturers, suppliers, and customers to transact supply chain commerce in a high-velocity community. It includes onPLAN, SupplyIT, OrderIT, and DemandIT. OnPLAN, first delivered in December 1998, provides performance metrics on the supply chain and its individual members, with an interface to OLAP technology. SupplyIT, just released, enables suppliers to view supply order details remotely and simulate multiple fulfillment scenarios using the manufacturer's actual production schedule. This reduces supplier order response time and enables extended supplier relationships such as VMI. OrderIT, also new, allows customers to place orders, monitor progress, and make modifications through all stages of the manufacturing cycle. DemandIT, planned for delivery in fourth quarter, is a Web application that allows collaborative demand and sales/operations planning. Modules, priced separately, range from \$10,000 to \$35,000. Contact: webPLAN Corp., 600 Terry Fox Drive, Kanata, Ontario, Canada K2L 4B6; 613-592-5780; fax, 613-592-0584; www.webplan.com.

What's wrong with this picture? Analyzing a recent survey, Beth Enslow, research director of business applications for the Gartner Group (Stamford, Conn.; bizapps@gartner.com), observes that corporate executives, whether leading a cost reduction supply chain strategy or a revenue enhancement initiative, overwhelmingly agree that their number-one supply chain priority is "planning and deploying inventory more effectively." However, when looking at the specific initiatives that could have a profound impact on realizing this priority—such as communicating electronically with trading partners, cutting manufacturing cycle time, or reducing order fulfillment cycle time—they were consistently ranked at the bottom of the priority list by the executives. "Apparently, they know what they want, but don't know exactly what is needed to achieve it," she observed at the Softworld Manufacturing and Supply Chain Expo and Supply Chain Conference.

New e-comm information at its own Web site. *Electronic Commerce for Distribution Channels*, a new report from the Distribution Research and Education Foundation (Washington, D.C.; 202-872-0885) has its own dedicated Web site. It will expand on and continue the book's discussion of channel issues and opportunities surrounding electronic commerce. The www.ec4distributors.com Web site features electronic commerce news, periodic articles and columns from authors, listings of third-party vendors, and discussion forums on various topics.

Supply chain book and Web site sponsored by Accenture (formerly Andersen Consulting). The book, *Achieving Supply Chain Excellence through Technology*, and Web site (www.ascet.com) contain a collection of thought-provoking papers and articles on a wide range of supply chain management issues. Editorial content has been drawn from leaders in all sectors of the supply chain industry.

On keeping process maps up to date. “To effectively manage and measure your supply chain, you have to understand the individual processes,” maintains Dennis Dreyer, director of logistics, service parts operations, at General Motors (Grand Blanc, Mich.; 8120-606-4215). “That’s why it’s important to have a map of all your material flows,” he advised at Interlog (Worldwide Business Research; New York). “A learning we picked up over the past few years is that the pace of change is such that you continually have to go back and reevaluate your network, to make sure that you’re still aware of what’s going on out there, and the implication it has on the data you’re collecting.”

New inventory control module released for Web-based procurement software. American Tech (Holmdel, N.J.; www.purchasingnet.com) has added a 100% Web-based inventory control module to its PurchasingNet-SQL procurement software. The inventory software allows companies with multiple sites, branches, or warehouses to manage inventory levels throughout the enterprise. Each site can manage its on-hand inventory, reorder points, and order quantities via any standard Web browser. It also includes transactions for issues, transfers, adjustments, and returns. The system supports cycle counting and contains a dynamic JIT inventory reorder analysis that automatically generates replenishment requisitions upon issuance of material.

It is not a matter of choosing whether ERP or supply chain management is better for your organization. “Supply chain management is the next logical step in an ERP implementation,” argues Carol A. Ptak, CFPIM, CIRM, principal, global ERP solutions group, IBM (Lakebay, Wash.; cptak@us.ibm.com). ERP is simply a computer tool that facilitates the planning of all resources in the enterprise,” she explained at Congress for Progress (Mid-Atlantic Chapters of APICS). “Supply chain management is where there is an automated integration of demands from customers to the requirements from suppliers through the calculation of the ERP system,” Ptak offers. Supply chain management provides the ability to translate demands from the market quickly to supplier requirements. “The goal is to minimize the amount

of inventory in the supply chain, improve the agility of each link of the chain, and, therefore, improve the profitability of all supply chain partners. Being able to quickly translate those customer demands to supplier requirements defines the requirement for effective supply chain management, and ERP is the engine that makes that translation happen,” Ptak affirms. “Attempting to implement supply chain without effectively using an ERP tool to manage the internal enterprise is rather like buying a car without an engine,” she insists.

SCOR overview now available in print. The Supply-Chain Council (Pittsburgh; www.supply-chain.org; info@supply-chain.org) has released an overview of the SCOR model in print form. SCOR is a standard guideline used by leading companies to examine the configuration of their supply chains, identify and measure metrics in the chain, determine weak links, and then work to achieve best practice where deemed appropriate.

The critical elements in determining stocking quantities. Thomas C. Uhrig, president of TCLogic (Indianapolis; www.tclogic.com), defines five critical stocking factors for building an inventory model. At Interlog (Worldwide Business Research; www.wbresearch.com) he identified them as (1) internal efficiency (DC operations, ordering proficiency), (2) business goals (inventory turns, service level), (3) suppliers (lead time, order policies, package quantity), (4) items (criticality, cost, life cycle), and (5) customers (service requirements, demand patterns, product population).

DecisionTime and WhatIf? software puts forecasting power in hands of decision makers. SPSS Inc. (Chicago; www.spss.com) will launch its new time-series forecasting software system, DecisionTime and WhatIf?, in September. The package combines the advanced analytics traditionally found in tools designed for skilled analysts with the ease of use found in tools designed for general business users. The combination enables inventory managers and materials managers to use the power of forecasting to make better business decisions. DecisionTime and WhatIf? address the capacity to build models and make them accessible to more users throughout an organization. The list price for a single user license of DecisionTime (includes one copy of WhatIf?) is \$1,999.

Tompkins monograph provides logistics benchmark. *Achieving Logistics Excellence through Supply Chain Synthesis* can help you benchmark your logistics oper-

ation. The 50-question diagnostic tool helps you to assess the status of your logistics operation and to prioritize opportunities for improvement. There are also details for a 12-step continuous improvement process that will maintain a successful logistics operation. For a free copy: Tompkins Associates, 2809 Millbrook Road, Raleigh, NC 27604; 919-876-3667; fax, 919-872-9666; www.tompkinsinc.com.

HK Systems introduces multiwarehouse-enabled inventory visibility software. Enterprise/Supply Chain Visibility (HK Systems, Inc.; New Berlin, Wisc.; www.hksystems.com) creates the opportunity to manage centrally inventory stores contained in multiple WMSs in a supply chain. This new product works in conjunction with the HK Systems Enterprise WMS and BMS product offerings and enables users to exploit inventory information access and redeployment from any location to any location. This system links to location and inventory management data contained in remote WMS. It also supports VMI.

Chapter II-9

Best Inventory Management Tips

INVENTORY REDUCTION REPORT TIPS OF THE MONTH

Eliminate inventory ownership. “We have migrated from company-managed inventory at our company warehouses to using distributors,” says a purchasing and logistics manager at a large manufacturer of communications equipment. “In essence, it has eliminated our ownership of the investment. Additionally, this approach saves us approximately \$3 million annually in junking expenses associated with obsolete inventory. We’ve also been able to improve our delivery performance.”

Create an inventory control position. “We created a new position for us, that of an inventory control clerk,” reports a warehouse manager at a soft drink bottling facility. The inventory control clerk focuses her efforts entirely on inventory management, controls, and daily variances. The warehouse manager requested the new position because he no longer has the appropriate time to control inventory variances. The new clerk now allows the warehouse manager to focus on management and proactive areas for the four-plus hours it previously took him to do the inventory report. The position pays \$32,000 per year but is expected to more than pay for itself with cuts in losses and improved accuracy.

Use ABC analysis to gain control over the more expensive inventories. “We had to have more control over our top-dollar inventories, so we began by doing an ABC analysis of the high-value stock,” explains a materials manager at a large producer of electronics products for aircraft. “We have taken our \$40

million inventory and reduced it by more than \$9 million in less than one year. Naturally, inventory turns have also increased because of this,” he details. “Another benefit has been a reduction in the number of planners, from 15 to 8.” They have centralized the planners, who are now focusing on the A items by commodity. During this year, they are planning to bring B items under control. “We have one planner for C items, and do not plan to control these any tighter,” he relates.

Tighten control on inventory stock. An inventory control analyst at a midsize manufacturer of components for the natural gas transmission industry relates, “We went to work focusing on reducing our safety stock and lessening our min/max levels.” The reorders are now based on one to three months of usage, decreasing the handling of materials and overhead associated with storing these materials. “Also, use of an ABC management strategy has helped in the identification of scrap/surplus materials,” she explains.

New layout, new software boost pick rate 300%. The operations manager at a small provider of vitamin supplements rearranged the warehouse to fit the 80/20 rule and is using rolling racks as well as realigning the old racks. “We also installed a new computer system that dramatically improved our operations and enabled us to manage our inventory much better,” he shares. “Now, with all of the changes in place, instead of picking only a few orders at a time, we have the capability of picking up to 21 orders with cart/pick list.”

Manage usage rates better. “We implemented this practice by first making a thorough study of the usage patterns throughout the facility,” maintains a material planning specialist at a midsize manufacturer of electronic equipment. “We also established a close relationship with suppliers to cut down on the lead time to our plant, which in turn reduced the safety stock we required.” The result of these initiatives, she notes, is a 12% reduction in inventory, representing about \$40,000 in savings per month.

Reorganize the stock. “The biggest inventory control idea that we implemented was to organize our stock so we could find it,” acknowledges a purchasing agent at a small manufacturer of restaurant equipment. “We bought more shelving, tagged each aisle, spread out the items to see them easier, put everything within easy reach, and made sure every item was bagged and tagged,” she describes. “We saved payroll on inventory day when it took

only two hours, instead of eight, to complete the physical.” On a \$250,000 inventory, they came within \$1,600 of unaccounted items. “This was the most accurate we’ve ever been, and the new arrangement helps the parts department do their job better.”

Drive management of inventory down to the part number. “We’ve increased our inventory turns by 67% since the material schedulers began to manage inventory at the part number level,” reports a material resource leader at a large company building midrange diesel engines. “Min/max windows per part number were established and managed. We also did daily sweeps of geographical areas by predetermined core carrier base to pick-up at window times at the supplier and deliver to the warehouse at predetermined window times.” They also implemented pull signals of empty trailers to pull another full trailer into the plant. Overall, purchased components were reduced by \$10.6 million.

Establish A, B, C classifications for all inventories. A division purchasing manager at a large producer of bronze memorials has classified all inventories at all their division plants into A, B, and C categories and has established maximum inventory levels for each of the classifications. “We now monitor our buyers’ responses to these objectives on a monthly and year-to-date basis,” he explains. Total inventory reduction attributed to this methodology last fiscal year was in excess of \$500,000.

Establish an electronic kanban. The materials director at a small contract manufacturer signed a supply agreement with a major electronic distributor. “With this agreement we also have established an electronic kanban process for approximately 100 of our high-volume repetitive items. To date, our major savings have come from inventory reductions, which in some cases has been upwards of 40%,” he offers.

Move to a synchronous flow manufacturing concept. According to a material manager at a small manufacturer of flexible packaging, “Since our move to synchronous flow manufacturing, our order lead times have fallen significantly.” In a matter of three months they reduced their finished goods inventory by 30% and WIP by 25%. “The move to shorter order lead times for customer orders has required us to increase our on-hand raw materials inventory slightly, which has been more than offset by the reduction in WIP and finished goods,” he explains. “Customer lead times are shorter than our

raw materials lead times now.” They’re now in the process of resolving the raw materials inventory situation by developing historical raw material forecasts and looking into consignment programs.

Implement an auto-replenishment process. “Moving to auto-replenishment of inventory against a blanket purchase order places the burden of inventory management on the supplier,” maintains a materials manager at a small producer of test equipment for the broadcast industry. “This has relieved the buyer from the responsibility of having to pull in or push out these items.” He also reports that since the auto-replenishment system has been put in place, inventory turns have “increased dramatically on 250 of the 300 parts currently assigned to auto-replenishment.”

Adopt a team-oriented sales and operations planning (S&OP) process. The worldwide materials manager at a large producer of chemicals shares, “Our primary challenge has been the reduction of slow-moving, off-spec materials.” To accomplish this, they ensure that all of the functions serving on the S&OP team, which includes materials management, production, and marketing, understand the cost/value of this inventory. They also ensure that they work together to develop a joint plan to sell at discount, rework, or dispose of this inventory. “Their activities are now included as part of every monthly planning meeting,” he notes. To date, they have reduced inventory investment by 33%.

Switch to third-party logistics. “Using their expertise and automated systems, we have better visibility of what we have where,” reports a logistics manager at a small manufacturer of telecommunications equipment and systems. “We also are using the same provider to set up our own distribution facility, which will allow us to order closer to the forecast, store sufficient equipment in a single location, cut long lead times, and improve our ability to meet market requirements at minimal cost. Since the nature of our business does not lend itself to JIT [just-in-time], this is the best approach for us,” he describes.

Reduce assembly run size. The manufacturing vice president at a midsize sporting goods manufacturer has finally realized success in convincing his multiple plant production departments that “overruns are costly, distracting, and a major component of causing high inventory levels.” Since getting the production departments to reduce assembly run size, the company now has achieved the joint benefits of producing more different models per month,

while reducing their finished goods inventories. In a period of 12 months, he shares, “We have reduced our WIP inventory by 60%.”

Shift inventory ownership to key suppliers. “We have leveraged our volume of inventoried MRO items by using fewer sources and requiring they provide us with higher levels of value-added service in return for the increased volume,” explains the purchasing manager at a large maker of packaging products. “We’ve shifted inventory ownership and management responsibility to these few, key suppliers.” Among the value-added services they now provide are additional technical expertise from the suppliers, point of use delivery, and continuous replenishment of appropriate inventory. Cost savings are averaging up to 20%, which is being attributed to the increased leverage, he notes.

Gain inventory management visibility at the top. “We launched an effort to convince executive management to look at competitive and industry inventory turns by calculating what effect a potential increase in turns would do to net income and cash flow,” explains a vice president of operations and logistics at a major provider of health care products. “Additionally, we identified improvement opportunities in each business sector and region, prioritizing each based on estimated benefits, difficulty to complete, and resources needed.” Each prioritized item was then managed as a project to include leadership, resource allocation, milestones, and follow-up. Results are reviewed monthly by the senior management team, and the “top-down” messages about inventory are noticed by staff.

Focus on inventory accuracy. “Inventory accuracy had traditionally carried a very low priority in our organization,” acknowledges a materials manager at a midsize manufacturer of turbines for the utility industry. “I had to do a very hard sell within the organization to finally get recognition of the importance of maintaining accurate inventory records and to obtain the resources to get it done. We put together a program which gave us our best physical inventory in years, coupled with a greatly upgraded cycle count program. As our inventory accuracy improves, our inventory is being reduced, and we no longer buy materials that are already on the shelf,” he details.

Enlist top management support for inventory reduction efforts. “It’s not so much an idea as it is a culture change,” believes a senior vice president at a small wire and cable distribution facility. “Senior management is taking a much more active role in the initial stages of planned reduction initiatives. We’ve

found that with the support from the top, the inventory reduction process we already have in place is driven to a much more effective level. The message is well understood by all,” he explains.

Address slow-moving and obsolete inventory. “Using our warehouse management system [WMS], we identified codes that had not sold within six months and those that had greater than six months supply,” says the director of logistics at a large provider of consumer medical supplies. “This helped us to eliminate a lot of non-value-added inventory. The result was a 20% reduction in floor space requirements, and some 10 days of on-hand supply, for some impressive dollar savings,” he maintains.

Analyze all SKUs. “We analyze all our SKUs and then classify them A through E,” notes a director of material at a small manufacturer of communications equipment. “We then try to understand the production rationale behind the slow movers and the multiple locations to which these are sent,” she explains. By reducing the lot sizes of the slow-moving inventory and holding them in a central location, the director anticipates saving more than \$3.5 million in inventory carrying costs alone.

Create a corporate inventory team. “We assembled a cross-functional, cross-plant team to develop a set of standard inventory procedures that would be universally implemented across the corporation,” says a purchasing manager at a midsize injection molder. Team members include the inventory managers from each of the six plant locations, along with representatives from purchasing, quality assurance, accounting, and engineering. Other appropriate department representatives also serve on the team. “Their task is to develop and implement inventory practices that will be followed in all our facilities,” she explains. To start the process, the team met with all departments that have an impact on inventory or are affected by inventory. “The goal is to achieve accurate and timely inventory data, and to ensure that the database is also up-to-date.”

Implement a “pull” process through the supply chain. “Our component suppliers have bonded franchised material at our contract manufacturer,” offers the vice president of materials at a midsize manufacturer of communications diagnostic systems. “The contract manufacturer does not begin producing until triggered by a shipment from us to the customer.” Once they receive an empty storage bin, the contract manufacturer has five days to assemble and

deliver the material, replenishing the material used by the shipment to the customer. “Upon our receipt of the assembled circuit packs, POs are electronically generated for all the components used to manufacture them, then automatically received, and simultaneously matched for payment,” he details. “These orders are sent via EDI [electronic data interchange] to our suppliers, notifying them of consumption as well as the payment coming to them.” In its first year, inventory turns jumped 35%, and inventory levels have been sliced 30% without stockouts.

Share schedules with suppliers. “We make our production schedules available to suppliers via EDI,” offers the director of materials at a small manufacturer of communications equipment. “The actual release of orders is on a ‘pull’ basis to satisfy firm customer demand. This greatly reduces inventory on hand to support the forecast,” he explains. “Inventory is brought in because it has already been sold.” Inventory turns have accelerated to a new high of 7.0 from the previous high of 4.6 turns per year, he relates.

Work with suppliers to reduce lead time. “We’ve begun an initiative that includes creating a measurement system of supplier performance at the item level and monitoring the variances,” explains an inventory manager at a large manufacturer of industrial machinery. This is combined with the reporting of customer backorders on these items that are created by late deliveries or the inventory impact of deliveries that are too early. “This type of information carries a lot of impact in our detailed supplier discussions,” he relates.

Shift inventory to supplier. “This was actually accomplished through consignment inventory held at our location,” says a materials manager at a small producer of carbon and graphite specialties. There are several advantages to having the supplier own the inventory. “Lead time is reduced to zero, inventory carrying costs are almost nonexistent, and lost production time waiting for incoming quality approval is eliminated,” the materials manager itemizes. In addition, lower pricing has been negotiated in exchange for a long-term supply agreement.

MORE TIPS FOR INVENTORY MANAGERS

Defining slow moving parts for new products. “An area that doesn’t get much thought is slow-moving parts when we introduce new products,” according

to Marvin D. Cope, director of parts operations, Customer Service, Maytag Appliances Sales Company (Newton, Iowa; mcope@maytag.com). To eliminate guessing on establishing a service parts inventory without a current failure history, he advised attendees at INTERLOG (Worldwide Business Research; New York; www.wbresearch.com) to (1) tune into engineering for data on predictive failures for individual parts; (2) focus on functional parts because these determine whether the unit will operate or not and are more critical to the customer than cosmetic items; (3) communicate throughout the supply chain and let parts distributors and service contractors know what is happening and what to expect; and (4) set safety stock levels with review dates.

Reverse logistics, cash flow, and inventory management. One of the emerging challenges impacting inventory management is how to get reverse logistics parts back so they can be reused without building inventory and avoiding new purchases. One solution comes from Ken N. Shaw, director of inventory management, worldwide service logistics, NCR (Peachtree City, Ga.; ken.shaw@peachtreecityga.ncr.com). “At NCR we create an inventory charge to the services organization when they don’t return a part, either new or used, in five days,” he explained at INTERLOG (Worldwide Business Research; New York; www.wbresearch.com). The fee charged is 2% of the price of the part per month. “The key is we don’t give them a budget, so it’s a pure charge to their local organization P&L,” Shaw tells *Inventory Reduction Report*. “We do get all sorts of emphasis to get the parts returned.” It is effective, besides. “At one point we had \$15 million in new and used returns. It’s now down to \$350,000,” he shares. An indirect benefit is improved data accuracy.

Six ways to improve inventory control of dangerous substances. To prevent generating hazardous waste, control the size of your chemical inventory, advises an inventory manager at a specialty chemicals facility. From her own experience, she advises the following: (1) Manage all inventory at one central location; (2) buy small containers of materials that have limited shelf life; (3) use a waste-exchange program for disposing of surplus usable materials; (4) arrange to return surplus material to the supplier; (5) purchase materials in returnable containers, or recycle the container; and (6) make sure the supplier allows return of damaged containers or products.

Consider tax implications when deciding where to store inventory. Thomas G. Gunn, business process engineering information officer at General Motors

Corporation, cautions inventory managers: “Increasingly we’re finding as we look at supply chain management issues that where you do work and where you store those materials around the world will directly affect the taxes you pay not only to the U.S., but other countries as well. We need to start looking at the tax consequences of engineering and supply chain decisions that we propose,” he declared.

Managing inventory by segmenting it into “buckets” of opportunity. Rose Drolett, manager of materials inventory and catalog at Equistar Chemical, LLP (Houston; rosem.drolett@equistarchem.com), has developed a creative methodology to “get the inventory management message” through to department managers. “You must analyze the inventory and segregate it into various segments for them,” she explained at a recent MRO Cost Management Strategies Conference (Institute of International Research; New York). For example, frequently used consumables are “zone store” candidates. “The low-cost items are placed in ‘free’ bins right where it’s to be used,” she offers. In addition, high-dollar, multiple-turn materials are ideal for consignment initiatives with your suppliers. “Here you have to shrink your supply base and increase volume with those remaining,” Drolett advises. Excess inventory should be put up for resale or redeployed. “Move everybody to an appropriate min/max level, after which they have the responsibility to control the inventory. And critical spares should be shared,” she advises.

Career advice for women logisticians. Kathleen Strange, director of logistics strategy and implementation at Staples Inc. (Cambridge, Mass.; kathleen.strange@staples.com) and president of Council of Logistics Management (CLM; Oak Brook, Ill.), shared with a predominantly female audience at a recent annual conference, “I think that women have an interesting opportunity right now, in that competition will be far more ability-based and include what kinds of technical skills you have. I can’t emphasize technology enough, and I see a generation coming up that has a much quicker grasp of how technology works. But, the higher up you go, the better your presentation skills need to be, and the better sales person you have to become,” she counseled.

An inventory management partnership to reduce inventory. Electronic commerce tools enable Michelin North America (Greenville, S.C.) to create inventory management partnerships with a “selected group of capable and

committed customers,” according to Lynn Melvin (lynn.melvin@us.michelin.com), application development manager of electronic commerce. “The goal is to shorten process cycles, which will lower inventory levels significantly,” she told a National Association of Purchasing Management (NAPM) Electronic Commerce conference. The customers electronically provide product sell outs, inventory levels, and desired fill-rate levels. “Together, we create inventory models tailored to customer’s business and replenishment schedules,” she describes. The Michelin models recommend a suggested order, which the customer can approve and submit. “There have been some great inventory savings achieved, but there’s also a cost involved, as it requires extensive back-end integration,” Melvin warns.

Activity-based costing to play more prominent role in inventory management. As inventory managers increase their focus on managing costs across the supply chain, activity-based costing will assume greater application. In their quest to know their cost structures better, inventory managers are getting down to the SKU level in their costing calculations. For instance, at the CLM Annual Conference, Terrance L. Pohlen, chief of the business analysis office at Defense Supply Center (Columbus, Ohio; terrance_pohlen@dsc.dla.mil), observed, “They want to capture the cost of rolling out full pallets of an SKU to one customer, versus the difference of sending mixed pallets or very small orders to another customer for the same product.” The goal, he relates, is to capture these cost differences down to the individual customer, and then to begin an initiative to eliminate them.

Use third-party providers to gather benchmarking data. “When I need assistance I often go back to my third-party providers to help me get benchmark data,” reveals Lorraine Leshner, logistics commodity manager at Tektronix, Inc. (Beaverton, Ore.; lorraine.lesher@tek.com). “We outsource within the logistics organization such functions as interplant fleet movement, receiving, freight payment, claims, and all transportation movement. All these different providers are really an extension of our logistics organization, so it’s important to go and talk with them first when about to benchmark,” she explained at the Proven Performance Metrics in Logistics conference (sponsored by Institute for International Research; New York). “If you have your business partner working with you to help you evaluate your organization, you’ll be a lot more successful in ensuring what areas you want to address and change.”

Inventory managers' shifting paradigm: from inventory management to value collaboration. “We’ve focused on moving the material, but now we’re being challenged to look at the intellectual asset flow because the material may never come inside our company,” observes Lee Seaton, director of collaborative business solutions at Hewlett-Packard (Cupertino, Calif.). At the Supply-Chain Council’s Supply Chain World, he explained, “It’s now a collaborative model. When we think of people in a collaborative relationship, this requires a rethinking of not only how we’re going to interact with them, but we also must define what kind of information we’re going to share, and what the basis of that sharing is going to be,” Seaton explains.

FACING PROBLEMS AND FINDING SOLUTIONS

Utility Looks to Demand Planning Tool to Reduce Inventory

Situation: The director of inventory control at a gas utility noted that “other departments were held flat on their budgets for operating goods. Meanwhile, our budget for hard goods was slashed annually for five years, so we had to operate much more efficiently.”

Problem: “One way to reduce costs was to tighten inventory control,” he acknowledges. “We typically inventory steel fittings, plastic fittings, steel pipe, plastic pipe, valves, regulators, and other day-to-day necessities for our business.” The goal, he relates, was to reduce inventory by moving turnover rates from once or twice per year to at least four times per year.

Solution: “We needed a forecasting tool to analyze our financial data,” the director reports. The choice was a demand planning system (Prescient Systems; www.prescientsystems.com) that would tightly integrate with lawson.insight (Lawson Software; www.lawson.com) already in place. According to the director, the Prescient solution uses data from lawson.insight to answer questions such as Has the item been in the warehouse too long? Does our organization use the item any longer, and what are we doing with it? “Our inventory turns have moved up, and we now stock 2,100 parts, down from the previous 2,400,” he explains. In addition, the accuracy of orders to suppliers has improved, and lead times and transportation costs have been

reduced. “The most impressive change is that our warehouse operations are now handled centrally,” he notes.

Enterprise Resource Planning Software Suite Provides More Informative Inventory Management

- Situation:** A large manufacturer of portable air compressors produces a large variety of units with a variety of optional engines, while also providing complete support and service for all products, both in-house and in the field, according to the materials manager.
- Problem:** “We required a more informative system to manage our inventory so we could be more cost-effective in replenishing our inventory and reschedule material plans accordingly,” he explains.
- Solution:** “We recently installed INFIMACS II enterprise resource planning software suite [Relevant Business Systems; www.relevant.com], with the material requirements planning module,” the materials manager offers. “It allows us to get a hold of our inventory levels, thus keeping payables in balance with cash, making us more flexible. The module provides a material plan that meets our production schedule, taking into account lead times and in-process cycle times for parts and assemblies.” It also plans work orders and purchase requisitions.

100% Radio Frequency–Directed Warehouse System Increases Accuracy to 99.5%

- Situation:** A leading cable and wire distributor restructured several of its warehouses throughout the country to improve their level of customer service, according to the regional distribution center manager.
- Problem:** “In the past we used competing agents to distribute our products,” he explains. “Today, the agents have been replaced by company-owned regional distribution centers which carry our full product range.”
- Solution:** “It’s been a two-year project, and we’ve put in place Logistics PRO [Intrepa LLC; www.intrepa.com] in all five of the regional DCs [distribution centers],” he notes. “Since

implementing the solution, we have increased inventory accuracy to 99.52%, and increased our shipping accuracy to 99.57%.” The distribution centers use the software’s functions, such as radio frequency functionality for pallet consolidation, demand-only replenishment, pick-to-workload instead of pick-to-unit, and the ability to configure multiple reserved dock areas per carrier. Additionally, since the operations are 100% RF directed, the facility is paperless, eliminating pick-sheets and picking labels within the warehouse. The manager notes one additional benefit: “All potential resource allocation trouble areas are highlighted for a warehouse supervisor, allowing them to be proactive instead of reactive.”

Service Planning Software Reduces Excess Inventories

Situation: According to an inventory analyst at a major computer manufacturer, its philosophy is to provide next-business day service to the majority of its customers. “Our service logistics group provides the majority of this support through forecasting, planning, and deploying items like hard drives, power supplies, keyboards, and cables for our customers,” she relates.

Problem: “Service level is our primary concern,” the analyst declares. “We also must focus on our bottom-line contribution to the profit and loss statement. The amount of money we spend on new material is also critical. Therefore, the repair process and the way we manage repair inventory is crucial, because it is generally more cost-effective to repair than to buy new material,” she explains.

Solution: “We implemented XelusPlan [Xelus, Inc., Fairport, N.Y.; www.xelus.com] so our planners could quickly handle the 6,000-plus service orders that flow throughout the facility daily,” the analyst notes. “The new software supports our drive to avoid technological obsolescence and excess inventory of component parts.” XelusPlan forecasts parts and identifies any excess inventory to that forecast. “This may be excess inventory that we need to work down, or we may determine that we have extended contracts with certain customers and need to maintain that inventory,” she explains. “In addition, the

software provides us with analysis tools so planners can classify the different reasons excess inventory occurred.”

Vendor-Managed Inventory Process Brings Common Sense to Inventory Management

Situation: The manager of inventory and procurement at a midsize manufacturer of commercial security systems reveals that he was hired to lead the reengineering efforts of the organization’s inventory and purchasing operation.

Problem: “We faced a new level of the classic inventory management challenge, that of having parts for manufacturing products in stock while keeping inventory low, because customers now want in two or three days what they used to want in two to three weeks,” he shares. Additionally, the JIT approach was not an option because of the number of the division’s suppliers and the specialty engineered parts required.

Solution: “Our team adopted a vendor-managed inventory system in which suppliers own the inventory that is stored at our facility until it is used,” he explains. To date, more than one-half of the suppliers are participating. Benefits to suppliers are that they are paid in one to five days and that they have better control for planning and forecasting. The team also created a computer program that provides descriptive, historical, and pricing information for each part the division buys. For example, it now buys six months worth of one-cent rivets that are used in many assembly operations, while the inventory and purchasing group spends more time managing the complex, high-cost inventory items, such as circuit boards.

Forecast Software Solution Improves Control of More Than 2,000 SKUs

Situation: A materials manager at a leading producer of household cleaning products wanted to ensure that its supply chain had the most accurate information to “perform smoothly.”

Problem: A result of a recent merger was that each organization was using a different statistical forecasting package. “With more than

2,000 SKUs to manage, and the executive focus on increasing cross-selling opportunities, forecasting became even more crucial,” he relates.

Solution: They selected the ForecastX Wizard (John Galt Solutions, Inc., Chicago; www.johngalt.com) to define a new forecasting process. “We have witnessed an increase in the company’s dollar-weighted monthly forecast accuracy from an average 71% to an average 84% within the first three months of implementation,” he details. “We now have better control over inventory levels.”

Warehouse Management Software Reduces On-Hand Inventory Levels to Days from Months

Situation: “A couple of years ago we began a thorough review of our manufacturing and logistics programs,” describes the operations vice president at a major manufacturer of hydraulic hose and related components. “We also had 13 distribution centers located throughout North America.”

Problem: “With thousands of SKUs in these distribution centers, our analysis revealed that we too often had the parts required by the customer at some other location,” he acknowledges. Additionally, the combination of how products were manufactured and the number of distribution centers meant that the company had an average of 192 days of inventory on hand

Solution: To reduce inventory, the company changed the way some of the products were manufactured and simultaneously began to reduce the number of DCs. A 100,000 square foot central distribution facility located adjacent to the major manufacturing site replaced more than 500,000 square feet of distribution space in 13 separate facilities. An automated warehouse and inventory control system (Robocom Systems International; Massapequa, N.Y.; www.robocom.com) manages and integrates final assembly processes with distribution systems, keeps track of 17,000 part numbers, and helps ship 6,000 lines items per day. Inventory levels also have been reduced from more than six months to just days, with greater accuracy and on-time delivery.

Improved Forecasting Accuracy Slices Excess Inventory of Perishable Product

- Situation:** A major provider of fruit juices focused efforts on lowering its inventory levels as “even a small improvement in inventory levels in our high-volume product significantly impacts our bottom line,” says the manager of logistics development.
- Problem:** “We developed weekly forecasts for about 1,500 line items, often requiring our people to work 60 days straight without a day off trying to get the forecasts right,” he explains.
- Solution:** Today, the forecasting process obtains data by weekly sales by customer by SKU/by distribution center from five geographic areas. These are brought into the new forecasting technology (Prescient Systems, West Chester, Pa.; www.prescientsystems.com) along with monthly numbers from financial planning. “Forecasts are developed by logistics, both short-term (two to five weeks) and long-term (six to 104 weeks) in about three days,” he relates. The improvement in the forecasting and continuous replenishment programs has reduced inventory 20% and improved inventory turns 27%, all of which translates into a better bottom line.

Auto ID, Bar Codes Combine to Improve Inventory Accuracy for Glass Manufacturer

- Situation:** A glass manufacturer supplying the automotive industry ships to repair and installation facilities from a central warehouse that contains hundreds of different sizes, colors, and shapes of windows, windshields, and automotive glass in inventory.
- Problem:** “We were losing customers because our distribution center could not meet delivery requirements on time,” mentions the warehouse manager. “With hundreds of glass parts to choose from, workers found it difficult to pick the right type of glass when required. The situation was complicated when we hired temporary works during peak demand seasons.”
- Solution:** “Our team opted for a methodology where workers could easily identify each piece of glass and determine its exact location so that picking and shipping operations could be

improved,” he explains. The solution included portable RF bar code data collection devices and thermal transfer bar code printers. “When product is received, each is labeled with the corresponding qualities [color, shape, size, strength] and tracked as it is moved into the distribution center. Any inventory movements, whether for internal moves or picks, are recorded in real time and updated regularly.” He estimates that hardware investment will be returned within 18 months.

Supply Chain Planning Technology Reduces Inventory Levels, Planning Cycle Times

Situation: A project manager at a large manufacturer of eye care products explains that the planning function is centralized at its headquarters location while manufacturing and distribution are global with plants and DCs located in North America, Europe, and Asia.

Problem: “We have a lot of sites and we transfer a lot of product and materials from site to site,” he explains. “Our existing materials requirement planning [MRP] system does not generate a plan that is materials- or capacity-feasible. It doesn’t look across the site to determine where material shortfalls or surpluses and imbalances might exist,” he details.

Solution: “We looked for a tool that would develop a feasible plan out of the box and eliminate people having to go in and adjust for these factors that MRP didn’t care about,” the project manager explains. The answer was found with PeopleSoft Enterprise Planning (PeopleSoft, Inc., Pleasanton, Calif.; www.peoplesoft.com), which temporarily has been running with the company’s home-grown MRP system and a legacy inventory application. When the implementation is complete, everything will run on the PeopleSoft solution. Shortening the planning cycle and optimizing supply chain planning, the project manager estimates that inventory reduction across the supply chain will be about \$10 million. So far, finished goods stocking is down by \$2 million. With the last pieces of the PeopleSoft system in place, the entire supply chain will be modeled, and most of the inventory reduction will come from eliminating imbalances in the supply chain.

Warehouse Management System Brings Efficiency to New Distribution Center Operations

Situation: A large producer of lift trucks recently opened a DC specifically for the receiving, inspection, storing, parts consolidation, and shipping of its products. The 71,000 square foot facility houses parts for the local manufacturing facility and its after-market support centers.

Problem: “This arrangement and the volume of tasks, which total more than 6,500 per day, call for a technologically advanced inventory tracking system,” the warehouse manager shares.

Solution: “A Robocom Inventory Management System [Robocom Systems International; Massapequa, N.Y.; www.robocom.com] operates the task-oriented system that tracks more than 52,000 parts in the warehouse,” he reveals. All parts are placed on storage-bound skids, which are tagged using Code 39 symbology. The identifying “license plates” on each skid display order number, part number locations, description, and quantity. They are scanned for storage assignment before being placed on 45-foot-high bay racks. When orders are received, the parts are picked from storage and scanned before being placed on another skid. The new system allows the manufacturer to troubleshoot potential problem areas by providing accurate inventory information. Workload planning reports mean that personnel bottlenecks are avoided; in addition, stack-ups in the consolidation areas are eliminated.

Optimization Solution Cuts Inventory by More Than Half, Lowers Carrying Costs, Too

Situation: The logistics vice president at a leading manufacturer of plumbing fixtures and supplies explains that “for years we’ve been trying to discern some kind of buying pattern, but order volume remains highly unpredictable, and is often dependent on the weather.”

Problem: “Customers are no longer willing to stock inventory, and they want just-in-time delivery with the product being shipped within 24 to 48 hours of their order,” he explains.

Solution: “We implemented a GAINS supply chain optimization solution [GAINSystems, Naperville, Ill.; www.gainstech.com] because it could not only forecast demand, but link into replenishment and stocking to allow us a clearer view of our return on investment,” he details. “We now can accurately forecast 100% of our manufactured products and commit to shipping them within two days. And we still have been able to reduce our inventory investment by 52%.”

WMS Installation Improves Inventory Accuracy to Over 99%

Situation: The production control manager at a major manufacturer of communications equipment explains that the organization remains focused on developing wireless technology. It also operates a world-class manufacturing facility.

Problem: With over 2.5 million square feet of manufacturing and warehousing space, there is a mobility challenge. “When you talk about the need for mobility, you’re talking about the need for current information,” he relates. The people who are walking or driving around the warehouse selecting material have been relying on batched information that was at least 24 hours old.

Solution: “We implemented an RF Navigator warehouse management system [Majure Data, Inc.; Norcross, Ga.; www.majuredata.com] to handle the storage and shipment of the more than 50,000 telecommunications products the plant manufactures,” the production control manager reports. It interfaces with the company’s MRP II system. RF Navigator receives customer orders from the MRP II system and executes the receiving, storage, picking, and shipping processes. The inventory data tracked by the WMS are updated immediately and continually during each stage of operations. Further, when an operator needs a certain material, he scans or enters the JIT number for that material. The JIT number represents a standard quantity, SKU, and delivery location. The WMS either knows that the material is in the storeroom and requisitions it, or sends an EDI request to an outside supplier. The WMS tracks raw materials and records the location of stored products in real time. In-

ventory accuracy, which had been 95%, now exceeds 99%. Further, material handling efficiency has improved 20%, and lead time has been reduced, as well as inventory, by 25%.

Simulation System Reduces WIP by Almost Half

Situation: An industrial engineer at a major automobile assembly facility reveals that it is too difficult to manipulate the manufacturing system according to different production strategies.

Problem: “There was an excess of WIP throughout the assembly facility,” he relates.

Solution: “We looked to a simulation study to help us understand the causes of changes in variables on our WIP,” he explains. ProModel (ProModel Corporation; 888-776-6633) was the solution used to gain an insight into the relationships among different variables. “Running experiments of the scenarios helped to set the rules for the production system to improve productivity,” he shares. “An insight was gained for understanding the relationships between WIP and the others such as lead times of pieces, lot sizes, and setup times.” As a result of the modeling effort, there was a 48% average reduction of WIP in the plant.

Third-Party Provider Helps to Slash Inventory Investment by \$1 Million

Situation: A logistics coordinator at a large provider of computer services for automobile retailers provides turnkey systems, software solutions, and consulting services and must meet 24/7, 4-hour client delivery requirements.

Problem: “Recent changes in the computer networks of automotive dealers dictate that next-day delivery of critical computer components is no longer a viable option, as they now need same-day support,” he explains. “They can’t afford to keep their computers down for a day.”

Solution: SonicAir, a UPS Logistics Group company (www.sonicair.com), was engaged to provide the solution. “We gained access to warehouse and same-day distribution support

24-hours-a-day, seven days-a-week, through their global network of 400 forward stocking locations,” he reports. In addition, “We now have a better handle on our inventory costs and have reduced our inventory carrying charges by \$1 million,” he explains.

Simulation Solutions Provides Greater Inventory Alternatives

Situation: An inventory manager at a major producer of communications network components explains the organization annually manufactures one million printed circuit boards, along with 200,000 mechanical assemblies and other products. The size of their inventory provides a challenge, he notes, as the company consumes some 550 million separate components each year.

Problem: “To improve our customer service, which is critical in our industry, we frequently challenge ourselves with alternate scenarios, which often involve inventory matters,” he offers. Among the questions they seek to answer are, If that order were canceled, how would that impact our inventory? Or, if we moved one project back and accelerated another, what would the impact be on our inventory? “We often did that kind of work with paper and pencil and calculators,” the inventory manager notes. “It took up to two weeks to do all the calculations and arrive at an answer.”

Solution: “We looked for a software package which could do these simulations, and which would work well with our existing products and methods,” he explains. The solution was found in webPLAN (webPLAN Corp.; Chicago; www.webplan.com). “We can now have that analysis completed in less than four hours,” he explains. “The accuracy level has increased, and we have more confidence in the results, because we’re dealing with much more contemporary data.” The amount of time spent planning and considering alternative scenarios has been reduced by 50%, and the analysis of their ability to meet delivery dates has been automated. Previously, every component of an order had to be physically scrutinized and cross-referenced with inventory.

New Warehouse Management System Drives Inventory Turns Increase, from Five to Eight

Situation: A diversified technology and manufacturing organization operated a 90,000 square foot warehouse. According to the warehouse manager, “Inventory turns were about five, and returns took anywhere from four to six weeks. In addition, orders had a three- to five-day turnaround, and inventory accuracy was in the low 60% area.”

Problem: Employees used a “time-consuming” card locator system and “all data was manually entered into our computer system,” he explains.

Solution: They selected the ROC v5.0 warehouse management system (Radcliffe Systems, Inc.; Willowdale, Ontario; www.radsystems.com) that they “customized quite a bit” and use for every function from the time a product is received to the time it is shipped out. Since installing ROC, they report that they now can keep less inventory and save on inventory costs, as smaller customer inventory orders are the rule. “Customers now are confident that we will have the items they need, and that the orders will be shipped out the same day,” he reports. Today, the warehouse space is down to 64,000 square feet and houses an average of 8,500 SKUs. “Receive and putaway functions that once took four to six days are now a four-hour process,” he mentions. “Inventory accuracy is now in the high 90s, and the three- to five-day order turnaround is now same-day.”

Cycle Counting Eliminates Wall-to-Wall Physical Inventories

Situation: A logistics manager at a midsize producer of plumbing products sought to improve inventory accuracy and identify the reasons for errors in inventory levels.

Problem: “To verify our inventory position, we relied on the traditional physical inventory practice, which consumed too much time, didn’t correct the book errors, and didn’t sit too well with our employees,” the logistics manager concedes.

Solution: “We looked into adapting a cycle counting procedure,” he notes. “We concentrated our cycle counting efforts on those

SKUs that cause us problems and the ones that had a long record of inaccuracy. We now count them more frequently and are seeing accuracy levels improve as we are able to better identify why the errors are occurring.”

New Warehouse Management System Improves Order Flow, Inventory Control

Situation: The 75,000 square foot warehouse at a major producer of aerospace and industrial products contains almost 25,000 SKUs in over 80,000 possible locations supported by about 75 personnel, according to the material control manager. The SKUs are primarily stored in one of five aisles of an automated storage and retrieval system (AS/RS).

Problem: “We were approaching the time when we had to select a new warehouse management system that would replace our existing first-in, first-out [FIFO] system, and also drive the AS/RS system,” he relates.

Solution: They selected the MARC-CS warehouse management system (TRW Global Enterprises Solutions, TRW, Inc.; www.MARCsystems.com) with a new controller code to replace its former system. “The MARC-CS software does not require each new receipt to occupy a new location, so like product is stored in the same location, improving storage utilization and order processing,” the material control manager explains. “We now have better warehouse activity control and improved interleaving capabilities related to picking, putaway, and counting tasks.”

Web-Based Collaborative Network Boosts Planning and Supply Chain Execution

Situation: “One of our business goals is to improve customer service, and we believe the answer is through greater accuracy in forecasting and replenishment,” the vice president of a major furniture company maintains.

Problem: “We needed a solution that could be implemented quickly and is easy to use, while providing a forum for collaborative planning, forecasting, and replenishment [CPFR],” he reveals.

Solution: They have decided to participate in a collaborative trading community (i-Community) designed by Logility Inc. (Atlanta, Ga.; www.logility.com) for the furniture value chain. The i-Community (powered by Logility's Voyager Solutions) allows organizations to collaborate on sales forecasts and replenishment plans as well as transportation and distribution center management with trading partners via the Internet. "We are currently implementing the Voyager Solutions suite, and we anticipate making significant reductions in inventory and transportation expenses," the executive explains.

Information Sharing Alleviates Long Lead Time and Inventory Management Uncertainties

Situation: The operations manager at a snack foods manufacturer shares, "Rapid increases and decreases in our business have resulted in our being out of stock at one end and having an excessive amount of inventory on the other."

Problem: The too much/too little inventory situation was squeezing their cash flow. "We needed cash, and the inventory situation became a target for us," he reports. However, "not only did we have a lack of data, we had an absence of data-driven decisions," he acknowledges.

Solution: While trying to resolve their problem and seeking their supplier's assistance, they also became aware that the supplier had similar inventory problems due to the extreme variability of the snack food manufacturer's business. "Our joint solution was to allow our supplier to have visibility into our planning process," he notes. "If they could see a year's worth of our planning, they could then schedule accordingly." The answer lies with a "simple" spreadsheet. The spreadsheet shows the production schedule for the snacks and the film printing. "We take our production numbers and enter them into the spreadsheet every Friday and e-mail it to our supplier, who then uses the information to schedule their press runs." They also enter their numbers and e-mail it back to the snack food manufacturer on Monday. "The spreadsheet/e-mail tool has opened our communications, and we've both been able to save a significant amount in inventory," he declares.

“Theory of Constraints” Software Feature Decreases Lead Times and Reduces WIP

Situation: A major producer of rolling mills for the metal producing industry builds and assembles parts to exact customer specifications. According to the materials management director, “We are a combination mass production operation and make-to-order job shop.”

Problem: “When we began to examine ways to improve customer satisfaction, we came to the realization that we needed to reduce our WIP inventory and to increase the throughput and velocity of our manufactured products,” the director explains.

Solution: “After studying our situation, we decided that we needed a production scheduling system that provided reliable schedules but required a minimum of expediting effort,” he explains. “One of the key reasons we chose the Thru-Put Manufacturing solution [Thru-Put Technologies; www.thru-put.com] was because of the adoption of the Theory of Constraints in the software package.” A series of special interfaces were created for transferring data between the software and the company’s primary MRP II business system. One interface was the creation of Demand Stream Driver, a specialized demand application. Other interfaces facilitate the passing of data, such as BOMs, routings, and inventory status. “With the Thru-Put solution in place, we have dramatically decreased the lead times of products while limiting the WIP to only that required for customer orders,” he reports. “The system has helped us to shrink the amount of time it takes to build individual parts, which has enabled us to lower both WIP and raw materials inventory.”

Locator Capability Helps to Alleviate Major Inventory Problems

Situation: The inventory manager at a midsize manufacturer of hydraulic filters and accessories explains, “We make a commodity product with very little differentiation from our competitor.”

Problem: “We add an average of 10 new products each year,” he notes. Some are manufactured, whereas others are purchased, packaged, and resold. Since it takes about 36 months to reach peak

demand, they would carry massive amounts of inventory. For several months very little product would move off the shelf; then the demand would be there, but they couldn't respond to it quickly.

Solution: “We implemented software from Fourth Shift [www.fs.com] that enabled us to get our arms around our inventory, locate our inventory, and produce our inventory to order and to forecast,” the inventory manager maintains. “The software solution we adopted allows us to purchase or manufacture according to demand or lead time, and make adjustments as demand builds.” Instead of “hunting and pecking to find the right item, we can go right to it, whether it is finished goods for an order, or an item we need for manufacturing.” The locator system has helped to move inventory accuracy from the low 80% level to a consistent 95+% accuracy today.

Reengineering Warehouse Efforts Improves Raw Material Tracking Accuracy

Situation: A major manufacturer of timepieces had warehouses that operated independently of each other, according to the director of operations.

Problem: Each relied on a paper-based batch system that was supplemented by stand-alone PC-based systems. “These systems were homegrown and not compatible, so data communications was nonexistent,” he explains.

Solution: “We entered into a major reengineering initiative, which was developed around a new warehouse management system [Manhattan Associates; www.manhattanassociates.com],” he explains. “It controls all activities, inventory and order fulfillment, and communicates with the conveyor control system, pick-to-light system, and RF scanners, which are used in the bin shelving pick area, receiving, and putaway.” The exchange of data between the various systems is now virtually seamless. “We are now able to accurately track the flow of raw materials going in and the flow of finished goods going out of the assembly area,” the director offers. “It also tracks the consumption of raw materials, which provides us with a new level of control.”

Inventory Control System Slashes SKUs While Improving Turnover Ratio

Situation: With 25,000 square feet of space and 9,000 SKUs, a distributor of builder's finished hardware was considering expanding the facility to handle the extra inventory, according to the organization's president.

Problem: "Over the past year we became aware of the concept of profitability based on movement class and inventory turnover," he explains. "This brought to our attention the fact that we just could not do business the way we had in the past."

Solution: "We moved to an automated inventory management system, which has proved very successful," the president declares. "We began by taking all of our buyers and management teams through a videotaped training process. We were taught that the way we did A, B, C, D buying is really the opposite of what we should be doing." Having 14 item classes and buying by item class was one way they increased their inventory turn ratio. "The system enabled us to free up hundreds of thousands of dollars in cash that was tied up in inventory," he explains. Further, they now have 8,700 SKUs with ample room available in the original warehouse. The inventory control system, on an item-by-item basis, monitors activities on each one, giving everyone in the company access to all current information. It also does the company's forecasting and gives suggested orders that are accurate about 90% of the time, according to the president.

Warehouse Management System Helps Track Inventory in Real Time

Situation: A large distributor of plumbing supplies was in the market for a solution that would manage warehouse space and inventory in a real-time environment, according to the director of distribution. Further, the solution was to be implemented in its regional warehouses as well.

Problem: "We have to accommodate random storage needs, efficiently utilize space, and accurately track inventory in real time," the manager itemized the requirements. "For large orders we have

multiple products being picked, and we needed a solution so as not to jeopardize our customer relationships.”

Solution: “We’ve installed VIAWARE WMS [Provia Software; Grand Rapids, Mich.; www.proviasoftware.com] at three of our facilities, with two more sites scheduled to go live in the next 12 months,” the director explains. “The software has been selected as our corporate standard to streamline our warehouse and distribution activities. The solution gives us complete visibility of our product from the moment orders are received until they are delivered.”

Off-Site Staging Facility Removes Inventory from Manufacturing Facility

Situation: The logistics vice president for a major builder of made-to-order office systems launched a supply chain management strategy to deliver a competitive advantage in the market.

Problem: “We have an above-average order cycle time for our industry,” he acknowledged. The industry standard is six to eight weeks.

Solution: “We engaged a third-party logistics provider who established an off-site dedicated storage and staging facility, which manages the raw materials inventory process. The activities include receiving, storing, and staging almost 70,000 component parts provided by the manufacturer’s suppliers. In fact, the suppliers own the material stored at the facility, which saves inventory carrying costs. “Our third-party provider has real-time visibility to our production schedules, enabling them to monitor inventory usage rates, gauge how production is proceeding, and instantly checking on the status of materials being shipped from the suppliers,” he describes. “Our provider ships materials to our manufacturing site every two hours, enabling us to maintain a nonstop assembly operation.” This has eliminated all on-site inventory at the plant. In addition, order cycle time, an important metric, has been cut to just five days.

Supplier-Managed Inventory Process Trims Inventory Levels for All Parties

Situation: The inventory control manager at a major chemical manufacturer described the primary corporate goal as one of gaining an

increased share of their customers' business while maintaining a focus on reducing its inventory investment.

Problem: "Traditionally, the industry runs high levels of safety stock to guard against stockouts, which can delay or even halt production," he explains. Additionally, he notes, "We began a series of reengineering efforts aimed at reducing costs throughout the supply chain."

Solution: "We created a collaborative concept with several of our suppliers and a few of our key customers in which both the supplier and customer agreed to share appropriate information," the inventory control manager comments. The supplier-managed inventory program that was created has the customers providing the chemical manufacturer with a weekly forecast of planned consumption. "Since we now have a better understanding of the customer's usage pattern, it enables us to forecast more accurately and replenish on a more timely basis," he offers. Further, they also share their production information with their primary suppliers in a similar vein. The early results have been promising. At one customer's facility, safety stock inventory was slashed by almost 60%, while crisis shipments have been cut by 80%. The chemical manufacturer also has seen a reduction in its own inventory levels, as well as more timely shipments from its primary suppliers.

Outsourcing Tool Crib Operations Improves Inventory Management, Cuts Costs up to 20%

Situation: The materials manager at a midsize manufacturer of ball bearings believed that tool room operations had become an unnecessary burden in time and money.

Problem: "The situation was out of control, with inventory accuracy a problem and supplies routinely out of stock, or in short supply," he ventured. "And the inventory we carried in the tool cribs was costly, besides."

Solution: "We suggested our MRO supplier take over the management of the tool cribs and the ownership of its inventory," the materials manager explains. "With most of the inventory on consignment, and the supplier doing a very cost-effective job managing this inventory, we've experienced savings of about

20% since the start of the program. With this continuing success, we're now negotiating with the supplier to do some value-added tasks that will provide us with additional savings," he adds.

WMS Boosts Inventory Accuracy by 99% Consistently

Situation: The vice president of logistics at a computer parts distributor oversees a 155,000 square foot distribution center with some 360,000 SKUs and services customers in 160 countries. Further, they offer customers a "fully integrated solution, from product planning and procurement to inventory storage and warranty repairs."

Problem: With the new mission, the logistics vice president realized that the existing "bare-bones" WMS had to be replaced because it was not capable of handling the demands of 20,000 service providers and supporting next-day delivery of more than 4,000 packages daily.

Solution: "Our main priority was a perpetual inventory system capable of telling us the status of our inventory in real time," he explains. After investigating various solutions, they selected the Elite Series Warehouse Management System from TECSYS (www.tecsys.com). Two months after going live, the warehouse efficiency improved dramatically. Now, it has a consistent accuracy rate of 99% when it comes to no-ships, missed transactions, and outbound errors. Additionally, write-offs due to inventory shrinkage have dropped 93% "due to the shrinkage reduction enabled by the system's real-time tracking of inventory and quantities throughout the warehouse," he declares.

New Planning and Scheduling Software Helps Reduce Finished Goods Inventories

Situation: "Our two-decade-old planning and scheduling system began to struggle to keep up with our production plants across the United States," describes the product supply manager at a major maker of paper products. "We had to modernize our logistics system to remain competitive."

- Problem:** “Our system was generating unreliable schedules because it was using a batch mode approach,” he explains. “Our planners were scheduling from computer-generated reports rather than directly from the computer screen. Instead of highlighting exceptions for action, these reports required manual intervention. Also, the systems at the various facilities were not integrated.”
- Solution:** “Our goal was to replace the outdated system with a decision-support environment,” the product supply manager states. “We chose Numetrix in part for its Supply Chain Integrator [SCI], which serves as the interface between a global strategic and tactical optimizer module, and a master production planning module of the Numetrix solution.” Part of the solution provides planners with financial data that enables them to know the costs, such as variable manufacturing, distribution, storage, and handling, attached for each solution. In addition, the planners found that they could use the SCI to import statistical safety stocks into planning models to cover variations in supply and demand.

Advanced WMS Increases Warehouse Efficiency 25%

- Situation:** The warehouse at a manufacturing complex operates 24/7. When materials are requested to meet production schedules, warehouse personnel pick them from storage and deliver them to the appropriate sites within the facility, according to the warehouse manager at a large maker of photographic equipment and supplies.
- Problem:** Management decided to redesign the existing warehouse’s operations to make them more efficient; in the existing system, inventory was received and accounted for manually, by penciling in the information on paper forms. “Because this system could not accurately reflect stock levels, it was necessary to keep an extra day’s stock on hand,” he explains.
- Solution:** The team opted for a WMS with an RF option. This option was at the request of the user representative on the team. He believed it would eliminate the need for fork truck operators to travel long distances within the warehouse to pick up work orders. The payback from the system includes increased equip-

ment use and personnel productivity. Also, inventory turns rose, which “reduced the amount of inventory needed to support production,” he explains. The new WMS enabled the organization to reduce inventory on hand by one day and reduce the number of leased materials-handling vehicles by almost 20%.

Improving Inventory Accuracy with Cycle Counting

- Situation:** The executive vice president of a midsize metal fabricator embarked on an initiative to minimize shop-floor problems.
- Problem:** “One of the biggest problems we had was with maintaining any form of inventory accuracy, as stockouts occurred frequently,” he offers.
- Solution:** “Our ERP software offers two programs that helped us to model our operating procedures,” he explains. The ABC analysis module sorts item master records and assigns an ABC code on the basis of each item’s actual demand history and standard cost, each item’s projected volume, and the percentage of the total dollar volume of all items being analyzed. Also, the cycle counting program helped to group items by part number and ABC code. “Our inventory personnel are trained in the correct procedures and are highly disciplined in their cycle count activities,” he notes. Today, they routinely achieve 96.5% inventory record accuracy.

Global Beverage Company Slashes Inventory Carrying Cost 50% with Better Forecasting

- Situation:** “While our inventory performance benchmarks indicated we were right up there with the top of the industry, we believed that we could achieve even greater productivity,” explains the inventory management director at a leading provider of beverage products.
- Problem:** “Sales seasonality, rigorous customer service requirements, and the growing need to anticipate the financial impacts of new product introductions, discounting, and sales promotions constitute a complex planning mix,” he offers. “Our slower, less accurate forecasting system just wasn’t up to the job of handling the new demands we were facing,” he allows.

Solution: “Our new forecasting system integrates SmartForecasts for Windows [Smart Software, Inc.; www.smartcorp.com] and the Oracle Express online analytical processing [OLAP] system,” he explains. Production forecasts are generated weekly as 14,000 time series of SKU sales by territory are sent from the company’s Oracle relational database to the Oracle Express analytical database, which is then fed into SmartForecasts. It selects the best statistical forecasting method for each time series and automatically generates the forecasts in report and graphical form. The entire forecasting and data analysis process takes 20 minutes. In the two years the system has been in operation, inventory turns have doubled, and inventory carrying costs have been halved.

Finite Capacity Scheduling Software Solution Trims Rug Manufacturer’s Inventory

Situation: A small company makes custom braided rugs the old-fashioned way, according to the president. They are custom-made and hand-sewn on machines.

Problem: “With a virtually unlimited number of yarn color and rug size possibilities, it is a production scheduler’s nightmare,” he concedes. In addition, the scheduler goes out on the shop floor at the end of each week and physically counts inventory and finished and partially finished goods.

Solution: They installed MAX Finite Capacity Scheduling software (Kewill ERP; www.kewill.com). “Since installing Finite Capacity early in 1999, we have been better able to balance orders with workload and improve manufacturing throughput,” the president reports. “With more than 3,000 rugs going on the schedule each week, we now have the flexibility and versatility to group sizes and colors more efficiently, and also to manage our inventory better.” Now, he relates, accurate production and inventory records are maintained in the system.

Simulation Study Identifies Impact of System Variables on WIP

Situation: A leading automobile producer manipulates the manufacturing system according to different production strategies, explains the logistics vice president.

- Problem:** “The constant manipulation caused an excess of WIP in the workshop, and we did not fully understand how changes in the system variables impact these levels,” he maintains.
- Solution:** “We introduced a simulation study to try and resolve the WIP in the workshop,” the vice president explains. ProModel (ProModel Corporation; www.promodel.com) was used to gain an insight into the relationships among the different variables. “Running experiments of the scenarios helped to set the rules for the production system to improve productivity,” he explains. “Therefore, an insight was gained for understanding the relationship between WIP and the others, such as lead times of pieces, lot sizes, and setup times.” The proposal for decreasing WIP was divided into two groups: scheduling and technology. As a result of the modeling effort, there was a 48% reduction on the average WIP in the workshop. The majority of this improvement was gained from applying scheduling rules, the remainder from technological improvements.

Inventory Optimization Tool Boosts Inventory Turns More than 150%

- Situation:** The inventory manager at a major producer of glass for the automotive industry sought to increase customer service levels while simultaneously reducing its inventory investment.
- Problem:** The manufacturer, which already operates at world-class service levels, looked for an answer that would optimize its inventory levels, costs, and workload throughout the supply chain.
- Solution:** “After reviewing several options and potential solutions, we opted for the GAINS (GAINSystems, Naperville, Ill.; www.gainstech.com) Inventory Chain Optimization Solution,” the inventory manager decided. Since its installation, the organization has been able to achieve a 60% reduction in inventory investment while still maintaining its world-class service levels. They also have increased on-time service levels to 99.9% while making the reduction in inventory investment. Also, inventory turns have improved by more than 150%, according to the inventory manager.

Notification System Monitors Inventory Amounts and Improves Data Accuracy

Situation: The materials manager at a large manufacturer of hard disk drives and storage components faced two major challenges: streamlining its component supply to lower on-hand inventory and moving away from the traditional labor-intensive ordering process.

Problem: The ordering process involved numerous phone calls and manual inventory checks. To ensure that production was not interrupted, the process called for high levels of on-hand inventory. Further, they had to improve the quality of the component data in their MRP system, as the incomplete and inaccurate data caused delays in production.

Solution: To automate its component supply, the materials manager recommended an interenterprise system to e-mail reorders automatically to suppliers using an event detection and notification solution (Categoric Software Corporation, Palo Alto, Calif.; www.categoric.com). The new system scans the company's databases twice daily, assessing material requirements from one application module against inventory levels tracked in another. Orders are automatically initiated and sent to suppliers as needed, according to the materials manager. The system not only notifies suppliers of the quantity of components required in the immediate orders, but also gives them a window into the amount of inventory on-hand and future weekly requirements. While not citing specific savings, he does indicate that savings from inventory reductions will be in the millions of dollars.

Internet-Based Solution Helps Manufacturer Reduce Inventory Levels

Situation: "Our core ERP solution was a heavily modified system from the 1980s," explains the logistics director at a midsize semiconductor manufacturer. "The system lacked flexibility and functionality to compete in today's fast-changing semiconductor market."

- Problem:** “The system was such that it required extensive rekeying of data and many quality assurance reviews,” he cites. “Rate-based production scheduling and finite scheduling were impossible.” The company wanted to have more flexibility, improve its time-to-market, and increase its customer service performance.
- Solution:** The company decided to rebuild its technical infrastructure on the foundation of an Internet-based extended enterprise application solution (Pivotpoint, Inc.; Woburn, Mass.; www.pivotpoint.com). It implemented Point.Man to manage the “nuts and bolts” of the manufacturing business—inventory control, order entry, finite scheduling, production management, and more. With the new system in operation, the logistics director reports a marked increase in on-time delivery performance, a significant decline in inventory levels, and a decrease in the time to market. “A key benefit is the ability to get information out of the system at any time and in any format,” he reveals. “It has increased our flexibility.”

Supply Chain Planning Technology Reduces Inventory and Planning Cycle

- Situation:** According to the project manager at a large maker of eyewear and eye care products, planning is centralized at headquarters, but manufacturing and distribution are global. “Production of the various brands is merged,” he explains. “The brands are supplied and produced as a common product line. We have a lot of sites, and we transfer a lot of product and materials from site to site,” he expands.
- Problem:** “Our existing MRP system did not generate a plan that was materials- or capacity-feasible,” the project manager offers. “It didn’t look across our sites to determine where material shortfalls or surpluses and imbalances might exist.”
- Solution:** “We selected PeopleSoft (Pleasanton, Calif.; www.peoplesoft.com) supply chain planning technology to reduce inventory levels and planning cycle times for our product lines,” according to the project manager. “With the last pieces of the enterprise planning system in place, the whole supply chain will be modeled, and most of the inventory reductions will

come from eliminating the imbalances in the supply chain.” So far, they’ve reduced their finished stocking constraints by \$2 million. The total goal is \$10 million with other supply chain initiatives included.

Automated Parts Replacement System Improves Picking Output 40% in Warehouse

Situation: “Our parts replacement center receives, stores, and ships more than 1,775,000 parts to customers worldwide,” maintains the inventory manager at a large producer of consumer electronics parts.

Problem: “The rising volume of our business was straining our antiquated inventory control system,” she explains. Much of the system is manual, with operators reconciling shipments on printed lists, using outdated packing list procedures, and conducting physical searches to find locations for new product parts.

Solution: “After a long, exhaustive search, we opted for the Exceed.cs supply chain execution system from EXE Technologies [Dallas; www.exe.com],” she relates. “The software, which was easily integrated with our existing order system, has brought our inventory under control.” All putaways, moves, picks, sorts, and quality control are tracked using handheld scanners that upload into the system. Bar code printers generate labels as soon as products arrive at the center. The system sends and receives order, receipt, and status information as soon as it is available. Since the implementation, picking output has surged by 40%, and lead times on outgoing shipments have been cut from five days to just one and a half, she maintains.

Cross-docking Operations Enhanced with New PC Terminals

Situation: “The amount of activity in the dock areas of our customer centers has increased since we implemented cross-docking capabilities,” offers the vice president of a major less-than-truckload (LTL) carrier.

- Problem:** “With this new capability we still hadn’t achieved the efficiency levels we had targeted,” he mentions. “Also, we still could not provide real-time tracking of customer freight.”
- Solution:** “We added PC cross-dock terminals at our customer centers to facilitate the flow of freight and to have a timely and accurate location of customer shipments,” the executive explains. The wireless LAN-based PC/Rover terminals (Kinetic Computer Corporation, Billerica, Mass.; www.kin.com) are mounted on the I beam between dock doors and communicate to the terminal computer server via RF link. Cargo unloaded from one trailer is scanned by the operator with the cross-dock terminal and then directly loaded on another trailer.
-

Direct Supplier Involvement Helps to Reduce Supply Chain Inventory

- Situation:** An inventory manager at a large consumer products company sought to “convince” others in the organization that “inventory is a communications opportunity linking the supply chain.”
- Problem:** “Inventory is the result of poor/inadequate/inaccurate or withheld information,” he believes. As such, the manager sought to improve “linkage” with the supplier community.
- Solution:** “We went about involving our suppliers of ‘value-added’ material as well as the raw material suppliers in a three-tier joint management of the supply chain,” he describes. The value-added supplier assumed responsibility for managing the total supply chain, for reporting inventory by specification, and for reporting service and quality levels to all three parties. “With the improved linkage of the suppliers with internal systems, processes, and information, we are all experiencing, albeit to different degrees, various levels of inventory reduction.”
-

Supply Chain Software Helps Toy Maker Bring New Efficiencies to Warehouse Operations

- Situation:** “We have four distribution centers that serve more than 50,000 retailers worldwide,” describes the operations vice

president at a leading designer and suppliers of toys and gifts. **Problem:** “We have a labor-intensive, paper-based distribution process that we’re trying to break away from, to increase our inventory turns and lower operational costs,” he offers.

Solution: The company selected a supply chain software solution (Optum Software; Costa Mesa, Calif.) and will link it to a newly acquired SAP R/3 ERP application. “The Optum software will be installed in all four of our distribution centers and will dramatically increase our inventory turns and improve our shipping accuracy,” the executive explained. The application combines operational logic with real-time order and inventory information to enable workers to execute key operations, such as unload, putaway, pick, pack, and ship, in concert. For example, the vice president describes, “On an inbound shipment, the software calculates optimal putaway locations, and through bar coding and use of RF handheld terminals, automatically records in real time where the product is stored. Also, when items are picked for outbound shipment, the operators are provided the optimal item location, and as soon as the item is pulled off the shelf, inventory for that location is updated instantly.”

Reinstalling Cycle Counting Helps Restore Order to Chaotic Inventory Situation

Situation: “A previous manager had eliminated the cycle count process,” a production and inventory control (P&IC) manager at a mid-size manufacturer of valves reveals. “Some material has not been counted/verified in over three years.”

Problem: “We knew the inventory had to be in the building somewhere; we just didn’t know exactly where,” he maintains. “Inventory accuracy, at best, was only around 60%.”

Solution: On taking over the responsibility, the new manager immediately reinstated the cycle counting process. “My goal is to improve inventory accuracy and make it a nonissue by having a repeatable process in place,” he explains. “With our cycle counting process again in operation, we count our inventory location by location and know exactly where what is and how many are there.” Already, the accuracy level is in the mid-90%

area, and is “climbing each month.” Now, “when we go to make a pick list to pull orders, we’re more than 99% confident the parts are there to satisfy the customer order,” the P&IC manager insists.

New Advanced Planning System Provides Better Control of Safety Stock

Situation: A purchasing manager at a liquor distributor that was experiencing growing demand realized that the time had come to automate its materials planning and purchasing functions to improve their operating efficiencies.

Problem: “We had to have a system that would reduce our increasing frequency of stockouts, yet enable us to improve customer service with less inventory,” the purchasing manager explained. “Further, we had to have a way to move buyers from the manual ordering process.”

Solution: “Using the Supply Chain Planner [Celerity Solutions, Inc.; Concord, Mass.] software, we have been able to construct a model of our supply chain,” he explains. “We now can project future inventory levels based on our sourcing rules, shipping and calendar restraints, lead times, safety stock, and excess stock level policies.” As the supply and demand change, he notes, planned supply orders are created, canceled, or adjusted automatically. For example, when lead times are reached, planned orders can be opened automatically or by a buyer. Also, the system alerts buyers to conditions that require immediate attention, such as excess stock or predicted shortages. “Alternatives for correcting the condition are clearly displayed,” he notes. “Our buyers are now shifting their focus from ordering to forecasting and inventory planning.”

Operator Training Helps to Improve Inventory Management

Situation: “The individuals responsible for managing the inventory had previously handled a few hundred SKUs for a single manufacturing plant,” reports an inventory control manager at a large producer of specialty machinery components. “Suddenly they

were in charge of over a couple thousand SKUs from several manufacturing sites after a corporate merger.”

Problem: “Our service level plummeted to a miserable 55%, even though we had stock of almost a year’s worth of inventory,” he declares. “Upon reviewing the operation, it was clear that training was at the root of our problems.”

Solution: “We used the APICS [American Production and Inventory Control Society] certification review program as the model to train these individuals,” the inventory control manager explains. After going through several of the review courses, “they began to spearhead major improvements in both inventory turns and customer service level.”

Move to Paperless Inventory Management Boosts Accuracy

Situation: “We have to keep track of thousands of products in more than three dozen factories and distribution centers around the world,” comments an inventory analyst at a large producer of hose fittings and assemblies.

Problem: “We’ve maintained inventory on paper, wrote information on charts and lists, and then had it all keyed into a computer,” she explains. “This manual process produced errors which gave us false inventory information on an almost routine basis.”

Solution: “We invested in an automatic identification process that enables us to have an inventory management system that tracks every product we make,” the analyst explains. The process starts when a product comes out of manufacturing. A bar-coded label is attached to the product or container before moving into the warehouse. An operator scans the label and the bar-coded bin location where it is being stored. When the product is pulled, it is again scanned and automatically deducted from inventory. “We now have better records and are assured that when an operator has to pick a part for an order, it’s there where it’s supposed to be,” she offers.

New Warehouse Management System Improves Inventory Accuracy

Situation: The logistics director at a leading provider of nonproduction goods and services with multisite DCs across North America

realized it was imperative for the organization to investigate the feasibility of incorporating a WMS into its operations.

Problem: “We were looking for a system with flexible system functionality and the ability to modify the level of automation at a moment’s notice,” the director explained.

Solution: “After reviewing a number of potential solutions, we selected Celerity’s WMS 4.0 [Somerset Solutions, Inc., subsidiary of Celerity Solutions, Inc.; Irvine, Calif.],” he notes. The system includes the standard material-handling interface, which controls high-speed conveyors and a pick-to-light system to expedite picking functions and to increase inventory accuracy. With the success of the initial installation, the company will continue the implementation of WMS 4.0 to its remaining distribution sites, the director states.

Vendor Managed Inventory Helps Chemical Maker Rid Itself of Excess Inventory

Situation: Similar to many manufacturers, a small maker of laboratory chemicals and reagents lacked access to real-time customer demand and distributor inventory data it needed to make efficient plans, the director of manufacturing reports.

Problem: “We were having quite big swings in orders from our distributors, which in turn caused us either to work overtime or, in times of drought, to have people basically waiting for something to do,” the director complained. “We were just building too much inventory, and it was creating tremendous problems in our manufacturing cycle.”

Solution: “We began working with Edifice Information Management Systems [Riverdale, N.J.], a VMI outsourcing service provider,” he describes. Powered by Microsoft BackOffice technologies, Edifice’s VMI system receives daily inventory transactions from the chemical producer’s distributors via EDI. Based on those data and demand history, Edifice creates an order plan that the company reviews, edits, and approves through a Web-based client application. Benefits include an inventory reduction of 10% while maintaining an order fill rate of 99%. Also, receivable discrepancies are down from 2% of line items to 0.2%.

Training of Entire Staff Raises Awareness of Need for Inventory Reduction

- Situation:** A corporate materials manager at a large builder of semiconductor manufacturing equipment sensed that there was a “creeping level of inaccuracy in inventory records being maintained, leading to undesirable amounts of obsolete inventory being stored.”
- Problem:** An initial review found the inventory record accuracy to be no greater than 60%.
- Solution:** “Our first step was to institute a training program,” the manager offered. “Since training was a significant issue, we trained the entire warehouse staff on the intricacies of cycle counting. We also emphasized the impact of inventory accuracy and the effect it has on the production floor and on the company’s bottom line,” he detailed. The company took one additional step. It assigned a single senior manager to be responsible for and lead the effort to reduce obsolete and excess inventory levels. “These efforts have added focus on the inventory situation and emphasized its importance, and the people are responding,” he explains.
-

Stockouts Almost Eliminated and Inventory Slashed with New MRP II System

- Situation:** “Although our market as a whole is static, our company is achieving strong growth,” describes the logistics director at a midsize manufacturer of recreational vehicles. “To continue this continued expansion, while maintaining control over our inventory situation, information technology is the key to our continued expansion.”
- Problem:** “We have been running a mixture of off-the-shelf and customized modules to monitor our manufacturing processes, and while they were adequate, they will not propel us to where we want to be in the future,” he explains.
- Solution:** A team was formed to improve the company’s computer systems, and team members also looked at four different MRP systems and evaluated two. The system ultimately selected was PRMS (Acacia Technologies, Lisle, Ill.). “The

full MRP II functionality has improved customer service in regards to stockouts,” the logistics director maintains. The company has 8,000 component line items, several of which have lead times as long as three months. “Our stockouts have been considerably reduced due to monitoring and control capabilities of the new system,” he describes. “This improvement in service has been made in parallel with a 15% reduction in inventory.”

Internet Allows Suppliers to Manage/Control Inventory of Essential Parts

Situation: “Our management approved a recommendation to use the Internet and install an ERP system to enhance our supply chain management practice and to enable us to collaborate with our trading partners,” offers the operations vice president at a large manufacturer of heavy machinery equipment.

Problem: “This has caused our team to do a lot of rethinking as we were currently using several different software packages,” he explains. The problem was, however, that they were heavily customized and could not be integrated with the systems of their major suppliers and customers.

Solution: “We decided to scrap our legacy systems and replace them with a series of packaged applications, such as SAP R/3 for manufacturing and i2 Technologies constraint-based planning for supply chain management,” the executive details. “We also developed a common Web-based environment, an extranet where we can exchange information with our trading partners.” Recently, the company has been able to extract information about inventory levels from the system and to put it directly on a secure extranet. “Now suppliers realize almost immediately when we’re running low and replenish the stock without having to be notified,” he declares. “The suppliers have access to the data and make sure we don’t run out of supplies,” he assures.

Highly Accurate Inventory Records Key to Inventory Reduction

Situation: “Our company was in the process of expanding into several new product areas, and we realized our inventory manage-

ment system also had to change if it was to keep pace,” reports the inventory manager at a midsize custom aluminum fabricator.

Problem: “We have as many as 250 different orders in process in a given week, with lead times ranging from three days to 12 months,” he explains. Production planning was a challenge.

Solution: “We rewrote our engineering computer programs and integrated them with a central cost accounting system,” the inventory manager describes. This link among engineering, cost accounting, and estimating teams now provides multiple departments with easy access to the same data. This has enabled the company to track usage of stock parts better and reduce order quantities. It also has eliminated the annual physical inventory process, which had previously shut the plant for two days. The better control of inventory and BOMs has led to an inventory reduction of 30%, while also improving inventory accuracy to more than 98%.

New Scheduling Software Reduces WIP Inventory 50%

Situation: “The cost of late product delivery to our customers is as high as \$250,000 per day,” reports the manufacturing systems manager at a large producer of drilling equipment for the oil exploration industry. “This dictates we deliver products and services on time, every time.”

Problem: “Our MRP system was not designed to schedule in a complex manufacturing environment,” he explains. “It became counterproductive as it increased lead times to accommodate unexpected events, forcing us to increase safety stocks.”

Solution: “We began scheduling the plant manually using the Theory of Constraints,” the systems manager shares. It was successful as it saved inventory costs, overtime, and expediting. However, the manual approach also plateaued. “We selected a material flow management software [Thru-Put Technologies; San Jose, Calif.] and completed the implementation in two months,” he notes. “Within weeks we increased the capacity of bottleneck resources by identifying the critical disruptions in plant flow,” he declares. “With the system’s early warning signals, corrective actions also can be triggered to establish

routings using nonbottlenecks to avoid excess safety stock levels.” To date, WIP inventory has been cut in half over the manual implementation, saving an additional \$2.8 million.

**RFDC System Improves Inventory Accuracy 28-fold
at Consumer Products Company**

Situation: “We have some 15,000 SKUs in our distribution center in the Northeast,” describes the vice president of operations at this large manufacturer of consumer products. “Some 85% of the shipments are represented by only two major product lines.”

Problem: “Increased sales problems began to cause logistics problems,” he offers. “Manual records of product inventory were not being entered into the system on a timely basis, which resulted in outdated information being available to plant workers and customers.”

Solution: “We began a search for a data collection solution for our entire distribution center operations and focused on getting a better handle on inventory accuracy,” he explains. They selected an Intermec Technologies Corporation (Everett, Wash.) solution that consisted of RF-based portable computers with laser scanners, portable printers, RF fixed printers, RF vehicle mount units, and RF fixed-mount intelligent readers. “The new system went live together with a year-end physical inventory, and within three weeks greater accuracy of the inventory data was being realized,” the executive declares. For example, the physical inventory in the rack storage area has improved to 99+%. This is based on a book-to-physical difference of \$78,000 on \$30 million of inventory.

**ERP Software Provides Extra Benefit:
Supplier Managed Inventory Program**

Situation: “Our production, after several years of 60% growth, was exceeding the capability of the existing ERP software,” observes the information technology (IT) applications manager at a mid-size manufacturer of equipment for the semiconductor industry.

Problem: “We needed a solution that could run material planning cycles on a daily basis—also one that could stay online around the clock identifying where our inventory was,” he mentions.

Solution: “One of our sites moved to a new ERP system [Glovia International; El Segundo, Calif.], and a second migrated to it two years later,” the manager explains. “All the sites have been upgraded to version 3.0, which supports Oracle.” In addition, he explains, “The Glovia system is also the backbone of our supplier managed inventory program, in which our customers can manage inventory online by obtaining spare parts and consumables while eliminating the traditional purchase order.”

Cross-functional Team Develops Solution to Reduce Inventory Costs, Warehousing Space

Situation: The senior director of materials management and purchasing at a midsize fabricator of metal products has created cross-functional teams to focus on specific inventory/supply problems that impact internal end users.

Problem: “Our team of representatives from inventory, distribution, purchasing, and manufacturing went to visit one of our major suppliers at his warehouse,” the director explains. “We were having problems with the delivery, storage, and payment for the materials they provided, which were inhibiting our operations.”

Solution: “After several follow-up meetings with the supplier representatives, our team was able to work out a structured agreement for having the supplier provide us with the materials for a period of three years,” he explains. “In addition, the supplier would store the material at his warehouse and deliver it to us as we needed it, delivering it to point-of-use at no additional charge. Further, we would turn around payment to the supplier within 10 days of delivery.” Overall, they reduced inventory costs significantly, while freeing expensive warehouse space.

Moving from a Manual to an Automated System Improves Inventory Accuracy

Situation: A large auto parts distributor with more than 30 warehouses nationwide carries an inventory valued as much as \$3 billion, according to the organization’s logistics director.

- Problem:** “Our growth was causing us to have problems with our inventory, especially in its accuracy and location,” he explains. “The manual systems we employed just couldn’t do the job any longer.”
- Solution:** “We had to automate and move away from the paper-based environment,” he declares. “Due to the scope of the project, and our lack of knowledge of systems availability, we engaged a consultant to work with us and develop a plan we could present to management justifying what we planned to do.” They developed a plan that quantified inventory accuracy improvement, reduction of errors, improvement of space utilization, and reduction of inventory. “We also put a figure on the improvement in productivity, and what it all meant to the bottom line,” the director explains. The solution was a multiyear project that saw the installation of WMSs, including bar coding technology and RF hardware. With the complete system now in place, the logistics director cites a \$20 million savings in inventory costs and a \$3 million savings in inventory shrinkage. “We have almost eliminated inventory shortages and cut mispicks by half,” he offers. “And productivity has improved by almost 10%.”

WIP Inventory Reduced by One Week per Production Line with MES Software

- Situation:** “We produce 40,000 assemblies of 1,600 different products each month,” maintains the manufacturing manager at a major provider of electronics packaging products.
- Problem:** “Our challenge has been to maintain optimum productivity and customer satisfaction in our high-volume, multiproduct manufacturing environment,” he offers. “Part of the problem was in maintaining too much material on the factory floor for the ‘just-in-case’ jobs.”
- Solution:** “We initially installed OnTrack [Real World Technology; Mount Prospect, Ill.; 847-390-0200], a manufacturing execution system, on one production line,” he explains. In terms of inventory, they realized a one-time material reduction off-the-floor equaling about one week worth of WIP. Similar reductions were achieved when the software was installed on three other production lines. “The software tracks product

inventory and helps the users ascertain where product is on the floor at any time,” he details. “It helps us to move WIP through the facility much quicker and keep production at optimal levels.”

Next Generation Advanced Planning and Scheduling Software Reduces Overall Inventory

Situation: “To improve our competitive position and meet market demand for sustained growth, we decided to reengineer our procedures for forecasting demand, accepting work orders from customers, making commitment for orders, and completing product deliveries,” describes the logistics project manager at a large semiconductor fabricator.

Problem: “We have a difficult environment for planning and scheduling as we have a large volume operation, long lead times, and complex interplant dependencies,” she explains. “We also have a high degree of breakdown, scrap, and rework.”

Solution: The project manager and her team considered a number of advanced planning and scheduling software solutions before they selected the one from Paragon Management Systems (Los Angeles). In part, the software enabled them to improve visibility for cycle times, inventory levels, and other key performance measures. Also, it offered intelligent routing, including product overrides for operations. “With the new software, we have been able to improve our throughput by better managing starts and product mix,” she explains. “Overall, we have been able to reduce inventory levels significantly and improve cycle time by 10%.”

New Virtual Manufacturing Strategy Saves Millions in Inventory Investment

Situation: “We have the multiple goals of faster time to market, improved supply chain management, and better responsiveness to customers,” notes the materials director at a midsize telecommunications equipment manufacturer.

Problem: “Our existing product data management system made it difficult for our internal groups such as engineering and purchasing to communicate and work together,” explains the director.

Under the old system, engineering changes were cut in without the knowledge of purchasing. By the time they reviewed the stacks of ECNs, the changes already were effective, and after the wrong parts had been purchased. “This led to a tremendous amount of excess and obsolete inventory.”

Solution: “We created a unique virtual manufacturing process in which the production and development processes are managed by the team members, who include parts distributors, contract electronics manufacturers, a bare-board manufacturer, and our own employees,” she details. Full EDI connects each team member and “speeds the exchange of plan and build messages.” A new PDM system (Agile Software Corporation; San Jose, Calif.) provides the collaborative capabilities for publishing product data and engineering changes across the enterprise and supply chain. “We’ve slashed inventory, cut cycle time by nine weeks, and greatly increased collaboration among internal and external partners,” she details.

Reviewing Days Supply of Inventory Leads to a Massive Reduction in Inventory Levels

Situation: “We revised our inventory management procedures by implementing a new measurement system,” offers the inventory manager at a large consumer products company.

Problem: “We computed our days of supply for our dry products, and found it was 32 days across the country. I’m already carrying about one million cases in our main plant, and it only represents an eight-day supply. So what kind of inventory do I have in the supply chain for 32 days?” he asks.

Solution: “There was no valid reason to have a 32-day supply in the supply chain,” he notes. Upon investigating, they found that their manufacturing cycle time was no more than two weeks on any given dry product. “Adding in a couple of days for transit, and revising our forecasts, we established 17 days as the target,” the inventory manager reveals. “In just two weeks after starting our plan, we moved to 25 days supply; after four months it was down to 20 days; within six months, we hit our target,” he maintains. “Our savings are in the millions of dollars, and no one has been caught short of product.”

Theory of Constraints Leads to Lower WIP Inventories

Situation: An inventory manager at a job shop shares, “We often make the same product. However, most orders require special fittings, brackets, or other minor but critical fixtures. Also, it is a rarity for us to make more than one of the same items at a time.”

Problem: “Our customers, nevertheless, pressure us to compress our lead times,” he explains. In the past this meant that the company stocked finished and semifinished goods. “But this was an ineffective, inefficient, and costly solution, at best,” the inventory manager maintains.

Solution: After attending a Theory of Constraints (TOC) workshop, the attendees applied TOC principles to the job shop’s operations. “They found many bottlenecks throughout the various operations,” he notes. “The team proposed placing the control point near the end of the process, just prior to finishing and shipping, to enable production to be timed to meet shipping commitments.” From there they established buffers and communications for planning schedules and tracking progress. In three months after rolling out the solution, there was a 25% increase in throughput and a 35% decrease in WIP.

Kanban Process Improves Inventory Turnover Ratio by More Than Double

Situation: The materials manager at a midsize specialty chemicals facility used a combination of MRP and min/max for inventory planning and control, and raw material turned about 5 times per year.

Problem: “While we thought we were doing well, we still experienced about three stockouts per month, and our operators complained of lengthy waits for raw materials at the stockrooms,” he describes. Additionally, the annual physical inventory consumed about 12 hours.

Solution: “We formed a team of stockroom clerks, a buyer, a support staff member, and myself to consider implementing a kanban-type system,” the materials manager notes. “We first created a demand forecast for the product families and then reformatted the BOMs to have only three levels.” Initially, the kanban pro-

cess was applied to most raw materials, all MRO items, and some production material. The team also negotiated with the key suppliers and got their lead times down to one week or less. “We also implemented a kanban training program for all shop personnel and monitored their activity,” he explains. “Now, we’re moving all MRO to consignment within the kanban process.” Among the benefits he shares: Stockouts were eliminated; order quantities decreased; and inventory turns climbed above 13. Also, the annual physical now takes about two hours to complete.

Web Technology Improves Inventory Management at Bedding Manufacturer

- Situation:** The logistics manager at a large manufacturer of pillows and comforters typically carries inventory of fill materials from Asia for fabrics and materials tags.
- Problem:** “Typically, we received shipments of raw materials long in advance of their need, which were based on projections from the retailers we served,” she explains. “However, the system we had in place wasn’t able to respond quickly to exceptions, which meant we couldn’t react quickly to changing situations, causing stockouts or excess inventories.”
- Solution:** “We launched a Web pilot with one of our retailers to get point-of-sale data showing current inventory on hand at its stores,” the logistics manager describes. “This automatic sharing of data about what customers have helps us make better decisions about materials on hand, and we can minimize our inventory levels.” The initial effort has expanded to additional retailers. “In some cases we get the information about the inventory at specific store locations,” she notes. For the future, plans are being investigated that will coordinate POS information from retailers with automated purchasing of fabric, bags, and tags from domestic suppliers.

Kanban and MRP Simultaneously Boost Inventory Turns from 2.5 to 8

- Situation:** A leading manufacturer and distributor of health care products customizes one specific product line to meet customer

preferences and individual dimensions. “Our goal is to achieve a manufacturing process in a demand pull environment,” says the organization’s inventory manager.

Problem: “We needed a system that could be rapidly implemented, support custom manufacturing, provide powerful planning capabilities, and allow data to be exported into corporate financial systems,” the inventory manager explains. “We wanted a system flexible enough to fit our needs.”

Solution: They selected MSS for OBJECTS (Fourth Shift, Minneapolis; www.fs.com) manufacturing software because it is adaptable to a demand flow manufacturing environment. “The new software has made materials planning easier and more efficient,” she explains. Now a planner can handle 1,200 purchase parts rather than the former 500. Additionally, the company is able to respond to customer demands and coordinate related activity via kanbans. “Since using the software in a demand pull environment, we’ve reduced our lead times from 15 to 6 days and increased inventory turns by more than triple. We’ve also improved our on-time delivery to a consistent minimum of 99%.”

WMS Provides Greater Inventory Control, Eliminates Massive Reconciliation

Situation: The operations manager at a midsize processor of steel bars explains that the company had recently completed an acquisition program to expand its production capabilities greatly. “Since the consolidation, we have found it necessary to exercise tighter control over the inventory,” he relates.

Problem: “Previously, our inventory was limited to just two sites and we used a three-part paper tag system for finished goods,” he explains. This manual system was not too reliable as the information on the tags was sometimes in error as they got lost or misplaced.

Solution: “Our inventory control and MIS departments worked together to develop a specification for a warehouse management system,” the operations manager notes. The real-time WMS uses bar code input and RF mobile data collection terminals. “Now the inventory is tracked from raw materials receiving

through production, putaway, pick/pack, and shipping,” he describes. Now there is much greater control over inventory as the salespeople have online access to the inventory at all the plants. As the operations manager declares, “The time saved on physical inventory and the other efficiencies, plus the low investment in the system, has paid for itself in under a year.”

Focus on Supply Chain Activity Leads to Inventory Reduction Initiatives with Suppliers

Situation: “We’re a wholesaler–distributor that is spending more time in managing inventory replenishment for our customers,” explains the company president of the provider of MRO products.

Problem: “Shortly into the business plan, we came to the realization that we had to better manage our own inventory before we could begin to manage that of our customers,” he relates.

Solution: “Our inventory turns are at 12, while the competition hovers around 4,” the president explains. “This performance is achieved by internalizing the demand forecasting information available from the customer and working with our suppliers to reduce the inventory we need to hold.” There has been a lessening of activities across the supply chain. For instance, the industrial distributor has eliminated some major activities. Specifically, it arranges direct shipments of OEM and MRO products from the suppliers to the customer on a JIT basis. In addition, it has developed a series of VMI programs with both its suppliers and customers.

New WMS Solution Increases Inventory Accuracy to a Consistent 95+%

Situation: The project manager at a major pharmaceutical company notes that they were in need of a WMS that would provide secure pharmaceutical lot control. “The distribution warehouse has many floor locations, and we cannot afford to put two different lots in the same location,” he explains.

Problem: “We began our search by examining almost 30 WMS vendors,” the project manager recalls. Among the other criteria we had to

meet were cost, system design, operational design, implementation and scheduling capabilities, related experience, company financial and technology strength, and support capabilities.

Solution: The pharmaceutical giant selected the MARC-CS solution (TRW Logistics Execution Systems, Chicago; www.trw.com/MARC) for its raw materials and finished goods warehouse facilities. MARC's lot control functionality enables the company to track this specific information and determine where a particular lot should be stored. In addition, inventory accuracy has increased to greater than 95%. Also, the distribution warehouse has experienced the greatest improvement with turnover now estimated at 80% to 90% of its inventory each month.

Equipment Tracking System Helps Reduce Tool Shrinkage by an Initial \$200,000

Situation: "We had no computerized tracking system of the 15,000 tools we provided our employees," maintains a maintenance manager at a large shipyard. "We expect a certain amount of attrition because any tool dropped into the deep water is gone forever," he mentions.

Problem: "Trouble is, we were losing close to \$500,000 annually in tools," he complains. "Part of the problem that hindered us in seeking a solution was the harsh environment in which the tools were used."

Solution: "We worked with a company that specializes in automatic data collection and label and tag manufacturing which also has experience in providing labeling solutions in harsh environments," the maintenance manager explains. After a three-month test of different materials, a bar-coded color label was selected that would satisfactorily adhere to the tools' surface. When removing a tool from the crib, employees first scan the tool bar code. Then they scan their personal bar code located on their helmet or ID badge. The information is cross-checked when the tool is returned at the end of the shift. "We've saved almost \$200,000 in equipment shrinkage for the six months that the labeling system has been in place," the maintenance manager shares.

Automated Storage Cabinet Helps Keep Office Supplies Inventory at Minimum Levels

- Situation:** “We were spending almost \$2,000 per month on office supplies, yet always seemed to be in an out-of-stock situation,” a department manager complains.
- Problem:** “Our company office supply ordering agents were interrupted between 15 and 22 times per day by requests for ordering and dispensing supplies,” explains the midsize organization’s purchasing manager. “This required them to make phone calls and fax orders to the suppliers. In emergencies, they even had to make trips to the local Office Depot,” he notes.
- Solution:** “We invested in an automated cabinet [SupplyPro, San Diego, Calif.; info@supplypro.com] that provides for JIT ordering to help keep inventory at a minimum,” the purchasing manager explains. It statistically analyzes usage patterns and establishes minimum stock levels. When a supply falls below the minimum level, the cabinet automatically sends an electronic order to restock the supply. During the validation test, the company achieved a 55% savings, which more than pays for the cabinet’s monthly rental. Additionally, the ordering agents were able to concentrate on their primary job duties.

Inventory Management Tool Slices Excess Inventories to Reduce Investment by 24%

- Situation:** According to the inventory manager at a large manufacturer of telecommunications equipment, there had been a concerted effort to clear out obsolete inventories. This resulted in a \$2 million reduction in inventory investment in a matter of six months.
- Problem:** “Once we rid ourselves of the obsolete inventory, we then had to concentrate on excess inventory levels,” the inventory manager explains. “But there was difficulty in coming to a consensus in how to address the different commodity codes and product groups.
- Solution:** “We implemented the IQR technique [IQR International, Inc.; San Juan Capistrano, Calif.] that focused on the dollar value of the inventory,” he explains. “The planner and buyers

formed teams, but since they were responsible for different commodities and products, they had inherently different potentials for inventory reduction.” Taking this into consideration, some teams were able to achieve a 60% reduction, while others only had 5%. “Had we issued an edict for a flat reduction target, I doubt we would have been successful,” he maintains. “The 5% team would have hurt service levels with a 20% reduction, while the 60% team would have achieved the 20% target rather easily, and gone back to business as usual without realizing their full reduction potential.” Overall, inventory investment was taken down by \$4 million over a nine-month period.

New Software Reduces Inventory Stock Levels and Propels Turnover to 6.5 from 3.5

Situation: A materials manager at a large producer of fire detection and security control systems reveals that the organization had purchased an MRP system two years previously. “But it wasn’t doing what had been promised,” he describes. “Our inventory levels were too high, and purchasing had no trust in the system.”

Problem: “The system claimed multiple planning parameters, but none of them worked,” the materials manager maintains. “Additionally, we had difficulties exporting data from the system, and since we couldn’t trust the data, we were overbuying to cover ourselves in manufacturing.”

Solution: “We decided to dump the old system and get a new one,” he explains. “However, we first had to run the numbers for what we thought we could do with improved purchasing and inventory management.” The analysis indicated that if the improvements were made, they could pay for the system. They selected MSS for OBJECTS (Fourth Shift Corporation, Minneapolis). “Fourth Shift gives us good visibility into our inventory issues,” says the materials manager. “It gives us the flexibility to use different planning parameters based on the situation. We can take all high-risk, high-dollar parts and plan them in a unique fashion, and leave everything else for another planning capacity.” Within a year of implementation, they were able to reduce inventory levels by more than \$1 million while increasing revenues 22%. Also, inventory turns almost

doubled while manufacturing cycle time was reduced from 40 hours to 32 hours.

50% Productivity Increase Credited to Installation of Voice Recognition System

- Situation:** A third-party provider, according to the warehouse manager, was looking to improve the productivity in its receiving operations.
- Problem:** “The level of noise in the dock area made us leery about proceeding with new technology,” he explains.
- Solution:** “We were offered a no-risk trial period, so we installed the speech recognition technology [Voxware, Inc.; Princeton, N.J.], which allows receivers to speak the PO number and store number for each package as it is unloaded from its respective truck,” he details. “With speech recognition, we’ve been able to increase the number of packages we can process per hour. Further, the number of missorted packages has decreased by 50%.”

PART III

SUPPLY CHAIN MANAGEMENT

Chapter III-1

Supply Chain Management

Insights from the Pros

WHAT LEVEL OF SUPPLY CHAIN MANAGEMENT DOES YOUR COMPANY NEED?

For many logistics managers there is still some suspicion about the nature of supply chains. Similarly, many supply chain initiatives have produced less than desirable returns. As a result, skeptics continue to ask, “Do I really need supply chain management?”

“Yes, of course,” Larry L. Hessney, CPM, CFPIM, CIRM, worldwide supply chain manager at Eastman Kodak Company (Rochester, N.Y.), answers emphatically. At a recent Annual International Conference of the American Production and Inventory Control Society (APICS), he suggested that “A better question is, ‘What level of sophistication do you need?’” He differentiated the levels of supply chain management (SCM) as

- *Basic SCM*, which emphasizes getting the most out of your current manufacturing resource planning (MRP)/enterprise resource planning (ERP) tools and combining them with the effective use of SCM best practices, such as supplier partnerships and vendor managed inventory.
- *Sophisticated SCM*, which focuses on the newer information technology (IT) tools for SCM optimization. “Sophisticated SCM is needed by companies with large, complex supply chains or companies in industries where competitive advantage can be gained with optimized supply chains.” Basic SCM, he says, is adequate for smaller companies with simpler supply chains, such as make-to-order operations.

Set Realistic Objectives

At the same APICS conference, Edward Topor, president of T/K Methods Inc. (Lake Bluff, Ill.), introduced a supply chain proficiency model that could help alleviate many of these problems.

This assessment tool identifies the logical stages of supply chain proficiency measured against a comprehensive set of business characteristics (see sidebar). The supply chain assessment model provides logistics professionals with the means of developing a road map that describes a starting point, a desired result, and the path to get there.

Prepare for the Proficiency Model

The methodology for completing the supply chain assessment is straightforward. The process includes the following steps:

1. *Create a project plan.* “A detailed project plan describes the project and establishes the resources required to complete it,” says Topor. A project kick-off meeting communicates the plan to management and all participants.

2. *Develop “as is” supply chain proficiency model.* This step provides the baseline for supply chain improvements. Because each characteristic must progress through the stages one at a time, the “as is” model provides the starting point for analysis. “An objective evaluation of the current proficiency is a critical success factor of the assessment,” he reminds us. It includes the key criteria for each characteristic that supports the stage assessments.

3. *Develop “to be” supply chain proficiency model.* The “to be” model requires significant management participation, he warns. “One can’t assume Stage IV is a goal for every enterprise.” In developing the “to be” model, management needs to exercise good judgment. The desirable target should be a stretch for the organization to achieve. However, it must be a realistic goal that can be achieved in two to three years. In the deliverable, the project team must define a set of measurable criteria by characteristic for each target stage. “The more specific the criteria, the easier it will be to define projects,” Topor assures.

4. *Perform a gap analysis.* This step analyzes the difference between the current and target situations. The critical success factor for this step is to address the culture issues. “Supply chain management changes the way the enterprise thinks,” he declares. “One or more organizational change

Supply Chain Stages of Proficiency (with Stage II and IV characteristics defined)

Characteristics

Stage		Characteristics			
Number	Description	Business Environment	Customer & Supplier Relations	Supply Chain Communication	Information
IV	Proficient	Cradle-to-grave supply chain management	Alliance	Collaboration	Interactive information sharing with customers and suppliers
III	Proliferating	Enterprise-wide supply chain management	Coordination	E-commerce	Enterprise-wide systems integration
II	Aware	Cross-functional site effectiveness	Cooperation	EDI	Site systems integration
I	Traditional	Functional efficiency	Adversarial	Little or none	Discrete systems

(continued)

II. Aware

A crisis usually shifts management to the supply chain management paradigm. When management commits to supply chain management, the enterprise tends to take on the characteristics of Stage II. This stage introduces the concepts of cross-functional integration and cooperation with suppliers and customers. The aware stage focuses on site efficiency.

Business Environment. Stage II begins the evolution of an enterprise toward supply chain management. Pockets of excellence begin to emerge. Although the culture remains focused on internal efficiencies, breaking down the walls of the internal supply chain is a prerequisite to addressing the external supply chain.

Customer and Supplier Relations. Although Stage II activities are not always consciously related to supply chain management, they indicate an awareness that the traditional model is inadequate. Supplier and customer relations may still have an adversarial tone, but some cooperation begins to creep into the process. Criteria for this stage include

Customer:

- Other functions besides sales interface with customers
- Requirements are understood in greater detail (i.e., on-time delivery of 98%)
- Participate in some customer-mandated supply chain programs

Supplier:

- Teaming becomes a practice
- Purchasing smarter is the mantra
- End users participate with purchasing on requirements
- “Team-by-day, scheme-by-night” approach still is prevalent.

Supply Chain Communications. In this stage, the lines of communication start to open, albeit slowly, with suppliers and customers. Key criteria at this stage are:

- Recognition that EDI requires a business focus
- Expansion of customer EDI transaction sets
- Initiation of supplier EDI

Information Systems. As the business progresses toward a more effective internal supply chain, integrated information systems begin to evolve. Initially, these integrated systems tend to address operational requirements.

IV. Proficient

An enterprise achieves full supply chain enterprise in Stage IV. This stage is characterized by a new paradigm. An enterprise cannot progress to this stage alone. An Integrated Supply Chain (ISC) network allows multiple enterprises to operate as a single entity. The virtual company—where the boundaries of business become blurred—becomes a reality. Criteria include alliances, collaboration, and interactive information sharing.

Business Environment. Stage IV fully implements the supply chain management paradigm. The ISC provides collaboration capabilities where sophisticated sensitivity analysis models determine the effects of change in products, supply sources, delivery options, and manufacturing alternatives.

Customer and Supplier Relations. At Stage IV the enterprise succeeds in breaking all the barriers of the traditional model. Suppliers and customers work in total harmony.

Customer:

- Value chain extends out to final consumer
- ISC becomes extremely sophisticated
- Full conversion from push to pull demand management
- Going to market as a supply chain

(continued)

Supplier:

- Supply chain extends back to raw material provider
- Supply chain heavily influenced by customer requirements
- Working with suppliers, as a single entity, on research and development
- Collaboration on marketing strategy

Supply Chain Communications. Communications are instantaneous and extend to the lowest practical levels of the supply chain. Major supply chain communications criteria are:

- Internet introduced for customer communications
- Supplier EDI fully implemented
- Instantaneous communications to all ISC members.

Information Systems. Sophisticated information systems are in place that extend ERP to include collaborative planning software. There is an extensive use of the Internet for electronic commerce.

Source: Edward Topor, T/K Methods, Inc.

management projects will be necessary within each characteristic.” For each characteristic, the team must define projects to progress logically from the “as is” to the “to be” states.

5. *Create a supply chain management plan.* The project team organizes projects across characteristics. “One objective is to achieve some ‘quick hits,’” he advises. Another is to maintain some semblance of balance across the supply chain proficiency model. The final deliverable for this project is created in this step. For the most part, the team organizes the information developed in previous steps. An exception is that the team also creates detailed project plans for the next-step projects to be initiated within three months.

6. *Gain management approval.* The final step of the assessment includes developing a management presentation that summarizes the contents of the final report, presenting it to management, and gaining their approval to proceed.

DO NOT LET TECHNOLOGY BE THE ONLY FACTOR IN SUPPLY CHAIN REDESIGN

New technology is exciting, but we can’t let it cloud our view of other critical, but less obvious, elements. Good logistics practice starts with organizational structure, alliances, and staffing.

Two recent studies, one by a team at the University of Wisconsin-Madison (UW) and the other from Deloitte Consulting, offer an excellent way to keep perspective. They conclude that technology is one of four essential supply chain “enablers”:

1. *Organizational infrastructure.* The respondents to the UW study felt that the organizational infrastructure was the most important enabler of supply chain implementation (see Table III-1.1). The UW research identified a list of organizational attributes, which the survey respondents ranked in Table III-1.2.

However, a similar study, *Energizing the Supply Chain*, by Deloitte Consulting (404-631-2420; www.dc.com), finds little movement toward integrating responsibilities for the full supply chain, including reverse logistics, customer service, and production planning. The problem here is that

Table III-1.1 Relative Ranking of Enablers

Organizational infrastructure	3.44
Technology	2.14
Strategic alliances	2.07
Human resource management	2.05

Note: 4 = highest importance.

Source: University of Wisconsin-Madison.

Table III-1.2 Organizational Infrastructure Enabling Attributes (%)

Coherent business strategy that aligns business units toward the same goal	32
Formal process-flow methodologies to enable SCM improvements	15
People committed to, and responsible for, cross-functional processes	14
The right process metrics identified to guide the operating units' performance toward the strategic organizational SCM objectives	13
Cross-functional design teams to implement change	10
Business processes shared within the organization vs. being owned by functional units	9
One business function that drives the SCM initiative	7

Source: University of Wisconsin-Madison.

without cross-functional alignment, companies will fail to deliver optimum supply chain performance.

2. *Strategic alliances.* The enabler receiving the most mention in the UW report centered on understanding the expectations of the alliance partners (see Table III-1.3). The message here is that shippers and receivers cannot get the job done alone, but require alliances with suppliers, customers, and third-party logistics providers.

Despite the benefits of partnering, customers and suppliers are not ready to collaborate fully in extended supply chain management. This reluctance

Table III-1.3 Strategic Alliances Enabling Attributes (%)

Expectations clearly stated, understood, and agreed to upfront	48
Collaboration on supply chain design/product/service strategies	18
Regular interface among top management of partnering companies	9
Compatible IT systems	8
Top management communication as to why strategic alliances are important and pursued	8
Agreed upon process to incorporate business changes	4
Alliance partner-selection process	4
Lead persons responsible for building alliances on the job for at least 1 year	1

Source: University of Wisconsin-Madison.

may stem from an inability to establish relationships that serve the business objectives of all parties involved.

In addition, although some are committed to pursuing higher levels of performance, they are less willing to share knowledge and risk. Once firms recognize the importance of information sharing, they will better be able to integrate the extended supply chain. To support these relationships, many companies use the Internet (see Table III-1.4).

3. *Human resources management.* As a factor in enabling successful supply chain performance, respondents rated human resources management as slightly less important than technology and strategic alliances. This may reflect the possibility that many firms have not confronted human resource issues when designing and implementing their supply chain practices, the authors write. As many companies struggle to find skilled and knowledgeable labor, it is not surprising that respondents rank hiring skilled management as a key enabler (see Table III-1.5).

4. *Technology.* This includes data coding and structures, such as American National Standards Institute (ANSI); data capture, such as bar coding; data collection, such as global positioning systems (GPSs); handling and

**Table III-1.4 Use of Internet
with Customers, Suppliers,
Strategic Partners (%)**

Currently in use	
Customers	29
Suppliers	32
Strategic partners	40
Planned within the next 2 years	
Customers	38
Suppliers	42
Strategic partners	41
Planned for 2 years and beyond	
Customers	4
Suppliers	5
Strategic partners	3
No plans	
Customers	30
Suppliers	22
Strategic partners	16

Source: Deloitte Consulting.

Table III-1.5 Human Resources Management Enabling Attributes (%)

Sourcing, hiring, and selecting skilled people at all management levels	27
Change agents to manage SCM implementation	27
Compensation and incentive programs in place for SCM performance	14
Internal process facilitators knowledgeable in SCM	13
Appropriate job descriptions and responsibilities	12
Performance appraisal system in place for people working on cross-functional supply chain projects	4

Source: University of Wisconsin–Madison.

routing connections, database management, and electronic commerce, decision-aiding tools; and management reporting.

In the UW study, two types of technology were identified: information technology and manufacturing/materials handling technology (see Tables III-1.6 and III-1.7). Despite the importance of this area, however, fewer than one-third have a formal strategic information systems plan. Even more problematic, the Deloitte study notes that those that do are having to reinvest in the systems in place, because of their ineffectiveness in carrying out supply chain initiatives (see Table III-1.8). Nonetheless, by extending the enterprise backbone, companies can leverage new opportunities, such as e-commerce procurement and collaboration forecasting.

Table III-1.6 Information Technology Enabling Attributes (%)

Operations, marketing, and logistics data coordinated within the company	30
Data readily available to managers, not embedded in legacy systems	27
Operations, marketing, and logistics data coordinated between companies	18
SCM linked to ERP systems	10
State-of-the-art systems in place	8
State-of-the-art IT thinking	7

Source: University of Wisconsin–Madison.

Table III-1.7 Technology—Manufacturing and Materials Handling Enabling Attributes (%)

Products designed for production flow-through and inventory velocity	53
Physical production processes designed to facilitate SCM initiatives	23
Products designed for state-of-the-art packaging, unitizing, and materials handling to facilitate flow-through inventory velocity	12
Products designed and unitized for manufacturing efficiencies	12

Source: University of Wisconsin–Madison.

Table III-1.8 Effectiveness of ERP Systems in Managing the Supply Chain

Financial management & accounting	3.3
Custom order processing	3.1
Revenue chain management	2.9
Supply chain execution	2.7
Supply chain planning	2.4
Human resource management	2.4

Note: 1 = not effective; 5 = very effective.

Source: Deloitte Consulting.

Two Key Points

Before jumping into an integration project, first make sure you follow a phased approach to SCM. In conjunction with industry practitioners (in particular representatives from 3M), UW developed a nine-step approach to SCM implementation.

Next, appoint a supply chain leader. The UW study team set out to identify how widespread the supply chain title had become in organizations. Among attendees at UW seminars, only 10% had a person with a supply chain title in the organization. Furthermore, 59% said they were involved in supply chain initiatives. The UW team reached out to the Council of Logistics Management (CLM) and found that only 2.5% had supply chain in their titles.

The authors of the study believe that “companies may have difficulty implementing initiatives if top management does not understand the supply chain opportunity and appoint a leader to capitalize on the opportunity.”

TWO NEW BENCHMARKS FOCUS ON PLANT SITE PURCHASING PERFORMANCE

The new PulseMark benchmarks give purchasing professionals a unique perspective—all of the data refer to single plant sites. The other appealing feature of PulseMark is that the benchmarks are categorized according to six basic production processes (discrete, assemble-to-order, repetitive, process, job shop, and engineer-/build-to-order).

Purchasing effectiveness improves significantly. PulseMark, Benchmarks for U.S. Manufacturing Productivity, produced by the National Association of Manu-

facturers (NAM) together with McGladrey & Pullen, LLP, and RSM McGladrey, defines purchasing effectiveness as the “total yearly purchase price variance as a percent of total yearly materials purchased.” The purchasing effectiveness benchmark (see Figure III-1.1), based on data collected from surveys sent to over 25,000 U.S. companies with one or more manufacturing sites, shows a positive trend from the prior year’s performance.

For example, in the discrete sector the “average” benchmark has fallen a full percentage point (to 1.9%). In the assemble-to-order category, the average was slashed by half (to 1.1%), with the “worst” measure freefalling from 6.9% to 2.2% in the most recent study.

Duane C. Oest, executive vice president of RSM McGladrey, Inc. (Schaumburg, Ill.; duane_oest@rsmi.com), reports that contributing factors for the improved performance include reducing the number of suppliers and entering into supply agreements with preferred suppliers. He also adds, “When evaluating purchasing effectiveness, purchasing professionals should also examine the hidden overnight/express freight charges associated with poorly planned, expedited material purchases.”

Cost of processing a purchase order continues to slide. Purchasing professionals are continuing their assault on reducing costs to process a PO (see Figure III-

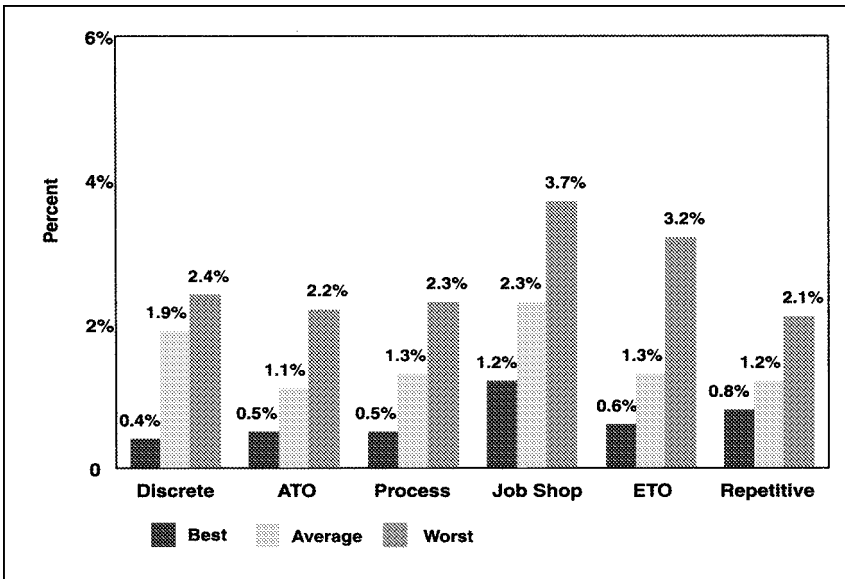


Figure III-1.1 Purchasing Effectiveness Benchmark Reveals Real Improvement

Source: National Association of Manufacturers.

1.2). According to the PulseMark data, the best performing organizations continue to lead this downward plunge.

For example, among those with the “best” performance, those in the ATO category reported a decrease of \$3.25 (to \$5.00); among ETO elite the fall was an impressive \$7.00 (to \$15.00). For the record, the “average” cost in most manufacturing categories also showed a similar decline.

Future benchmarks to be impacted by supply chain integration and e-purchasing. “While it is difficult to distinguish differences between supply chain integration and Web-based electronic commerce, there is no doubt that this technology is taking hold,” Oest tells us in an exclusive interview. “From an aggregated U.S. manufacturing perspective, acquisition of materials across the Web is well past the introductory stage and is well into mainstream practice,” he declares.

However, Oest is quick to acknowledge that there are sizable variations across industries and supply chains. Based on annual PulseMark surveys and a recent NAM e-commerce survey, for some supply chains—particularly electronics and automotive—e-Commerce is required, not requested. “The firms are fairly advanced in Web-based purchasing,” he notes. “In other types of firms with different supply chains and different integration needs, the amount of material acquisition is down in the 22% to 25% range.”

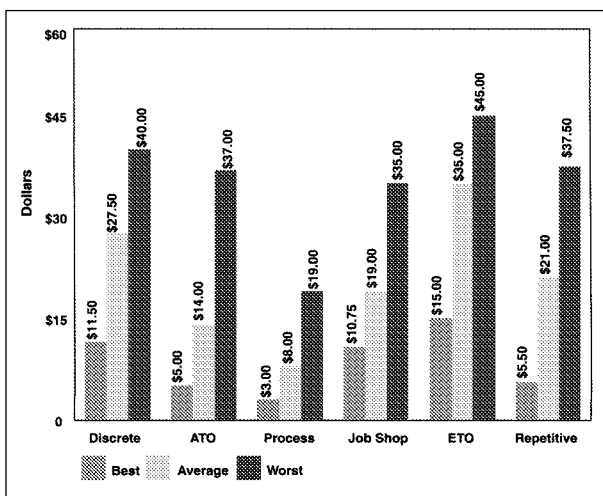


Figure III-1.2 Cost of Processing a Purchase Order Heads South as Best Practices Take Effect

Source: PulseMark 1999, *Benchmarks for U.S. Manufacturing Productivity*.

Standards for Web-based “buy-side” material acquisition not ready for prime time. The use of the Internet within manufacturing has been divided by software vendors into the “buy-side” and “sell-side,” explains Oest. The sell-side strategy is defined as development of electronic processes to present and sell products through the Internet.

The buy-side provides an increased ability to find, price, and purchase materials through the Internet. In NAM’s survey, only 32% of all manufacturers are actively acquiring materials across the Web. Specifically, from this base, 92% buy MRO, 43% examine product catalogs, 32% seek customer service/support, and 23% look for new products. Oest observes, “The definition of MRO items over the past few years has expanded to include a wide array of office- and computer-related supplies.”

Increased productivity to be mirrored in tomorrow’s yardsticks? The NAM survey specifically asked senior manufacturing executives about their core strategies behind the e-business objective (see Figure III-1.3). Maintaining a “true supply chain perspective,” the surveyed executives believe that “increased productivity will be applied downstream to their suppliers.”

However, Oest suggests that “you’ll also need to keep in mind that the same supply chain streamlining process you’re applying to your suppliers will be applied by your customers to your company.” As this process continues to ripple through industries and across supply tiers, the “stress that will be placed on all supply chain members will be incredible,” he declares. “Linkage of Web-based tools to the core transaction systems within each company will be the key that defines both short- and long-term success for each firm.”

But Oest issues a warning: “Before participating in either the sell-side or buy-side, purchasing professionals must have full control of all aspects of their existing business process.” In other words, “all the ‘old’ issues are back again.”

Knowledge of product costs, margins, flexibility, material costs, throughput, and quality are going to be required. As a supply chain manager responded, “This new process provides a real competitive weapon to the companies that have their core business processes under control; heaven help those that are ‘winging’ it.”

REMOVE SUPPLY CHAIN’S WEAK LINKS, NO MATTER WHOSE FAULT THEY ARE

Both suppliers—and the purchasers who manage them—must change practices to improve the supply chain. “Significant improvements can only be

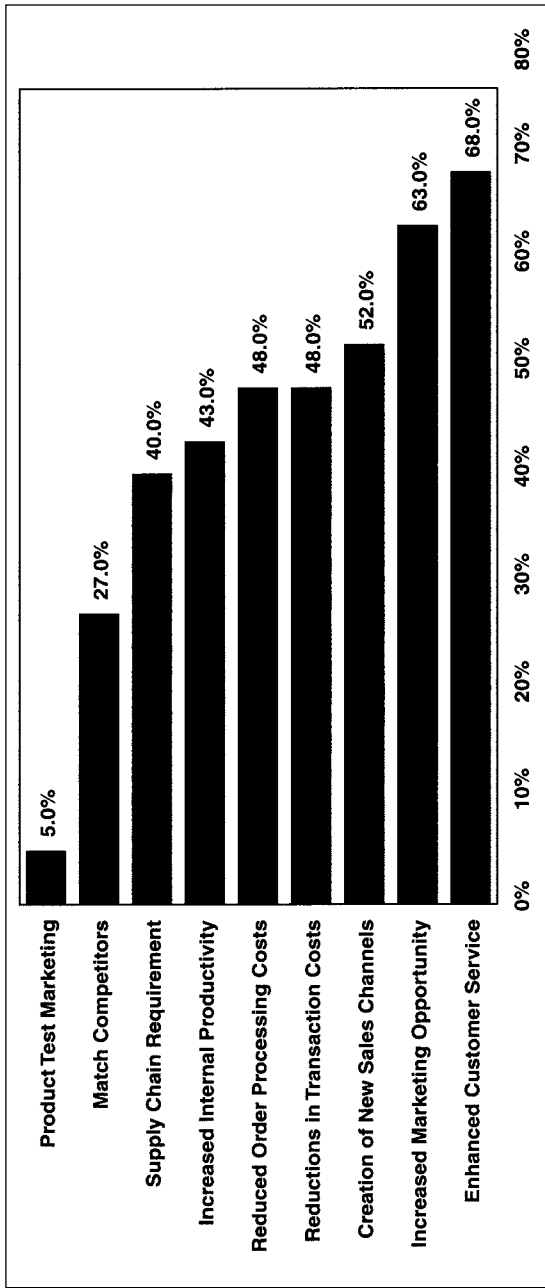


Figure III-1.3 Strategic Intent for e-Commerce

Source: National Association of Manufacturers.

made with a balanced focus,” maintains Jim Limperis, C.P.M., CFPIM, senior contracts manager, supply management, at Motorola, Inc. (Mansfield, Mass.; James.Limperis@motorola.com). The initiatives that Motorola and its suppliers took to strengthen their supply chain serve as a current model (see sidebar).

Identify the specific weak links in the chain. “It is naive to assume that the supply chain will always be running on all cylinders,” Limperis reminded attendants at a National Association of Purchasing Management (NAPM) Annual Internal Purchasing Conference. “At any given time there are fundamental links in the supply chain that are weaker than others,” he emphasized.

In fact, Limperis goes so far as to acknowledge, “It is not always easy to see ourselves as we really are.” At Motorola, the suppliers are encouraged to offer feedback in an open and nonthreatening manner. “If this is not done, weak links within our functional organizations are not exposed,” he insists.

Solicit supplier feedback. Motorola invites feedback, both formally and informally, to “ensure two-way flow of information. The formal method comprises a one-page checklist of some 20 traits. The supplier rates Motorola on a six-point scale against each trait.

“We also ask the supplier to rate its best customer, whose identity is not revealed, after Motorola,” Limperis notes. “This provides a worthwhile benchmark by trait.” Supplier feedback allows the supplier to grade Motorola on attributes such as early supplier involvement, response to cost reduction ideas, purchasing professionalism, schedule stability and communications, ethics, partnership performance, technical support, and forecast accuracy, among others.

Introduce activity-based costing (ABC). This is an excellent tool to identify weak links in the process. “ABC costing can provide the proper discipline to the customer’s organization to identify cost drivers inherent in the process and to eliminate them,” he explains. The challenge is to identify cost drivers that impact the supply chain.

At Motorola, they identify each component within a BOM as a cost object. Based on assorted quantifiable supply management and component/quality engineering criteria, a two-letter rating is assigned to each part number. The four ratings are “preferred,” “acceptable,” “restricted,” and “unacceptable.”

Supply management and engineering each assign a rating to the part.

Look beyond Traditional Customer-Supplier Relationships to Strengthen Supply Chain Links

“Supply chain management integrates and manages the flow of material and information across organizations to meet customer needs,” explains Jim Limperis. These linkages must go beyond traditional customer-supplier relationships to encompass new practices. They include such factors as shared planning, inventory, human resources, information technology systems, and even corporate cultures.

Recently, Motorola’s Internet and Networking Group embarked on an aggressive outsourcing effort. “We worked closely with the qualified electronic manufacturing service [EMS] provider to ensure that the customer would not be impacted by production interruptions while the products were being outsourced,” he explains. “The EMS provider was viewed as an extension to our internal factory, and we could not afford any weak links across the supply chain.” Limperis describes how the various elements came together:

- *Shared planning.* The EMS provider and Motorola worked closely with information technology to ensure that the respective ERP systems electronically communicated sales order needs in real time. Since the systems were not compatible at the outset, a weak link quickly developed. “Manual monitoring of forecasted demands and sales orders ensued until the information technology modifications patched up the chain,” he explains.

- *Inventory.* Supply orders with Motorola’s suppliers were canceled and reentered between the EMS provider and suppliers so that supply lines were not impacted. Motorola sold component inventory to the EMS provider on a quarter-by-quarter basis.

- *Human resources.* Because many direct employees were affected by this outsourcing effort, both human resource organizations worked together to allow displaced employees an opportunity to work directly for the EMS provider. This enabled the employees to continue to work in their fields of expertise on the same product. For the provider, they gained instant access to experienced operators with no training required and no recruiting expenses incurred. For Motorola, they earned goodwill by ensuring continued employment of displaced employees and smooth transition of the product to the EMS provider without interruptions to customers. In addition, they reduced the cost of operation by eliminating the fixed-cost component of cost of goods sold.

- *Corporate culture.* “Although difficult to quantify, it is important that the flexibility and responsiveness required by Motorola in responding to customer needs be communicated clearly to the EMS provider,” Limperis explains. “Equally important, the EMS provider must assimilate the Motorola corporate culture so that performance remains unchanged and the physical outsourcing of the product is transparent to the customer.”

Some of the criteria to establish the overall ratings include lead time, cost, current supplier, sole versus single source, and custom versus standard component. As an example, if a single ASIC has extended lead times due to allocation issues, is expensive, requires adding a new supplier to the database who needs to be qualified, will result in a sole source, and is a custom component, then the part will probably be classified as restricted or unacceptable.

“We, as the customer, may be the weak link in many of these criteria because we have been inflexible in specifying strict specifications that prevent the component from being a standard, single-source, readily available component,” he explains. “There may be applications which dictate high performance chips that force our hand. However, there are numerous opportunities via ABC management to identify and eliminate cost drivers that impact supply chain value,” says Limperis.

Introduce a supply chain ombudsman. There are usually three sides to every story: the customer’s, the supplier’s, and—somewhere in between—the truth. “Most times it’s the latter,” Limperis concedes. “Unless there is a diplomatic but forceful ombudsman assessing the degree of ‘over-the-wall-let-the-supplier-figure-it-out’ activity that exists, these weak links can cause rapid oxidation to the supply chain.”

An astute supply chain ombudsman will find opportunities to expose weak links in the supply chain and drive timely resolution to strengthen them. An example is a supplier review.

Motorola uses a supplier satisfaction score sheet to measure suppliers’ performances on a weekly basis for key electronic service providers. The score sheet assesses the supplier’s quality, delivery, communication, service, and technical performance. A grade (A to D) is assigned for each parameter. Guidelines accompany the report so that the latter scores equate to a quasi-quantifiable metric.

Any scores below a B warrant corrective action by the supplier. “The advantage of this scoring methodology is that it can be done fairly easily with minimal data tabulation,” he explains. The disadvantage is the potential subjectivity in scoring, particularly with communication and service. The supply chain manager can use this tool to drive improved performance both with the supplier and internally as well.

“There are numerous examples of mismanagement of the supply chain due to the customer’s myopic view of partner responsibility,” Limperis shares. “The supply chain manager must assume the role of ombudsman to change the culture of internal customers so that responsibilities become joint

opportunities to correct problems that impact the supply chain and, ultimately, the customer.”

COLLABORATIVE STRATEGIES TO REDUCE YOUR OVERALL SUPPLY CHAIN INVENTORY

It is easy to dismiss collaboration as another buzzword in the lexicon of today’s business world. However, the impact of collaboration on the supply or value chain and on reducing inventory levels throughout the chain increases daily.

Collaboration and inventory reduction relationship. A recent survey of 2,000 U.S. manufacturers not only identifies the impact of collaboration on the supply chain but also reviews the practices that are most effective in reducing inventory levels. *High Performance Value Chains* (Cap Gemini Ernst & Young, www.capgemini.com, in collaboration with *Industry Week*) finds that “innovation, sharing specific types of information with customers and suppliers, and improved inventory strategies help to create value chain collaboration.”

“As more companies pursue internal models of cross-functional teaming, the types of information being shared between trading partners and the strategies being implemented are the significant differentiators,” the co-authors (Al Youngberg, vice president of global supply chain practice, al.youngberg@us.cgeyc.com, and Kevin O’Laughlin, vice president of global supply chain practice, kevin.o’laughlin@us.cgeyc.com) report. Not surprisingly, the information most shared with suppliers is purchase orders, followed by inventory and production information. However, sharing data with customers takes on a “dramatically different perspective,” they find. The data that are shared the most include new product development information, followed by production, inventory, and sales order information.

Value chain collaboration involves gaining trust of partners and sharing reliable data. That is a major conclusion of the survey. “The findings strongly show that companies with top-performing value chains share a wider range of information with their customers and suppliers than do those with poor-performing value chains,” Youngberg and O’Laughlin report.

The value chain survey verifies that collaboration and information sharing deliver a wealth of benefits, such as timelier delivery of goods, reduced inventory costs, and enhanced product quality using the knowledge of all

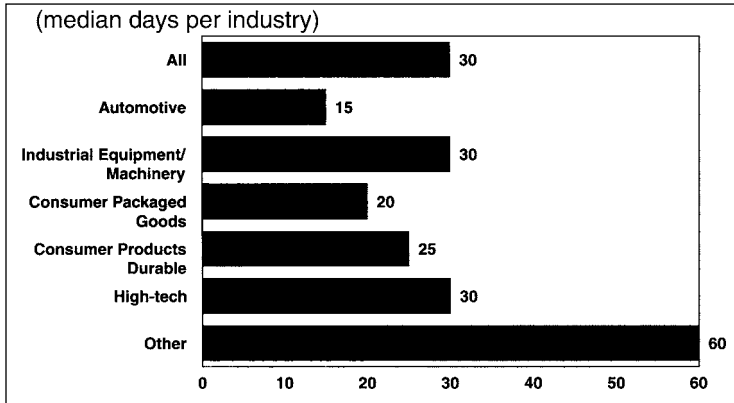


Figure III-1.4 On-Hand Raw Material Inventory

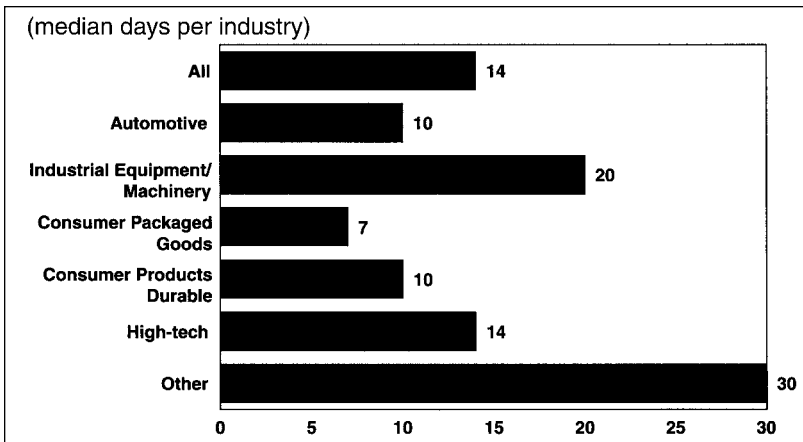


Figure III-1.5 On-Hand Work-in-Process Inventory

partners. For example, 51% of respondents in excellent or very good chains report the tangible benefit of inventory reduction. Only 18% in poor chains do. Overall, 35% of respondents say they have reduced inventory through collaboration (see Figures III-1.4, III-1.5, and III-1.6).

Collaborative inventory strategies reduce value chain inventory levels. “Collaborative inventory strategies are effective in reducing inventory levels when information replaces inventory,” maintain Youngberg and O’Laughlin. Information becomes available by sharing between suppliers and customers or because collaborative strategies allow decisions requiring requirements to be

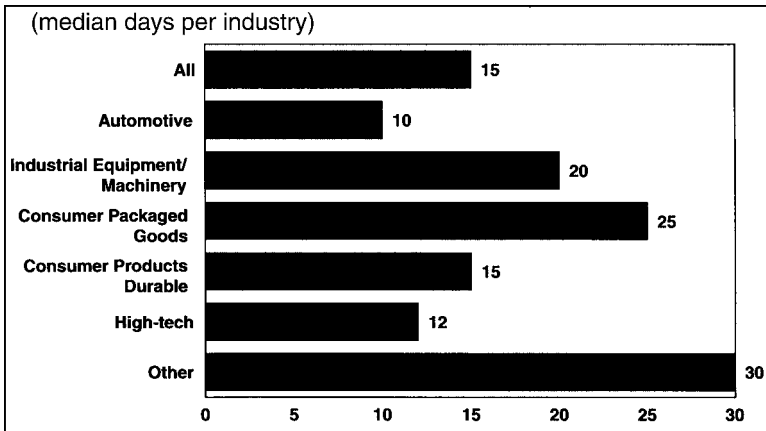


Figure III-1.6 On-Hand Finished Goods Inventory

delayed until information regarding real demand becomes available, they explain. According to the survey, the most commonly used inventory management practices are just-in-time (JIT) delivery, vendor managed inventory (VMI), and real-time inventory tracking.

“Some collaborative inventory strategies, such as VMI, may not take inventory out of the value chain, but may merely shift the ownership of the product, thus increasing inventory levels for one party and decreasing them for another,” they caution. They also note other collaborative inventory reduction strategies, although at the present time they are “less widely embraced.” They include

- *Collaborative planning, forecasting, and replenishment (CPFR)*. One fourth of the respondents say they practice CPFR, in which both supplier and customer share information on demand and product availability so that each can plan more effectively.

- *Cross docking*. Product is moved directly from the receiving dock to the shipping dock without placing the product in storage. Cross docking requires real-time communication and information from suppliers, as the receiving function must know what is on a shipment before it arrives.

- *Merge-in-transit*. Order components from suppliers are brought together at a merge hub, consolidated, and then shipped to customers. Because final consolidation takes place immediately before shipment to the customer based on known customer requirements, there is no need to maintain inventory of consolidated products.

Inventory reductions are most noticeable in the top quartile of the survey responses. A small number of companies in each industry are very effectively implementing collaborative inventory strategies. In each case, the authors note, these represent the industry's top performers, which are "enjoying a significant competitive advantage due to the adaptation of these strategies." Following are examples:

- *Automotive/industrial products.* In this sector, collaborative inventory strategies such as cross docking with suppliers result in a significant reduction in inventory levels. The survey shows that inventory turns for the top quartile exceed 40 turns for those using cross docking versus 25 turns for the entire automotive response (see Figure III-1.7). Similarly, inventory turns for the top quartile of the industrial products industry exceed 13 for those using cross docking, compared with 10 for the entire industry response.

- *High technology.* The companies with high-performing chains are two to four times more likely to share multiple types of information. Less widely practiced than other inventory management strategies, cross docking with suppliers does result in inventory reductions among the high-tech companies. Those companies practicing merge-in-transit with suppliers also realized significant inventory reductions. The top quartile for the industry as a whole reported in-

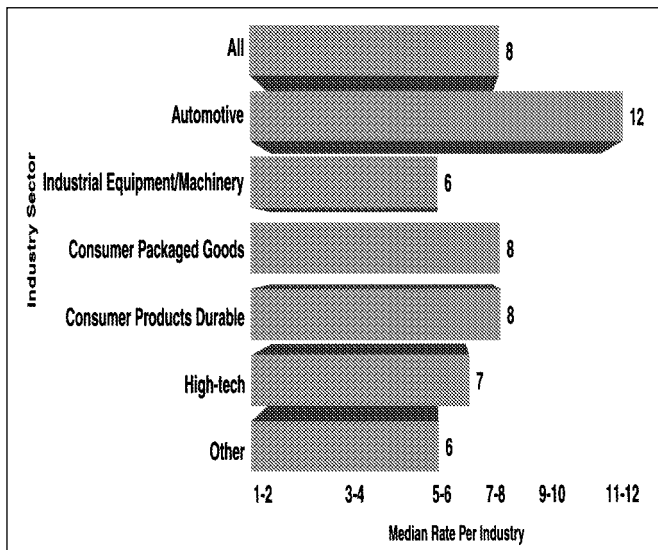


Figure III-1.7 Annual Inventory Turn Rate Can Be Significantly Improved through Better Collaboration

Source: High Performance Value Chains.

ventory turns of 12 or greater. The top quartile of those companies using merge-in-transit report inventory turns of 32 or greater. That represents almost a threefold reduction in inventory levels using this collaborative strategy.

- *Retail/consumer goods.* Information sharing is a major component of the strategic imperative for companies in this sector. Purchase orders, product information, inventory levels, and sales forecasts are the top information items shared. Within consumer goods manufacturing, several collaborative inventory techniques are used, including JIT deliveries, cross docking, resident suppliers, VMI, consignment, synchronized demand/supply planning, and CPFR. The study shows that some of these strategies result in real inventory savings across the supply chain, while other strategies merely decrease inventory at one point and increase it at another.

TEN FACTORS DETERMINE WHETHER YOU ARE READY FOR SUPPLY CHAIN SYNTHESIS

While inventory managers work diligently to apply supply chain management solutions, others are pushing the concept to new dimensions. One of the latest is the legendary Jim Tompkins, president and founder of Tompkins Associates, Inc. (Raleigh, N.C.; www.tompkinsinc.com). He's now talking about supply chain synthesis, which "picks up where supply chain management leaves off."

Introducing supply chain synthesis. Tompkins declares, "Supply chain management as a link optimization methodology does not work. We don't need a methodology; we need a process of continuous improvement. That's supply chain synthesis," he explained in his keynote address at a recent Distribution/Computer Seminar (sponsored by C. S. Report Inc.; Uwchland, Pa.; www.logistar.com).

In defining supply chain synthesis, he identifies the 10 commandments of e-SCS as

- *Nimbleness.* As in responsiveness, "You don't waste three days on a 12-week WMS implementation, you don't waste weekends, and you don't let the 8 to 5 clock get in the way," he admonishes. "You use technology to work 24/7 to get the job done." Tompkins declares, "We really have to be nimble in everything we do to make sure we can be responsive to the needs of that marketplace. We have to understand that the business will change and, therefore, the e-supply chain synthesis must change with it."

- *Speed.* “If you don’t ride fast, you will die,” he emphasizes. “The bumpier the trail, the steeper the slope, the faster you must go.” Therefore, he advises that you “get a whole new thought process on speed. We need to understand the issue of speed is different than it once was.”

- *Continuous improvement.* “Today’s great solution is tomorrow’s pretty good solution,” Tompkins describes. “We have to adjust constantly.”

- *Breadth.* “There is no business as usual,” he states. “Everything you do is different.”

- *Holism.* “First you need to understand within your own link and then understand the chain,” he offers. “You don’t create a chain. What you do is create two links that work together and then add another link, and another. That’s how you evolve to eSCS.”

- *Customer satisfaction.* “People tend to use the words *customer service* and *customer satisfaction* as if they mean something similar,” he suggests. Customer service is about what you do for the customer, while customer satisfaction is about what the customer gets from you, Tompkins explains.

- *Best practices.* “We have to understand that best practices are not something that’s fixed, but something that’s continuously evolving” he offers. “Your job is not to try to benchmark against someone else who may be obsolete. Your objective is to create the new best practice and carry it to the next level.”

- *Global perspective.* Tompkins declares, “There is no longer any regional strategy in business. In fact, where was the location of the Web site you were on last evening—who cares?”

- *Quality communication.* “The whole trading exchange concept and technology is about communication. But if all you have is communications, you really don’t have an integrated supply chain,” he charges.

- *A focus on the bottom line.* “We need to better understand where all of this impacts the bottom line, and to continuously focus attention on it,” Tompkins declares. Ask the question of every integrated supply chain you’re working with: what is the return on investment (ROI), return on assets (ROA), and profitability.

The supply chain synthesis benchmark. Tompkins has developed a diagnostic tool to assist in benchmarking your organization and to identify your status in 10 key areas where your organization must address “integration and turbulence” in the pursuit of supply chain synthesis (see sidebar). A complete

Conduct a Benchmark Assessment

The Tompkins report outlines the 10 factors upon which to benchmark an organization's status on logistics and supply chain synthesis. Answer each of these questions with the following score:

0 = We have not done this.

1 = We have done this in part.

2 = We have done this fully.

1. *Enabling Technologies*

- Has EDI been effective in terms of the connectivity and the flow of information throughout the logistics network?
- Has a supply chain synthesis IT strategy been developed and communicated that addresses both tactical and strategic requirements?
- Have systems procedures and processes that support fully visible material tracking and monitoring throughout the pipeline been developed and implemented?
- Has an automatic data collection standard been created and implemented throughout the pipeline?
- Has a technology assessment of the Internet been done and the implications on the pipeline addressed?

2. *Supply*

- Has the philosophy of continuous replenishment based on the needs of the downstream customers been fully pursued?
- Has the pipeline been configured to handle the required levels of product and package customization to allow for responsive fulfillment of customer desires?
- Have we segmented our customers to allow us to focus our attention properly on the highest priorities, and is there a process in place to understand the customer expectations in the different segments?
- Has the reverse distribution pipeline been rationalized and designed to handle all reverse direction product flows?
- Have the standard package sizes been designed so that the shipping quantities through the pipeline may be handled in an efficient and effective modular fashion?

3. *Chain*

- Are we actively working both up and down the pipeline for a continuous flow of materials and information and not just looking at a few links of a supply chain?

(continued)

- Do we truly view the pipeline as a continuous flow of interrelated elements where all elements impact all others?
- Are there measures in place to track inventory turns throughout the pipeline, and are efforts ongoing to improve total pipeline inventory turns?
- Has the pipeline been synchronized and aligned to allow for a seamless flow of goods and information?
- Has the market seasonality been documented, defined, and understood, and has the pipeline been configured to handle this seasonality efficiently and effectively?

4. Synthesis

- Have we implemented an effective planning process throughout the pipeline that fully addresses the global supply chain synthesis requirements?
- Do we actively seek out information on the changes in our marketplace and work toward harnessing the energy of these changes to our competitive advantage?
- Do we focus attention on, encourage, and reward risk taking, innovation, and creativity?
- Is there an effective set of supply chain synthesis performance measures in place that is widely communicated throughout the pipeline?
- Have we enhanced, and do we continue to enhance, our adaptability throughout the pipeline and focus on achieving greater speed, responsiveness, flexibility, and modularity?

5. Warehousing

- Have all appropriate cross-docking opportunities been considered, evaluated, and implemented?
- Have modern, real-time warehouse management systems been installed in all warehouse operations to achieve inventory accuracy, operating efficiency, and order fulfillment effectiveness?
- Have efficient and effective order picking, storage, and material handling systems been installed to address the continuously changing requirements?
- Has the warehousing process been configured to allow for the proper level of product and package customization to meet customer expectations?
- Have the warehouse management system, the warehouse facilities, the warehouse procedures, and the warehouse staff been integrated with all other pipeline operations to ensure total supply chain synthesis efficiency?

6. Logistics

- Has our distribution network been analyzed, rationalized, and synthesized over the last five years?

- Have we considered, evaluated, and determined the proper role of third-party logistics over the last five years?
- Have transportation costs been evaluated from a total pipeline perspective?
- Have the inventory levels throughout the pipeline been rationalized and synthesized from a total supply chain synthesis perspective?
- Have all the just-in-time, vendor managed inventories, direct store deliveries, and quick response programs been evaluated and the good portions maintained while the ineffective portions were eliminated?

7. Manufacturing

- Are the internal material handling systems consistent with incoming and outgoing material handling systems to maximize material handling efficiency throughout the pipeline?
- Have manufacturing constraints been identified and setup times and lot sizes rationalized?
- Have the manufacturing planning and execution systems been designed to support the continuous flow of incoming materials and the manufacturing operations?
- Have the production processes been configured to allow for the proper level of product customization to meet customer expectations?
- Have systems and procedures been put in place to allow the expedited shipment of finished goods straight from the end of the production process?

8. Organizational Excellence

- Is there a high level of trust throughout the pipeline?
- Is the term “partnership” used in a positive way to indicate true win-win relationships, and do partners share in improvement savings?
- Have supply chain synthesis opportunities for improvement been identified, prioritized, and teams chartered to design, recommend, and implement continuous improvements?
- Are we making the proper investments in our supply chain synthesis intellectual assets and growing supply chain synthesis competency?
- Is there clear process accountability throughout the pipeline?

9. Maintenance

- Has the reliability of manufacturing processes been upgraded to support the continuous, responsive flow of products?
- Has the proper preventative and predictive maintenance system been installed to maximize manufacturing effectiveness?

(continued)

- Has the work-order scheduling system been designed to require maintenance prioritization based on production schedule adherence?
- Has the foundation of a high-quality maintenance storeroom, an effective computerized maintenance management system, and a responsive operator-based maintenance process been put in place to support continuous flow operations?
- Has a Maintenance Performance Measurement System been installed that supports the requirements of the pipeline?

10. Quality

- Are there well-documented and followed procedures and processes for the flow through the pipeline?
- Does a clear, well-understood process for corrective actions exist throughout the pipeline?
- Are there procedures and processes in place to measure and ensure the quality of information throughout the pipeline?
- Have we established customer satisfaction requirements in the pipeline, and do we routinely measure and report on customer satisfaction?
- Have consistent quality standards been established from a broad pipeline partnership perspective, and are these standards monitored throughout the pipeline with the pursuit of these standards resulting in repeatable, consistent results?

Total Score:

100 indicates that an organization has fully adopted and implemented supply chain synthesis (i.e., it understands how to address the rate of change in the marketplace).

50 indicates that an organization has fully adopted and implemented supply chain management (i.e., it knows what supply chain integration is but does not understand how to apply that to the rate of change in the marketplace).

0 indicates that an organization has fully adopted and implemented traditional logistics (i.e., the focus is primarily on the internal coordination of the materials management function).

OR

0–20 represents an organization that is logistically isolated.

40–60 represents an organization that is logistically interfaced.

80–100 represents an organization that is logistically integrated.

Source: Achieving Logistics Excellence through Supply Chain Synthesis.

discussion is contained in the monograph *Achieving Logistics Excellence through Supply Chain Synthesis*, which is available from Tompkins Associates (800-789-1257).

TODAY'S SUPPLY CHAIN FOCUS DEMANDS LESS TOTAL SYSTEM INVENTORY

The twenty-first century supply chain calls for lower inventory levels and reduced working capital. Accurate lead times and forecasts, physical staging to find shortages, annual physical inventories, and multiple BOMs are obsolete, states Dave Garwood, president of R. D. Garwood, Inc. (Marietta, Ga.; www.rdgarwood.com). They are replaced with supplier-managed inventories, demand planning to reduce variation, simulations to anticipate and avoid shortages, and quickly configured BOMs for custom products (see sidebar).

Garwood's remarks set the stage at Congress for Progress XXV (sponsored by the Mid-Atlantic chapters of APICS), which focused on inventory management in the supply chain. Experts shared real-life ideas on how to maximize inventory reduction opportunities in the supply chain. Among the thought-provoking actions were the following:

Collaborating on identifying system constraints. William T. Walker, CFPIM, CIRM, power products supply chain manager at Agilent Technologies (Rockaway, N.J.), suggests, "Supply chain inventory should be positioned before the system constraint [constraint buffer] and at the customer end of the chain [shipping buffer]." The level of inventory in these two buffers can be managed to a days-of-supply target. The trading partners who do not own either the constraint buffer or the shipping buffer should then strive to drive all other inventory out of the system.

You can best manage day-to-day operations by monitoring two global performance measures, states Walker. Supply chain throughput equals the net amount of product (shipments minus returns) transferred to the customer at the very end of the supply chain. It should be measured daily by SKU in units.

The daily throughput by SKU at the end of the chain can then be compared with the daily throughput by equivalent SKU and offset by one day to verify synchronization among each of the trading partners.

The second measure is total supply chain inventory, which is the sum of equivalent SKUs in the shipping buffer plus the constraint buffer plus each

Supply Chain is Now a “Demand and Supply” Chain

Some 82% of senior executives in *Fortune* 500 companies with responsibility for supply chain management believe that Internet technology will have a major impact, or totally transform, their supply chain performance within the next three years. That’s one of the revealing conclusions from a new research study, *Moving the Supply Chain into the Digital Age: Integrating Demand and Supply* (a joint project of the Economist Intelligence Unit and Meritus Consulting; www.eiu.com/latest/meritus.asp).

Another is that although high-quality performance throughout the supply chain is critical, many companies are ill prepared to integrate digital technology or reduce their cycle times. The research team observes, “Companies urgently need to achieve major improvements in the current business processes that support order fulfillment, operations, and incoming and outgoing logistics.”

If companies are going to develop the high levels of supply chain performance necessary to succeed in the digital age, senior managers must clearly understand their customers’ expectations, their own company’s performance, and their suppliers’ performance. “All companies in the supply chain should be involved in forecasting demand and planning supply,” the report states.

“Senior executives must ensure that each ‘link’ or node clearly understands and complies with the end-customers’ demand and delivery requirements. Because no forecast is perfect, accurate, near real-time information about the plan should be shared throughout the extended enterprise, including employees and business partners, to rapidly facilitate any necessary remedial actions.”

Supply and demand planning is the most important business process needed to integrate with the supply chain. Within this category, well over two-thirds of the senior executive respondents believe that supplier/partner relationships, procurement and sourcing, inventory management, delivery management, and cost reduction strategies are the most critical integration issues.

“Internet technology is the key to achieving this integration,” the researchers note. “Organizations must go beyond simply building Web sites and aim to create innovative solutions throughout the extended enterprise, from fulfillment and procurement to knowledge management and training.”

Rapid and effective communications speed inventory data. The increased outsourcing of almost all business functions (with the exception of materials management, the survey notes) and supply chain management in its entirety increases the need for fast and flawless communication. Respondents expect that the supply chain will increasingly communicate electronically over the next three years.

Most significantly, typical supply chain information—such as inventory data, requests for quotations, fund transfer, planning data, delivery tracking, and sales forecasting—is expected to see the greatest increase in digital communications (see Figure III-1.8).

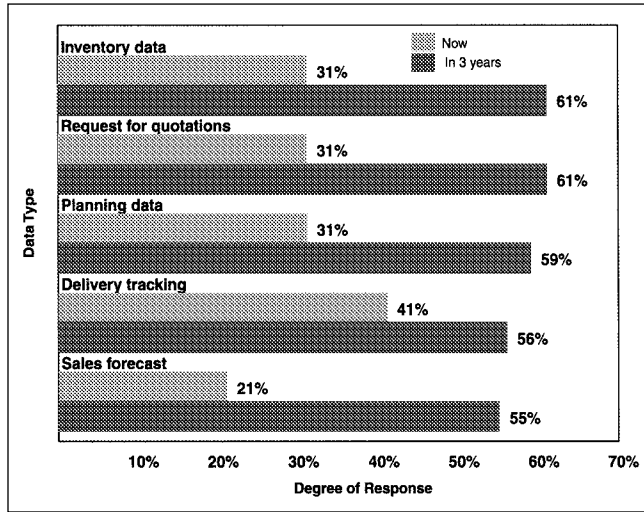


Figure III-1.8 Inventory Data Tops List of Drivers for Future Supply Chain Electronic Communication

Source: *Moving the Supply Chain into the Digital Age: Integrating Demand and Supply.*

of the in-transit pipeline inventories plus any other undesirable inventory at each trading partner. It should be measured daily and in units.

Three tools for successful inventory reduction in the supply chain. Mark K. Williams, CFPIM, consulting manager at the North Highland Company (Atlanta, Ga.; mwilliams@north-highland.com) said that it is easy to be a participant in a world-class supply chain, but another thing to actually pull it off. “To do so, one needs to change the way one does business and employ the tools that are critical to supply chain success.” He lists three:

1. *Schedule sharing.* “By sharing one’s schedule with the supplier, the opportunity to work with real demand is provided, not a forecast,” he relates. This also allows the supplier to reduce the amount of finished goods safety stock on hand, thereby reducing costs.

2. *Consignment.* “If one developed a comprehensive consignment agreement, which included customer responsibility for insurance, obsolescence, and shrinkage, one could reduce annual inventory carrying cost by 40% to 50%,” he claims.

3. *Vendor managed inventory.* Here, suppliers actually take on the responsibility of managing their inventory throughout their customers’ supply chain.

The key advantage of VMI, he notes, is replacing the forecast with hard data. “By knowing exactly how much inventory the customer is carrying, a supplier’s own inventory requirements are reduced since the need for excess stock to buffer against uncertainty is reduced or eliminated,” Williams explains.

Assessing supply chain capabilities. Karen L. Alber, CFPIM, director of business solutions at Quaker Oats Company (Chicago), recommends conducting a performance analysis against current and future customer requirements. Areas to be assessed include inventory levels, cycle times, delivery times, and perfect order completion.

In addition, Alber assures that “successful supply chains must link customers and suppliers through collaborative planning and forecasting.” Collaborative planning allows companies to improve efficiencies by comanaging business processes, in which partners share information on forecasts, product movement, inventory, and demand.

All of this, meanwhile, increases the focus and commitment to integrated systems, such as ERP and advanced planning and scheduling (APS), both of which improve information availability across the organization, she explains.

Prepping for entry into the supply chain. Jack Symon, CFPIM, CIRM, CPM, senior manager of e-solutions at Whittman-Hart (Florham Park, N.J.; jack.symon@whittman-hart.com), had an urgent message for the audience. “Even if you choose not to actively join the supply chain management movement yourself, most likely many of your suppliers or customers will choose to do so,” he explains. “As part of their supply chain, you will be assimilated.”

To join the supply chain movement, Symon suggests the following:

- Reevaluate all internal/external processes and relationships and determine how your business infrastructure will be affected and how your culture will be altered by entry into the supply chain movement.
- Evaluate the operation and effectiveness of your ERP/MRP system and supporting processes. Does it support operating and information needs of the newly shared vision? Can it be integrated to support the needs of customers and suppliers? What is the level of inventory accuracy?
- Brainstorm with customers and suppliers to develop an execution plan for evolving to a supply chain environment. “Establish an achievable pace,” he urges. “Start simple and then progress—team and learn from stronger channel partners.”

STRATEGY NOW SHIFTS TO MANAGING INVENTORY AS A SUPPLY CHAIN ASSET

An interesting trend is emerging in inventory management: The mathematics of inventory management are changing from the traditional counting of inventory as a corporate asset to managing inventory as a supply chain asset.

Total inventory investment is coming down. The recent 21st annual inventory study by Pittiglio Rabin Todd & McGrath (PRTM) verifies this trend (see sidebar). “The new ‘hot potato’ math of inventory management says that companies no longer have to have physical possession of their inventory to achieve optimum balance that will maximize profitability,” maintains Todd Bargman, principal, PRTM (Waltham, Mass.; tbargman@prtm.com).

The result is not only a consolidation of supply-chain assets that are reducing the total inventory investment in the supply chain, but also a

United States Leads World in Inventory Performance

For the past five years, U.S. companies have led the way in improving inventory performance, according to the PRTM data. For instance, inventory turns are up over 12%, to an overall average of 5.4 turns, and inventory days of supply are down 16% to just under 63 days (see Figure III-1.11). “This improvement trend has been driven by the need to support falling margins (down over 7%) as overall growth has dwindled from a high of nearly 15% per year to just over 6%,” observes Todd Bargman. Strong price pressures have put most companies on the offensive to lower costs through improved inventory management.

In Japan, inventory metrics hold constant. Many inventory management initiatives were placed on the back burner due to the Asian crises and overall economic conditions. Inventory metrics have held steady despite the significant downturn that has caused negative growth for the past three years. The only exception is the computer segment, which has shown strong inventory performance improvements in nearly all metrics.

In Europe, focus remains on operational efficiency. Leading firms in each sector have centralized distribution and reduced the number of inventory locations across Europe. Their focus is now on integration with suppliers and key customers. Overall, cash-to-cash cycle time in Europe has slowly decreased for five straight years (see Figure III-1.12), and inventory as a percentage of revenue has decreased four points to 15%, from a high of 18.7% in 1995.

dramatic shift of inventory upstream in the supply chain. “Leading companies have significantly lowered their ‘four-wall’ inventory levels by partnering with suppliers and have turned inventory levels from a cost to be controlled to an operating philosophy that is a competitive advantage,” he explains in PRTM’s *Insight*.

Why moving inventory up the supply chain is working. “Advanced information management tools and techniques are enabling the movement of inventory upstream in the supply chain,” he reports. Another factor is the redesign of business processes to the concept of an extended or integrated supply chain.

High-performing companies that have adopted advanced tools are requiring more sophisticated inventory management practices from their suppliers, the PRTM study reports. Supplier/vendor-managed inventory, direct/drop ship, innovative replenishment techniques (breadman, milk run), consignment inventory, supplier-managed hubs, and third-party logistics services are the approaches that are here to stay, Bargman concludes.

Rate of adoption not the same for all. The recent inventory study also shows that the rate of change varies across the technology industry segments. “Levels of inventory performance previously seen as unattainable have quickly been reached and surpassed by leading computer companies,” he points out.

Other segments, such as chemicals and pharmaceuticals (see Figures III-1.9 and III-1.10), are slow, so far, to adopt new inventory practices but are already starting to see the impact of changes downstream in their supply chain.

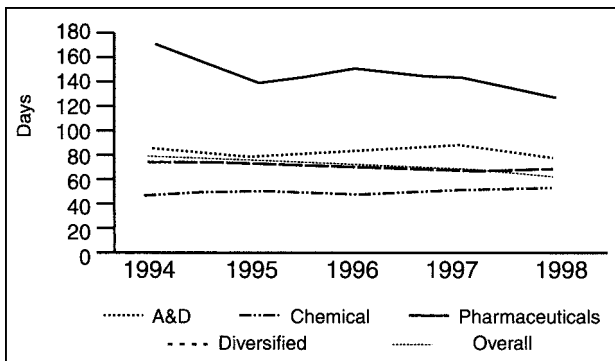


Figure III-1.9 U.S. Inventory Days of Supply Trending Down

Source: PRTM Inventory Study.

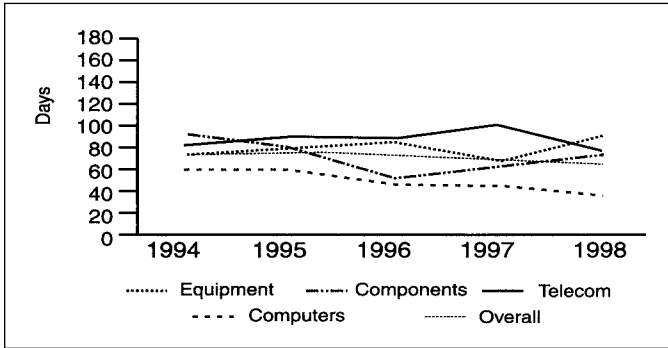


Figure III-1.10 U.S. Inventory Days of Supply Trending Down

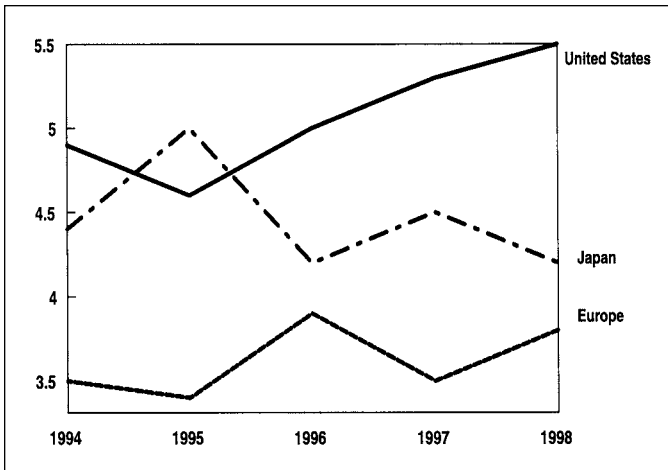


Figure III-1.11 Inventory Turns by Geographic Region Finds U.S. Industry Sustaining Lead Worldwide

Source: PRTM Inventory Study.

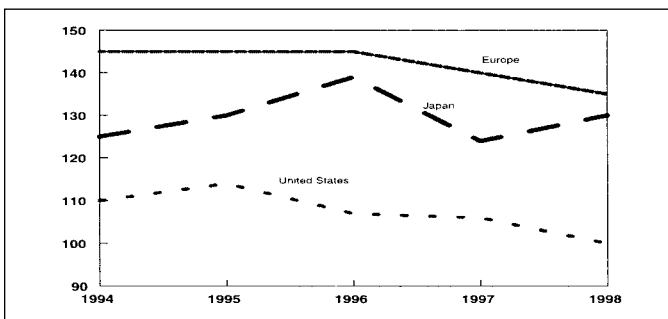


Figure III-1.12 Cash-to-Cash Cycle Time by Region

“It is now clearly a vital job requirement of supply chain managers to have an acute understanding of their company’s and their industry’s state of evolution in inventory management relative to their competitors and supply chain partners,” Bargman prods.

The latest look at how various technology segments are doing. PRTM’s latest inventory study includes over 350 companies across eight technology segments. This overview includes

- *Computers.* At the leading edge of the trend, this sector has been focusing on supply chain management practices in response to heavy competition and price pressure. Over the past four years, computer companies worldwide have cut inventory days of supply by 20% to 40%, while inventory as a percentage of revenue has “fallen to rock-bottom levels” (just over 1% in Europe, and 6% to 8% in the United States and Japan). This improvement in the computer sector has come at the expense of components manufacturers. According to Bargman, “despite aggressive supply chain management improvement efforts,” they have only been able to achieve modest gains in inventory days of supply (5% to 8%) and no change in inventory as a percentage of revenue.

- *Telecommunications/Equipment/Diversified.* These electronics-related segments are beginning to follow suit. The telecom industry is starting to reap the benefits of outsourcing, component storage environments, and moving inventory upstream. Inventory days of supply hit five-year lows, at 73 days in the United States and 93 days in Europe. Correspondingly, inventory turns in the telecom segment rose solidly above four in the United States and Japan. They are also at a five-year high in Europe, at just below four. Similar to the components segment, the equipment and diversified segments have seen mixed results, according to Bargman. “They are caught in that tight spot between customers who push back on accepting equipment until the last minute and trying to move their own material inventories back to their suppliers.

Other high-tech industries just beginning to make the break. Bargman details the following examples:

- *Aerospace and defense (A&D).* This industry has already started to focus on inventory management practices. For example, some companies are making supply chain strategy a key element in the bid process for major con-

tracts. With the decline in spending, A&D gross margins have held steady while key inventory metrics have shown impressive gains.

For example, inventory days of supply in the United States are down over 10% to 77 days. They are down a dramatic 20% in Europe, to 103 days. In addition, inventory turns are up to five-year highs, reaching over 4.8 in the United States, and cash-to-cash cycles times are trending down across all three geographic regions.

- *Pharmaceuticals.* Pharmaceutical firms' inventory DOS are at 1.5 to 2 times those of the average for other industries across three regions. With gross margins of 60% to 70% (twice those of the study average), the operations emphasis is on establishing capacity to meet demand. However, companies are beginning to turn to contract manufacturing and to simplify their manufacturing supply chains. Bargman notes, "Given the magnitude of the opportunity, where inventory days of supply are over 120 days, a significant change in inventory practices will certainly provide a competitive advantage to early adopters."

- *Chemicals.* Traditionally, the chemical industry has enjoyed relatively low supply chain complexity. However, as many firms drive to become specialty chemical companies, their perspective on inventory management is also changing. Specialty chemical companies mean more complex supply chains and less opportunity for cost reduction in technically difficult production processes. To control costs, then, they have to focus on inventory management performance.

SEVEN REASONS LOGISTICS MANAGERS ARE TURNING TO ESCM SOLUTIONS

Internet-based, or electronic, supply chain management (eSCM) solutions can link many steps in the supply chain over a central hub cheaply and efficiently. The questions that remain, though, are how important each of the various linkages is and what that means for logistics managers. For example, how important is it to create tighter and more transparent cost controls? Or for sellers to check customs duties, shipping charges, and taxes? Or for buyers to view catalogs with real-time prices?

To get some answers to these questions, Zona Research, Inc., of Redwood Shores, California, recently asked managers to rank the importance of the benefits of virtual logistics to their organizations.

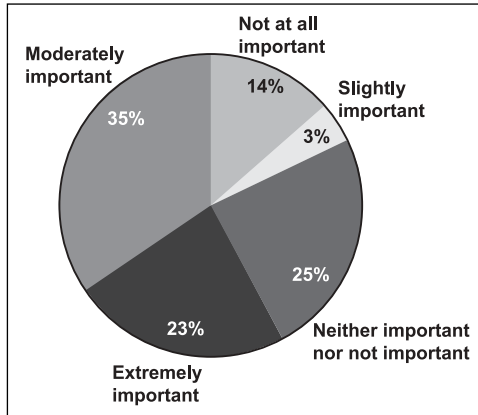


Figure III-1.13 Importance of Tighter and More Transparent Cost Controls

Source: Zona Research, Inc.

eSCM as Control Method

Overall, 58% of logistics managers felt that tighter and more transparent cost controls were important or extremely important as part of their eSCM solution; 25% were neutral; and 17% of users felt it would be of little or no importance (see Figure III-1.13). The survey results indicate that many companies expect eSCM solutions to provide cost control benefits to their business and that the market for eSCM solutions that are able to fulfill company expectations will continue to grow.

As a result of eSCM, companies will become more sensitive to fluctuations in prices and other costs and will be able to respond much more effectively. The eSCM will help them receive alerts when upstream suppliers raise prices and have the ability to shift to other suppliers quickly through online exchanges.

In addition, organizations were asked to rate the importance of reduced costs through better pricing and purchasing in their sSCM system. Nearly two-thirds of survey respondents rated these activities as somewhat or extremely important (see Figure III-1.14).

This shows that capturing better prices when buying supplies through eSCM systems is a top benefit because of the opportunities for comparative pricing that these solutions offer.

It also has to do with the fact that greater numbers of suppliers can be accessed in less time through such systems. Online suppliers can pass along volume or loyalty discounts through the dynamic pricing regimes that are frequently available on virtual supply chain systems.

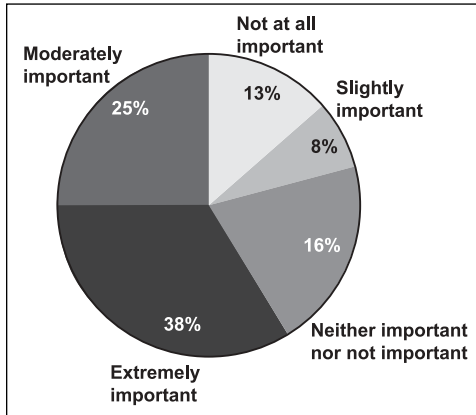


Figure III-1.14 Importance of Reduced Costs through Better Pricing and Purchasing

Source: Zona Research, Inc.

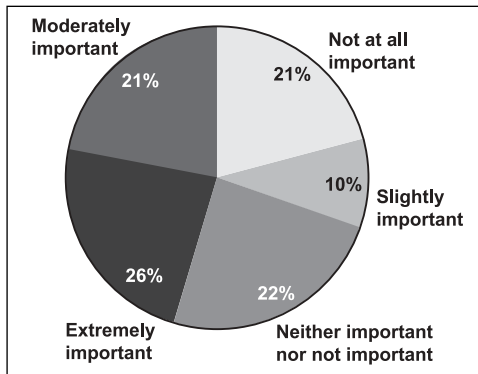


Figure III-1.15 Chance to Change Larger Economies of Scale

Source: Zona Research, Inc.

Countering Economies of Scale

Achieving economies of scale can increase inventory costs and even contradict JIT concepts. An eSCM offers several cost-saving features (such as dynamic pricing and requests for bids) and eliminates lengthy procurement procedures.

Zona asked managers to rate the importance of large economies of scale in an eSCM. Nearly 3 out of 10 said it was extremely important (see Figure III-1.15). The results indicate that companies with large raw material needs,

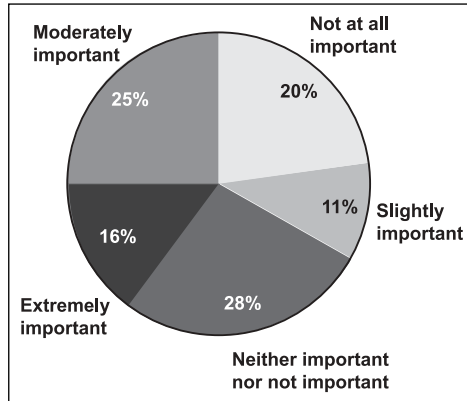


Figure III-1.16 Importance of Automatically Triggered Workflow Operations

Source: Zona Research, Inc.

such as heavy manufacturers, tend to benefit from economies of scale, whereas firms with minimal procurement needs do not benefit significantly.

Impact on Workflow

When asked to rate the importance of automatically triggered workflow operations in the eSCM, more than 4 in 10 respondents rate such activity as somewhat or extremely important (see Figure III-1.16). Less than one in five felt that such activity was not at all important, and more than one quarter were indifferent on the issue.

The research shows that only midsize firms, with 501 to 1,000 workers or very large enterprises with more than 2,500 employees rate automatic workflows as important. Job-wide, middle-level managers were among the groups to rate such workflows as important, indicating that they know how much an eSCM can make workflows more efficient.

In terms of annual sales, firms ranked such workflows about equally in terms of importance except for those with \$10 million to \$99.9 million or over \$1 billion in annual sales, which rated them important far more often than unimportant.

Reduces Warehouse Inventory

While there are many benefits to eSCM solutions and the cost control they offer, respondents do not believe that these solutions reduce the need to warehouse parts and finished goods (see Figure III-1.17). This is surprising

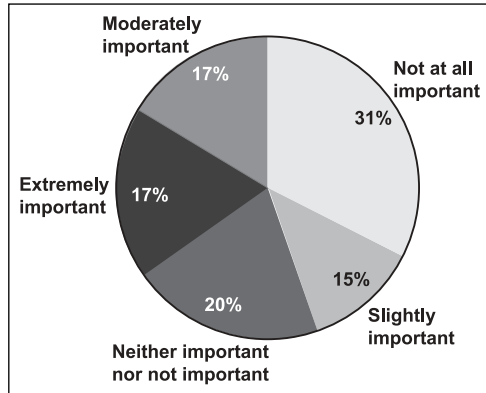


Figure III-1.17 Importance of Reduced Need to Warehouse Parts and Finished Goods

Source: Zona Research, Inc.

given that eSCM solutions can indeed help firms approach build-to-order production strategies that can lead to savings in warehousing costs.

With build-to-order systems made possible by eSCM, firms can be freed from having to warehouse, from having to guess about how much to sell, and from having to take a potential loss on goods that are not sold and then discounted later in secondary markets.

Reduced Order Fulfillment Cycles

Another potential benefit of eSCM is in reducing order fulfillment cycles, yet less than half of the managers believe it is either somewhat or extremely important when making a decision to purchase an electronic solution (see Figure III-1.18). This could be because the most noticeable speed increases are likely realized in the shift to EDI solutions. A higher response was generated for the increased benefits of customer service, which is a more crucial motivator for purchasing an eSCM.

Optimizes Cross-Border Pricing

When asked to rate the relative importance of using their eSCM system to help optimize their firm's cross-border pricing, half felt it was of little importance, and only one in five said it was very important (see Figure III-1.19).

This points to the notion that a sizable number of firms are not yet con-

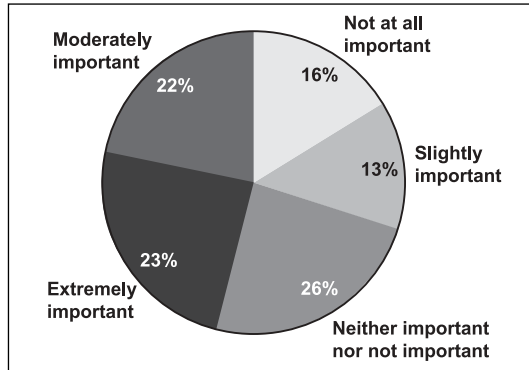


Figure III-1.18 Reduced Order Fulfillment Cycles

Source: Zona Research, Inc.

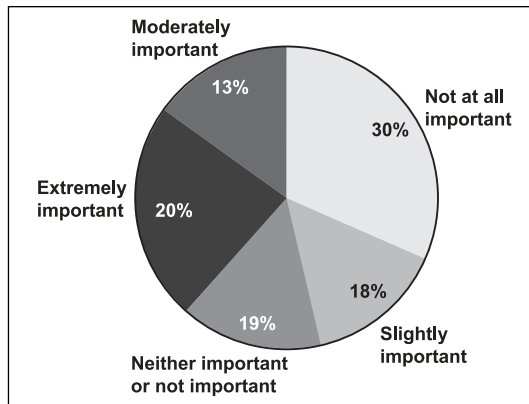


Figure III-1.19 Importance of Optimizing Cross-Border Advantages

Source: Zona Research, Inc.

cerned about pricing issues in various parts of the world either because they sell primarily to domestic markets or because pricing issues are not impacted by their supply chain management efforts. Even so, eSCM is a critical tool in facilitating cross-border pricing, concludes Zona Research.

Increased Customer Satisfaction

Logistics bottlenecks and botched deliveries can very quickly remove the shine from any organization's reputation. Therefore Zona asked logistics managers to rate the importance of increased customer satisfaction as a potential benefit from their eSCM system.

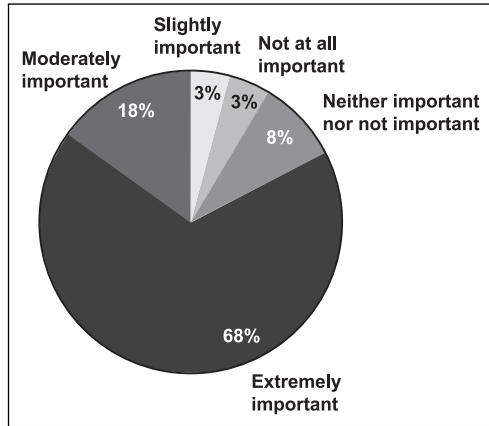


Figure III-1.20 Importance of Increased Customer Satisfaction

Source: Zona Research, Inc.

More than four out of five say that customer satisfaction is either important or extremely important, while fewer than 1 in 10 were neutral on the subject (see Figure III-1.20). In analyzing the responses, companies with more than 2,500 employees and those with fewer than 250 were among the groups that were neutral about this benefit.

NEW VICS GUIDELINES HELP LOGISTICS MANAGERS IMPLEMENT CPFR

Many initiatives, such as vendor-managed inventory, quick response, and efficient consumer response have contributed to improving supply chain performance. However, these initiatives have not fostered true integration among supply chain partners. That is where CPFR enters the mix. Collaborative planning, forecasting, and replenishment is being embraced by a myriad of retailers and manufacturers hoping to streamline their supply chains. How can you incorporate CPFR into your own logistics operations? By learning exactly what it is and how others are using it, and following the steps to implement similar procedures.

The Fundamentals of CPFR

Simply put, CPFR works to ensure that retailers and manufacturers reduce out-of-stock items and carry less stock while doing it. According to a 1996

Table III-1.9 CPFR Benefits

% SKUs	8.2
% of sales	6.5
Alternate purchases	3.4
Lost sales	3.1

Note: The chart does not take into account other intended purchases lost at time of the visit.

Source: Retailer Operating Data, Prism Partner Store Audits, Coca-Cola Retail Council Independent Study, 1996, via the Voluntary Interindustry Commerce Standards Association.

study by the Coca-Cola Retail Council, for every 100 customers going into a store to buy a specific product, 8 will not find the item because it is out of stock. In other words, retail product stockouts occur at an average rate of 8.2% (see Table III-1.9). CPFR is designed to eliminate this problem.

At the core of the CPFR program is the intention that customers always find what they want in stock, says Joseph Fabrizio, senior vice president and director of stores at Boscov's (610-370-3766). "CPFR is an agreement between trading partners to develop a market-specific plan based on sound category management principles," Fabrizio says. Although trading partners are typically considered only the manufacturers and retailers, the term now extends to all supply chain partners. "It now encompasses everyone who touches the merchandise," Fabrizio explains. This includes the transportation provider, warehouse, and supplier. "Everyone needs to be involved and accountable." According to the Voluntary Interindustry Commerce Standards (VICS) association (www.cpfr.org), for the CPFR model to work, the partners must agree to take ownership in the process and the plan.

Follow the Leaders

How are supply chain manufacturers working to make CPFR principals a reality? They are creating a plan that addresses what will be sold, how it will be merchandised and promoted, in what marketplace it will be sold, and in what time frame. According to VICS, the plan is executed via each partners' existing systems and is accessible via communication tools such as EDI. Therefore, CPFR does rely on the Internet and EDI, but it works to create further integration between supply chain partners.

Once the plan is established, the supply chain partners use CPFR prin-

ciples to create forecasts. These forecasts, according to VICS, can be automatically converted into shipping plans in an effort to avoid traditional—and often time-consuming—order processing systems.

“True CPFR in my opinion means forecasting for every SKU,” Fabrizio says. For example, Wal-Mart has joined with Procter & Gamble to do just that. According to Fabrizio, the partners are projecting down to the SKU level to ensure that they experience almost no out-of-stock items. In fact, Procter & Gamble executives actually work on-site with Wal-Mart to determine future product needs.

Boscov’s, a billion-dollar retailer located in the Northeast, realizes the benefits of CPFR and has adopted some of its principles. According to Fabrizio, the company is not large enough to implement CPFR fully into its operations. However, EDI and vendor agreements still play a major part in logistics processes at Boscov’s. In addition, the retailer has developed programs that ensure replenishment as well as profitability. “We work with vendors to ensure success,” Fabrizio says.

If the number of companies that have embraced CPFR is any indication of its success, CPFR has been well received and should continue to be the topic of much industry buzz. Like Wal-Mart and Procter & Gamble, other companies such as Kmart, Sara Lee Corporation, Lucent Technologies, and Kimberly Clark have adopted CPFR principles. However, says Fabrizio, the results of many of these CPFR practices are still being determined. It’s a fairly new model, he says. “There’s an awful lot yet that has to be determined.”

Tips for CPFR Success

The CPFR Web site (www.cpfr.org) is an excellent tool to use when learning about CPFR, Fabrizio says. He also recommends getting a copy of VICS’ CPFR guidelines. According to VICS, the guidelines are designed to serve as a road map for suppliers, distributors, and third-party logistics providers. The manual covers CPFR principles, technological support tools behind CPFR, and change management issues associated with CPFR implementation. The manual can be ordered via the CPFR Web site.

When implementing CPFR, it is important to have cooperation from your supply chain partners as well as your own internal employees. “It takes 100% commitment to make CPFR part of your processes,” Fabrizio says. “The buyers, executives, distribution centers, and stores all have to participate.” Of course, you also must have technological tools in place when implementing CPFR into your logistics processes. In addition to EDI and

Internet capabilities that link retailers and manufacturers together, you should have point-of-sale data, forecasting, and distribution center software on hand.

Although software and hardware are necessary for CPFR success, getting the technology in place is the easy part. “What isn’t easy is the company culture,” Fabrizio notes. Again, you have to have buy-in from all supply chain partners, keeping in mind all the while that CPFR is an entirely new way of doing things. “It’s sharing ideas with vendors,” Fabrizio adds. “Rather than saying, ‘you will do this,’ it’s saying ‘how will we do this?’”

Last but not least, you should consider networking with VICS members and maybe even become a member yourself. By benchmarking with some of the largest retailers in the country—such as Wal-Mart and Kmart—you can learn how to incorporate CPFR successfully into your own processes.

If you choose to embrace CPFR, look out. The benefits it may provide will floor you. For example, you will likely experience improved communication among supply chain partners and a more efficient supply chain. Your customers will find the products they want in stock, while you and your suppliers use forecasts to reduce your inventories. As a result, Fabrizio says, everyone involved—manufacturers, retailers, and customers—will experience lower prices. In addition, because you will have fewer out-of-stock items, you will likely experience increased sales.

SUPPLY CHAIN SOFTWARE EASES COLLABORATION WITH TRADING PARTNERS

Even though logistics managers are inundated with information about supply chain technology, not everyone knows how to take full advantage of the power these tools afford. As a result, more upfront detailed planning can literally put the power of the supply chain in your pocket. That is the message that Greg Girard, an analyst with AMR Research of Boston (617-574-5217), and Greg Schlegel, supply chain senior consultant with IBM in Flanders, New Jersey, relayed to attendees at a recent Council of Logistics Management annual meeting.

A Focus on Collaboration

Both Girard and Schlegel agree that one of the most important benefits that supply chain technology affords today’s logistics professional is the ability to collaborate with trading partners, and thus, obtain a truly optimal pipeline.

“Collaboration ensures that the best solutions for all are implemented,” says Girard. “It achieves this by making sure that every partner is exposed to the right information.”

Logisticians may find discomfort in sharing information, continues Girard. However, he says, there is no better way to make the most optimal decisions for your supply chain. “If your own house isn’t in order, there is no way you can achieve true collaboration,” says Schlegel. “You are in the business of building a supply chain community and you have to do it well.”

Becoming a Change Agent

While it still may be your CEO, CFO, CIO, or vice president of supply chain who makes the final call about what technology to purchase, it is up to you as a logistics manager to brief senior management about supply chain management, says Schlegel.

One way to do this is by creating a supply chain council within your firm. Gather senior management, representatives from your logistics department, and other people who will be impacted by the purchase of new technology and make sure that everyone understands the value that the technology can bring to the organization. “Logistics managers play a bigger role than ever before in fostering change within their firms,” says Schlegel.

He points out that if you do not have the capability to foster such communication on your own, look to consultants for outside help.

Pushing Back the Sales Cycle

Logistics managers also play a pivotal role in selling senior management on the idea of purchasing supply chain technology. “Logistics managers can help by pushing back the sales cycle to ensure that their business requirements are understood,” says Girard. “It is up to them to make sure the organization doesn’t get snowed over by the technology if it doesn’t fit the business.”

Bear in mind, too, that your input should and will have an impact on how your organization grows, says Schlegel. Your ultimate objectives should include reduced cycle times, reduced cost of capital, and increased revenue. Part of the sales cycle involves educating supply chain technology vendors as well. This is critical, because when it comes right down to it, “vendors don’t really understand what you do,” says Girard.

Schlegel says to make sure that the vendors you are considering can address three primary issues: flexibility, integration, and speed. “As far as

flexibility is concerned, you want a system that will offer you the information you need in various forms and in some type of graphical schematic,” says Schlegel.

On the subject of integration, make sure that the solution can be applied to handle everything from order entry to production planning. And make sure that it offers a bidirectional information flow.

Finally, speed. “This is the life of any good supply chain,” says Schlegel. “Logistics managers don’t have time to sit around and wait for information. They want it online and in real time.”

Five Elements for Your Tool Kit

As a logistics practitioner for over 20 years, Schlegel says that his approach to purchasing supply chain technology is addressed at a personal, rather than technical, level. These are the five elements he keeps in his supply chain tool kit to ensure that any purchase he makes is a successful one.

1. Stay current with emerging tools and technology. The best ways to do this, he says, are to earn industry certifications and stay educated.

2. Embrace new technology protocols. “The hardware and software on the market today only keeps getting more sophisticated,” he says. “It’s not going away, so learn how to use it.”

3. Pursue people, communication, and team-building skills. Schlegel says, “Logistics folks have grown up in a functional silo, but today they must be part of a team, either as a member or a driver. You can no longer be one-dimensional in a multitask environment.”

4. Enhance the project by making sure management understands what the business requirements are and the skills required to carry out a successful implementation.

5. Get involved. “As a logistics manager in today’s business culture, you can’t stand on the sidelines,” says Schlegel. “If you do, your needs will not be addressed.”

THE CHALLENGES AND PITFALLS OF CREATING A DIRECT-TO-CONSUMER LOGISTICS CHANNEL

Most firms will have to transform their traditional supply chains to set up CDL channels in the next three to five years just to remain competitive. Companies such as Amazon.com say you have no choice. While CDL will

soon be indispensable, only 10% of logistics players currently have the right skills to do it effectively. If you find yourself in this group, advice from leading practitioners is sure to help you create a CDL supply chain, either as a core or lateral channel.

CDL Poses Significant Challenges

In the grocery industry alone, CDL is expected to become an \$85 billion industry by 2008, estimates Accenture (formerly Andersen Consulting). Two leaders in this area are Peapod and Procter & Gamble. At a Logicon Conference, Todd Stark, associate director of logistics and supply chain development and global consumer direct for Procter & Gamble, explained that, typically, in a consumer direct process, the consumer enters her order via computer, fax, phone, or other order entry device. The consumer direct provider processes and fulfills the order from a retail store or dedicated distribution center. The product is then delivered to the consumer, either at home or work.

Thus, CDL poses some significant challenges that conventional supply chains do not:

- *Handling out of stocks and substitutes.* In a typical supply chain there are ways to handle the customer when product will be delayed or out of stock, but that is not the case in CDL. “These are consumers who are making dinner that night and won’t accept substitutes,” Stark says. “If we are not meeting or exceeding their expectations, it will hurt our business.”

The objective is to anticipate demand and receive daily deliveries from suppliers, says John A. Caltagirone, chief logistics and operations officer for Peapod. “The data we collect on purchases is excellent, so suppliers know what was shipped and what to automatically replenish.” However, he does admit that if a product is out of stock (e.g., a brand of ketchup), consumers will generally accept a substitute.

- *Delivering perishable items.* In the grocery business, up to 55% of the order is perishable, so temperature control is critical. Stark says that while there is nothing unique about multi- or single-temperature supply chain deliveries or making deliveries to a consumer’s home, the combination of the two is unique. “We have to pack and ship product in individualized, multi-temperature orders in a 12- to 18-foot vehicle. The logistical challenge is that the product has to be delivered as fresh as possible so that when it reaches the consumer, he is 100% confident in the quality.”

Another delivery challenge is meeting consumers’ time windows. At Peapod, for instance, customers expect to receive their goods within two

hours. Caltagirone explains that orders are picked, packed, and staged by routes to ensure that drivers meet those time windows.

- *Making the most efficient transportation decisions.* This is where simulation models can be helpful, Stark and Caltagirone agree. What-if scenarios can determine how many dock doors are needed to make delivery schedules more flexible and how many deliveries to make in a particular neighborhood.

- *Meeting customer expectations.* Consumers demand price and billing accuracy, value-added features such as coupons and promotions, very few mispicks, and efficient product assortment.

- *Improving logistics processes.* The experts agree that personnel must be able to pick backroom items three times faster than in traditional supply chain fulfillment processes and keep out-of-stocks under 3%. Stark says that these elements are challenging because there is currently no template for success, and logistics models vary by region.

Fulfillment Methods

According to Stark, there are three types of fulfillment methods for CDL (see Figure III-1.21):

Model	Positives	Negatives
Store Pick	<ul style="list-style-type: none"> ▼ Ease and speed of start-up/low cost of entry ▼ Broadest product selection ▼ Immediate, valuable retailer recognition in consumer's mind ▼ Potential to cover broad geography quickly 	<ul style="list-style-type: none"> ▼ High order pick inefficiency ▼ High order inaccuracy levels (SKU confusion) ▼ Store congestion ▼ Lack of integrated store/DC information systems ▼ High cost infrastructure
Dedicated Distribution Center	<ul style="list-style-type: none"> ▼ Greater control over entire supply chain (replenishment, pick/pack, delivery, information systems) ▼ Higher pick accuracy ▼ Ability to rationalize SKUs 	<ul style="list-style-type: none"> ▼ Higher start-up costs than other models ▼ Broader logistics mastery required
Pick-up Facility	<ul style="list-style-type: none"> ▼ No delivery expenses ▼ Lower labor expenses ▼ Can be relocated to suit changing needs 	<ul style="list-style-type: none"> ▼ Not a consumer-preferred model ▼ Risk of consumer no-shows ▼ Potential for high inventory/spoilage costs (multiple inventory locations)

Figure III-1.21 Operational Model Considerations

Source: Procter & Gamble.

- Store pick: fulfillment from an existing retail outlet
- Dedicated distribution center: fulfillment from a local distribution center
- Pick-up facility: fulfillment from a kiosk, mobile van, cross dock, or existing store

“The most reliable and cost-efficient is the dedicated DC,” says Stark. Consider that the store pick method is not designed for fast, efficient, and flexible order picking, but to be attractive for customers shopping in the stores. “Often, items will be out of stock up to 15% of the time in the store, so you wind up picking from out-of-stock shelves,” he says. And in the case of the pickup point, if customers are picking up groceries that have already been selected for them, then they are really not saving a trip to the market.

Role of Logistics Manager

Stark and Caltagirone agree that the role of the logistics manager in a CDL supply chain is critical but different from that in a conventional supply chain. To meet performance measures, the manager must make sure that staff is well trained to pick and pack. It is up to the logistics manager to make sure transportation routes are as efficient as possible.

“Logisticians are talented, but they have been focused on getting product into distribution centers and out to retail stores,” says Stark. “The focus in this business is getting the product to the consumer.”

One way to adjust the focus is by tightening relationships with suppliers. Caltagirone says this relationship is necessary not only from a business perspective, but from a systems perspective as well. “Our systems are tied together so that when a product goes off our shelf, they know what to replenish,” he says.

Cost of CDL

Stark and Caltagirone agree that while CDL reduces the cost of picking and packing, it increases transportation costs. Currently, delivery costs are from \$3.00 to \$5.00 per order, and they are expected to jump to between \$7.50 and \$9.00 by 2008, says Stark.

Procter & Gamble relies on its own fleet and 3PL transportation providers to make deliveries. Stark says that special vehicles had to be made to

handle ambient and refrigerated temperatures for the direct-home deliveries. “We want to be able to control that last mile that the product takes until it reaches the consumer,” he says.

“The costs of CDL are higher than other supply chain models because we are trying to bend over backwards for the consumer,” says Caltagirone.

LOGISTICS PROS OFFER SEVEN WAYS TO REDUCE SUPPLY CHAIN UNSALABLES

Senior management indifference, out-of-code product, inefficient handling practices, excessive seasonal product returns, and pallet overhang are some of the leading causes of unsalable items in the supply chain. But as all logistics managers know, the problems, while easy to identify, are often tricky to solve. To get some expert advice on the best ways to handle unsalables, we talked with four logistics leaders at a recent Logicon conference.

Seven Ways to Handle Unsalables

1. *Establish a point of contact.* The pros agree that putting someone in charge of unsalables is the only way to control the problem. Motts just hired its first dedicated source to handle unsalables about one year ago.

Prior to that, it was a sales function “because it was thought that the sales folks were the closest to the customer and unsalables were considered a customer problem,” explains Ernest Argenio, product recovery manager for Motts. “Then it was considered a packaging problem, then a finance problem. Eventually senior management saw how expensive a problem this was—costs doubled over two years—so they took action and hired me. It is a worthwhile investment to have someone full-time dedicated to unsalables. No one can really understand it otherwise, and you won’t be able to take a bite out of the escalating costs.”

Gerber Products has a one-man team that reports to the finance department. Michael Mills, national remarketing and product recovery manager at Gerber, looks for ways to reduce damage internally before the product is passed along to the customer. “I also work with the customer to identify key drivers of unsalables for our 3,000 SKUs,” he says.

Quaker Oats has also dedicated resources. It hired a Damage Prevention Analyst who works with the distribution centers to measure how product is

being handled. The company also established a whole team, which reports to the vice president of logistics, to focus on ways to avoid having product returned, controlling it internally and externally, explains James Hicks, manager of trade damage/unsalables at Quaker Oats.

2. *Set up unsalables policies.* Argenio drafted an unsalables policy in the second quarter, outlining how Motts products should be handled. “I just tell our customers that unsalables hurt us both and that we need to reduce the occurrence,” he says. “Our customers pretty much accepted the policy without a problem.”

Hicks says that Quaker Oats has set up standard operating procedures (SOPs) with its distribution centers so that they know what constitutes a shippable product, how to load the product, and how to ship the product. “We even educate our folks operating the forklifts so they know how to handle the product in storage,” he says.

Gerber’s standard operating procedures include returning goods back to its DCs if certain criteria are met. If the damage is a Gerber error, it pays the freight cost. If it is a customer error, they pay the freight cost.

Other Gerber SOPs include a markdown at the store level to generate sell through, utilize closeout stores to move certain items, capture dollars by brand and business unit for all unsalable expense, and establish a new item introduction budget for new items replacing discontinued items.

3. *Consider packaging alternatives.* Hicks says that Quaker Oats is converting to shipping product on pallets rather than slipsheets because of their strength. He says that Quaker Oats actually repackaged a brand of product last year, which reduced unsalables for that year. Hicks warns, however, that “it can take up to 15 months to see the impact of a packaging change.”

Gerber conducts Package Condition Audits, which require physically viewing the package to determine why it was returned and to determine which packages are driving unsalables.

4. *Evaluate customers’ equipment.* One of the ways that Quaker Oats controls the reduction of unsalables externally is by evaluating the type of equipment its customers use to pick up the product. “If we don’t like the equipment they use to pick up our product, we reject it,” says Hicks.

In addition, he says, Quaker Oats watches how the customer unloads the product to make sure that damaged goods do not process through to the store level.

5. *Invest in technology.* The Logicon panel told attendees that it relies on digital cameras located at their DCs to photograph how product is handled, how it is loaded, and what could be done differently to ensure that product is undamaged upon receipt.

“Each DC has a returnable budget,” says Hicks. “The cameras are helping to reduce inefficiencies and keep our DCs close to budget. Unsalables is a quick, unconventional way to reduce costs and see a drop on the bottom line.”

6. *Consider an internal reclamation center.* While many companies opt to send their damaged product to reclamation centers, Sprint PCS, a cellular phone distributor, has hired a third party to work on site at an in-house reclamation center.

“This was a great solution for us,” explains Eric Salisbury, corporate director of logistics for Sprint PCS. “The center turns product back into a sellable state in less than one week.” Telephone handsets that are defective are returned to the manufacturer.

7. *Use a scorecard.* Mills says that Gerber has set up benchmarks to see how it is doing with unsalables. The scorecard measures the percentage of orders complete, percentage of orders delivered complete, damaged product received at destination, quantity of backorders, and sales dollar back-ordered. Gerber now boasts a rate of 1.3% of sales compared to 2% two years earlier.

Since coming on board at Motts, Argenio has reduced unsalables to 1% of sales from 1.2% a year earlier. He says the industry average is 1.08%. “We knew we could be better than the industry average.”

TWO MANUFACTURERS SHARE TIPS FOR FORECASTING MULTI-SKU SELLING TRENDS

Incorporating promotional and seasonal activity into the forecasting process requires access to inventory information and a true sense of collaboration among trading partners. Two consumer goods giants, Nike and Warner-Lambert, have developed such forecasting systems and, as a result, have created logistics replenishment programs that are making their promotions and their supply chains a success.

Identifying Gaps in Promotion Management

Warner-Lambert distributes a variety of products, from seasonal items during cold and flu season to competitive consumer products such as mouth-wash and front-end impulse buys such as breath mints. “Our product nuances make it tough to forecast,” says Andrew Helveston, replenishment manager, corporate business teams, for Warner-Lambert. “We realized that we weren’t capturing promotions correctly. We either had too many orders or too few going to the retailer. As a result, the promotion was not lining up with the customer’s needs.”

In an effort to correct this, Helveston says, Warner-Lambert examined its three-step approach to promotion management to identify gaps.

1. *Planning.* This occurs from six months to one year prior to the event. At this time, the type, price, and time of the promotion are determined. One mistake the company made here was continually pumping inventory into the store, without considering the retailer’s amount to date.

2. *Execution.* This takes place six to eight weeks prior to the promotion. The vendor receives orders, and the customer receives product. Here, Warner-Lambert just assumed product was going to arrive at the site.

3. *Evaluation.* Usually occurring one to four weeks after the promotion, Warner-Lambert considers whether the event was profitable. Was the incremental gain in sales worth the cost of the promotion? It was up to sales to make these evaluations, but they were not actually held accountable for seeing the promotion through to the end.

“Basically, these gaps led to the customer being left with a promotion and handling it on their own,” Helveston told attendees at a recent Logicon conference. “It was like a ticking bomb and just waiting for it to go off.”

Planning Is a Collaborative Process

After identifying its weak spots, Warner-Lambert set out to make corrections. In the planning process, it now ensures that the event is comprehensive and details about quantity, timing, and execution are shared with everyone. Software programs are in place to ensure that stores are not carrying a lot of inventory when the promotion is over.

In addition, a collaborative forecast is generated and shared with manu-

facturing and production to make sure that lead-time requirements are met. Finally, there is visibility of quantities/timing to the logistics folks to make certain that shipments are on time.

CPFR is used to manage collaboration with retailers regarding quantities. This provides visibility to timing of the promotion and expected quantities within the customers' buying system, explains Helveston.

Monitoring the Execution

Gaps identified in the execution of the promotion resulted in closer monitoring through to the store shelf. This begins with the order receipt at Warner-Lambert, ensuring that the inventory is available. The process continues with the order shipment to the customer, tracking timely delivery and receipt verification. "Logistics analysts make sure every purchase order makes it to the customer's distribution center," he says.

The monitoring ends with the product receipt at the store. An inventory planner reviews the store level inventory. Sales representatives evaluate the inventory levels after the event, and if inventory is left over, they are to find out why, Helveston explains. "Each step is important," he continues. "Planning must be communicated, execution must be monitored, and the evaluation should be incorporated into future promotions for profitability."

Evaluating the Profits

Helveston says that evaluation is critical in understanding the success and profitability of the promotion. Warner-Lambert now considers the cost to execute the promotion, such as display costs, advertising costs, and markdown costs. In addition, there is a concentration on inventory sell-through (returns and obsolescence).

"Be sure to reduce inventory, or the retailer will try to return it," says Helveston.

Additional Replenishment Strategies

Warner-Lambert has set up various replenishment programs to ensure that it delivers the right amount of product exactly when it is needed at the retail site. First, it has set up vendor managed replenishment (VMR) with several of its larger grocery and retail chain clients. Warner-Lambert also relies on corporate business teams, made up of representatives in replenishment,

logistics, finance, and sales. Each of these cross-functional groups is assigned to service one customer.

When It Has to Be There

Like Warner-Lambert, Nike manufactures and distributes a variety of products, making forecasting a challenge, explains Mary Eck, director of strategic distribution logistics for Nike.

“Sporting apparel, equipment, and footwear have to absolutely be there for a sporting event, but each product has different lead times and different processes,” explained Eck at the Logicon conference. “We have to coordinate things just right to get each product to the consumer at the same time.”

She says Nike used to rely on airfreight to do this, but the costs became too astronomical to have it be the only solution for timely delivery. “Our forecasts for production were off or our lead times were running late, which forced us to use air,” she says. “We knew we had to move beyond this.”

Forecasting Tools at Nike

Nike moved beyond this by instituting various forecasting tools:

1. *Forecasting through trend analysis.* Eck says that forecasting has gotten easier for Nike because the company now focuses on sporting trends to determine what products are most popular and where they will be used. For instance, she says, if a certain sport is more popular at a certain time of year or if consumers are dressing in sporting attire, such as golf clothes, Nike can use these trends to establish more reliable forecasts. “This helps us determine what products will be popular at different times of the year,” she says.

2. *Country-specific demand plans.* Each country in which Nike is located does its own demand and inventory plans. “This allows us to react to capacity constraints in individual countries,” explains Eck. “We can get closer to the market and make products for that country. It allows us to react more quickly to country-specific trends.”

3. *Use of global systems.* Nike relies on ERP software from SAP, will soon implement a supply chain planning tool from i2 Technologies of Dallas (the company currently uses a system from Manugistics), and expects to install an optimization software solution in the near future. Eck says that these solutions will help Nike gather information from manufacturers, vendors,

logistics service providers, carriers, and the consumer with regard to production capacities, forecast projections, and historical product data.

“The information helps us see products across a range of activities,” she says. “We can see how successful a product is, decide if we should cancel it, or redirect it to a different region or country. We can even see the accuracy of our projections, comparing our real-time accomplishment with our realistic goals.”

Nike used to rely on a 12-year-old legacy system, which, according to Eck, had a bunch of bandages on it. “It couldn’t work for all the countries, regions, and groups of products,” she says. At one time, she says, Nike had 31 order management systems.

The Successful Results

Eck says that these three tools ensure that only the required amounts of stock are held in inventory, and still enable the company to plan for increased demand. In addition, Nike says it is able to hit its service levels and still reduce closeouts and cancellations. Finally, it is increasing the accuracy of its demand plan to be more accurate and have less of a negative impact on the supply chain.

“At Nike, we like to create demand by making great products and taking risks, but you have to be prepared for the unexpected.”

NEW DEFINITIONS FOR COLLABORATION ENHANCE SUPPLY CHAIN MANAGEMENT

A recent study (*The North American Survey of Trends in Supply Chain Management*; Deloitte & Touche Consulting Group; Toronto) finds two of three respondents saying that they plan to share information with customers and suppliers for collaborating on forecasting and replenishment: They will synchronize supply chain operations, particularly the strategic, tactical, and operational planning activities between and among trading partners.

Previously, we described the concept as a “higher level of vendor managed inventory, or collaborative inventory management.” The key to this customer partnering agreement is “joint responsibility of the manufacturer and the customer to establish and develop a collaborative forecast.”

Collaboration, as applied in supply chain management practice. In a short time, however, the concept has broadened. For example, in a recent issue of *The Report on Supply Chain Management*, analyst Larry Lapide of AMR Research, Inc., affirms, “In a collaborative relationship, information is not just exchanged and transmitted, but it is also jointly developed by the buyer and seller.”

Generally, this information deals with future product plans and needs. Historically, he continues, “this type of information was not jointly developed on an electronic basis. It was rather developed in person or by fax and phone.”

Much like an information sharing relationship, information ancillary to the actual purchase is shared in a collaborative environment. However, unlike an information sharing relationship, information is not shared on a FYI-basis, since either trading partner may change it until both parties agree, he explains.

Information sharing is but a small step toward establishing a collaborative relationship. We have published many articles citing examples of partners trading information. However, Lapide and others insist that these information sharing relationships differ from collaborative ones. Often the recipient is using the data as-is and is not providing feedback. “While this information is helpful in improving supply chain performance,” he argues, “it does little to reduce the uncertainty faced by trading partners in determining future demand.”

According to Lapide, “Since the information shared from one partner to another is on an FYI basis only, there is no opportunity for the other partner to provide his or her own insight and knowledge of consumer needs. In addition, there is little opportunity to work together on matching supply with anticipated demand,” he continues.

In addition, prominent among the information shared with supply chain partners are data about inventories, including raw materials, WIP, and finished goods. Others include sharing production schedules, sales forecasts, and promotional calendars.

In a collaborative effort, as described by Lapide, “trading partners work together to better understand future demand and to put plans into place to satisfy it profitably.” As an example, in working collaboratively on consumer requirements, trading partners might work to decide jointly how many and when products will be produced to meet expected consumer demand. Among the types of planning that trading partners can conduct collaboratively are

- Replenishment planning
- Demand forecasting
- Promotional planning
- New product planning
- Product design and technical specifications
- Product packaging
- Pricing
- Store layout and shelf space planning

The question is not “if” collaboration, but rather “when.” According to the best available information, no companies have yet begun the collaborative process on a mass, routine basis. However, there are industry efforts to establish standards, software vendors developing technology, and reports of some pilot processes. Among them are Heineken USA with its distributors, and Nabisco with Wegmans.

In the Heineken application, the company collaborates with its distributors on forecasts via the Internet. The system enables the distributors to view a Heineken-generated demand forecast. A distributor can refine or approve the forecast. At completion, the planning module creates a recommended replenishment order.

In the Nabisco/Wegmans pilot, both companies will share common demand and supply forecasts for the Planters product line. Wegmans will forecast consumer demand in its 54 stores, and Nabisco will manufacture to meet that demand.

Among the industry group initiatives, the following are examples:

- The Voluntary Interindustry Commerce Standards Committee (VICS), through its CPFR Committee, has published a draft set of voluntary business process guidelines by which retailers and their suppliers can electronically collaborate.
- Value Chain Initiative was started by Microsoft to develop common frameworks for business-to-business electronic commerce on a supply chain.
- Automotive Network Exchange, from the Auto Industry Action Group, is developing an Internet-based extranet to allow automobile makers and component/subassembly suppliers to exchange information electronically.

- Demand Activated Manufacturing Architecture, part of the American Textile Partnership, examines supply chain collaboration processes intending to help create a computer-based information highway for soft goods. It's developed the supply chain integration program that a planner can use to perform a supply and demand analysis within a total supply chain scenario.

Collaborative relationships and their supply chains. Be warned: one model does not fit all. Relationships among trading partners will differ, depending on the companies involved. However, the most important collaboration opportunity areas, cited by Lapide, will result in three major types:

- *Manufacturer/suppliers will focus on synchronized production.* This will be realized by electronically sharing schedules with suppliers, allowing them to provide feedback and make changes based on whether material needs can be met. This type of collaboration also includes visibility into the raw material, WIP, and finished goods inventories of all suppliers to help ensure synchronized, realistic production schedules.

- *Manufacturer/customers will focus on demand planning.* The major collaboration opportunity areas for manufacturers and their customers are in demand planning and inventory replenishment. Here, both parties will need to cooperate electronically to share and modify each other's demand plans and forecasts. When collaboratively developed, a replenishment plan is designed to ensure that adequate product is available to meet demand. This will require partners to share and modify each other's finished goods inventory replenishment plans electronically, maintains Lapide.

- *Companies/third-party providers focus on logistics planning.* Here, the emphasis will be on joint logistics planning. For example, collaboration between a company and third parties providing DC services will focus on the productive use of facilities, labor, and equipment. This will likely involve electronic sharing of DC inventory replenishment plans with analysis to ensure that planned receipts do not overload the receiving function. Also, plans may be shared to ensure that each DC has enough space to store planned inventories.

Reprints of the report (*Are We Moving from Buyers and Sellers to Collaborators?*) are available from AMR Research, Inc., Two Oliver Street, Boston, MA 02109; 617-542-6600; fax, 617-542-5670; www.amrresearch.com.

INVENTORY MANAGERS NEED TO SHORTEN THE GLOBAL SUPPLY CHAIN

Planning and controlling inventory in the global supply chain are essential. What is needed is a well-designed, integrated business process supported by an information system that will allow planning how a shipment should move through the supply chain, how long it will take, and how much it should cost under normal circumstances. "This will be used not only as a basis for scheduling and control of the actual shipment, but to determine the supply chain cost that must be incorporated into the total product cost to ensure sufficient margin," reports Steven M. Purdy, vice president of Herbert W. Davis and Company (Fort Lee, N.J.; 201-944-5580).

The process and system must incorporate a method of defining the supply chain, each shipping lane, each transfer point, the transit times, and associated standard costs in multiple currencies. The system also should be capable of generating and processing the documents necessary to move the materials, he explains.

There must be an ability to record actual performance and costs against them. The system design and development side of this is not especially difficult, he assures. Also, the technology and infrastructure of gathering far-flung data are also not that difficult. "The Internet has great potential for moving the needed data from remote locations to your supply chain management system, and there are commercial services in many parts of the world as well," Purdy maintained at a recent APICS Annual Conference.

Generally, though, the actual data recording side is difficult. "At a minimum, for the process to work, the arrival and departure of shipments at a point need to be known quickly, as well as any costs associated with the transfer," he explains. The problem is getting service providers to provide this information quickly, accurately, and in a form that can be used.

This may mean providing equipment and training, as well as paying service charges, if it can be done at all, he explains. Making an investment of this kind with third parties "reduces the flexibility in obtaining services in the open market."

In some cases, it may be impossible to get the needed services, and there may be gaps in the coverage. In that case, Purdy notes, "it may have to be accepted that the best that can be done is to assume that if something arrives, it must have taken the intervening time to get there." The actual costs will

then have to be spread back over the process by logic once they are known, much like back-flushing labor and material in a manufacturing control system when detail data are not collected at each manufacturing operation.

Detailed inventory tracking to manage shrinkage is even more difficult. This is not often done in the supply chain, even within the United States. “It would involve labeling each master carton in a shipment with a bar-coded license plate, storing the identifying data about the carton in your database, and having each individual carton scanned at each transfer point,” he explains.

To start, if there were a third-party manufacturer, he would have to produce and correctly apply the label and transmit the associated data to the supply chain system. Again, Purdy points out, it would require investment at vendor sites, would reduce flexibility in sourcing, and would depend on the vendor’s doing the job well.

“The flip side of this, and just as difficult or more so, is getting the license plates read at each transfer point,” he declares. To do the job right, every carton has to be scanned every time the material is out in the open, such as being put into or taken out of a container or truck.

“If this is done, and it may mean doing it both when a load is broken down and when the product is reloaded for further distribution, we will know exactly what we have, where shrinkage, if any, has occurred,” he explains. This will allow the following remedial actions to begin immediately:

1. Deal with the customer service issues.
2. Initiate physical or economic recovery.
3. Take preventive measures for future shipments.

“Monitoring shrinkage this well requires a lot of accurate, frequently gathered, near real-time data that not only may not be available today, but for which the infrastructure, policies and procedures, and contractual arrangements with service providers may not exist,” he explains. “This kind of inventory tracking over long periods and distances is new territory,” he acknowledges.

However, when done as outlined, and knowing the constitution of the inventory and its location, other benefits accrue. For instance, Purdy advises that there is the possibility of deploying dynamically to distribution warehouses, or even allocating and shipping directly to customers when the shipment has landed.

“Being certain of what is actually in stock on the leg of the shipment before landing will allow stock to be allocated and the inventory to be cross-docked for shipment into your distribution network, or shipped direct to the customer, shortening the supply chain and providing more prompt service,” Purdy highlights.

Why inventory managers must be thrust into critical supply chain roles. “The time value of inventory investment and the cost of shrinkage in transit and at the multiple points of transfer inherent in long-distance shipping have become important in determining true margin and profitability,” contends Purdy.

In another view, John W. Scharlacken, principal consultant, supply chain management group, Price Waterhouse Management Consulting LLP, shares in the proceedings of the APICS conference, “The holistic supply chain planning concept replaces the traditional view of the supply chain as merely a means of piping product to a customer. It provides control of business processes quickly reacting to customers’ current product and delivery needs, collects information about future requirements, and relays it back through the network to be shared by everyone with responsibility for managing the supply chain.”

What it is going to take. David Harland, manager of the logistics and order fulfillment team, global business process integration program, the Gillette Company (Boston), adds, “In common with other multinational companies, we see the profit in a JIT, high-service, low-inventory approach to fulfilling customer requirements.” According to Scharlacken and Harland, the primary objectives of the global supply chain planning process include

- Establishing a quick response that provides competitive advantage
- Achieving world-class customer service levels
- Achieving world-class inventory turnover objectives
- Maximizing administrative resources

The tradeoff between inventory turnover and total product cost. Purdy says, “If inventory is being managed as an asset and the cost of the investment in it is recognized as it should be, a three-month supply chain represents a maximum possible turn rate of four.” However, the economics of lower offshore manufacture may justify the added transportation cost, the lower rate of turnover, and the associated inventory investment, he itemized.

“The important thing is to understand the total economics of the manufacturing cost versus transportation and carrying cost tradeoff, and manage it intensively and intelligently,” Purdy challenges. “When the supply chain is very long, it is essential to know what the total cost of getting product to the customer will be, or should be,” he asserts. This is probably the most significant difference between manufacturing or buying products domestically and sourcing globally. “Logistics costs are a significant controllable element in purely domestic operations and are being managed more closely than ever,” he mentions. But even locally, getting the data needed to manage well from third-party service providers is not easy.

“In offshore operations, it is that much more difficult,” Purdy advises. “Often, neither the tools nor the data necessary for improved management are readily available.”

DELANEY DATA REVEAL NO INVENTORY REDUCTIONS—ONLY SHIFTS IN SUPPLY CHAIN

“The state of the U.S. business logistics system is disappointing,” declares Robert V. Delaney, executive vice president of Cass Information Systems (St. Louis; 314-506-5820). “Last year, our business logistics costs were equal to 10.6% of the U.S. GDP [gross domestic product].” The troubling aspect is that the 10.6% of GDP has plateaued for the past three years.

Even worse, “when you remove the contribution of favorable interest rates [for calculating inventory carrying costs], the 10.6% of GDP plateau applies for most of the 1990s,” he cites in the *10th Annual State of Logistics Report*, cosponsored with ProLogis (Aurora, Colo.; 303-375-9292).

Decline in inventory investment efficiency contributes to logistics cost stagnation. Delaney insists, “We must improve the efficiency of inventory investment.” Yet it declined in the late 1990s. The ratio of shipments to unfilled orders in manufacturing businesses that produce to order improved from 1.61 to 1.58 months of supply, but the ratio of shipments to inventory in manufacturing businesses that produce to stock increased from 1.35 to 1.38 over the comparable one-year period.

“We had expected to see a trend developing in which the aggregated ratio of manufacturing, wholesale, and retail trade inventory to monthly sales would decline to 1.30,” Delaney acknowledges. “But it increased to 1.39. We appear to be stuck between 1.35 and 1.40 months of supply since the

mid-1990s,” he details. “We have not taken inventory out of the system,” he claims. “We are merely shifting where inventory is held within the supply chain.”

Inventory performance is disappointing in view of new concepts. “We have so many initiatives to improve the efficiency of inventory investment,” Delaney observes. These include CPFR programs and initiatives in electronic commerce and the use of the Internet. Yet as an example, he cites companies in the consumer direct channel. “They began by testing and hardening their operating models,” he offers. “They study alternative networks, of facilities and levels of automation.”

Inventory investment appears to increase in the aggregate as consumer direct companies implement their fulfillment centers. “The reason is that traditional retailers and distributors do not concede their market to the e-commerce start-ups,” Delaney explains. “They innovate pricing programs, expand their product offering, and work at adding value to their customer service. They will not reduce their inventory until it becomes clear that market share has been lost.”

However, he cites the work of St. Onge Company (York, Pa.), a designer of facilities and provider of automation consulting in the consumer direct distribution and customized production channel. They have identified 20 categories of products that can reduce their inventory investment by one-third by the year 2005. These include pharmaceuticals, home decoration, large household appliances, food, computers, and automobiles.

Why the emphasis on inventory investment efficiency has become so acute. During the late 1990s, the cost of the business logistics system increased 40% from a decade earlier. This is equivalent to 10.6% of nominal GDP. The cost of carrying this inventory is about 3.9% of GDP. He further responded that obsolete inventory accounts for 40% of inventory carrying cost.

According to *Inventory Reduction Report* studies, obsolete inventory is the biggest challenge facing inventory managers. “We have not been able to accelerate the velocity of inventory investment,” Delaney argues. “If we could achieve an inventory to monthly sales ratio of 1.3,” he calculates, “we would improve our logistics productivity by \$25 billion.”

There will be increased pressure on inventory managers to achieve this target. That is, if logistics costs have any chance to remain at existing levels or even improve. The reason? Potentially devastating cost hikes in other areas. Among them:

- The driver shortage will become even more acute. Some companies are advertising \$4,000 signing bonuses with no waiting period. The average pay scale for drivers increased by 10%.
- Fuel economy will decrease as the 2002 emission rules take effect. The related increase in the cost of fuel will be passed through directly to the prices paid for trucking services.
- The Ocean Shipping Reform Act will provide \$2 billion of improved productivity over the next five years. However, Delaney charges, “We have kept \$30 billion on the table by prohibiting the states from permitting heavier trucks and by preserving the economic protection of the Jones Act [reserves shipping between U.S. coastlines and territories to ships that are registered and built in the U.S. and are crewed by U.S. citizens].”

“We have to focus on inventory velocity because the costs of environmental protection will make future cost reductions from transportation carriers unlikely,” Delaney insists (see sidebar).

ERP Systems: When the Logistics Productivity Gain Stalled

Delaney is harsh when it comes to ERP systems. “We have seen nothing comparable to the confusion created by ERP Systems in our 40 years of logistics management experience,” he declares. “We note the installation of ERP systems has coincided with the productivity plateau of the 1990s.” He does not put all the blame on ERP systems, however. Top management shares responsibility.

“Many legacy planning systems that fueled past logistics productivity gains were set aside in the move to ERP systems,” he reports. “ERP systems do not appear to be providing logistics professionals with strong alternative planning support.” Nevertheless, Delaney notes, “Key ERP vendors are reducing interface obstacles by documenting and making their application programs accessible to supply chain systems.” Also, the Open Application Group (OAG) has focused a standardized effort on interfaces to supply chain software.

However, Delaney insists, “Implementation will lag 6 to 18 months before benefiting logistics professionals and two to four years before impacting national productivity.” That is not acceptable, even if true. Delaney remains a skeptic: “Based on experience, we have reason to doubt that it will be true.” It is time for top management to “face the facts and resolve the logistics issues and concerns regarding ERP systems,” he challenges in the 10th anniversary edition of his *State of Logistics Report*.

SUCCESS WITH OUTSOURCING INVENTORY MANAGEMENT BEGINS WITH A TIGHT CONTRACT

With the potential benefits of reduced operating costs, lower inventory investment, and improved customer service, the lure of outsourcing is strong. Yet many outsourcing relationships dissolve within two years. According to one survey, 57% of top high-tech companies expect to expand their outsourced services even though more than 44% of those currently retaining third parties were so unhappy with their services that they had to change providers.

This ambivalence toward outsourcing is corroborated by the authoritative Mercer Management Consulting annual third-party logistics surveys. Findings here indicate that firms routinely achieve a 30% to 40% reduction in logistics costs, but also that for a large population of manufacturers, logistics outsourcing is a source of failure and disappointment.

Outsourcing to continue its growth pattern. The benefits of outsourcing are a strong magnet for many. For instance, industry expert Richard D. Armstrong, president of Armstrong & Associates, Inc. (Stoughton, Wis.; 608-873-8929), estimates potential savings of 7% to 10% in reduced inventory and carrying costs alone from using a third-party provider.

Further, the author of *Who's Who in Logistics? Armstrong's Guide to Third-Party Logistics Services Providers* finds warehousing providers, for instance, including radio frequency, multiple location inventory checking, and other features, "well beyond traditional service offerings." Other value-added services now routinely include sequencing, metering, kitting, and other warehouse-related items as well.

Expanded services a definite drawing card for outsourcing more functions. "Generally, most firms will begin using a third-party logistics provider for a basic service like warehousing or inventory management and control," explains Charles A. Watts, CPIM, John Carroll University (University Heights, Ohio). "They will then increase their level of involvement with an outsourcing partner for more extensive value-added services," he observed at Congress for Progress XXIV (Mid-Atlantic Chapters of APICS).

"As customers become more accustomed to a third-party provider, they may be willing to venture into more value-added services," he explains. "These services involve areas of the value chain other than pure logistics functions."

John P. Blest, operations manager, Fulfillment Systems International, a third-party logistics provider, perceives this new market, too. “With the advent of virtual manufacturing and the evolving trend toward the implementation of supply chain management strategies, new third-party services—such as order processing, product and marketing features fulfillment, repair and return services, customer service, pick, pack and ship, and freight forwarding—are emerging,” he says. Even total inventory management is being outsourced as organizations concentrate on fully exploiting their core competencies, he claimed at a recent APICS International Conference.

End-customer contact by third-party provider seeds of discontent. The potential problem of outsourcing relationships is pinpointed by Blest. “The significant difference between subcontracting of the past and outsourcing of the future is the increased potential for third-party suppliers to have contact, directly or indirectly, with one’s end customer,” he says. “Logistics and distribution providers have an exceedingly high potential to influence your relationships with your customers. Therefore, great care must be taken in the selection process.”

An insider’s guide for selecting a third-party provider. “In the search for a provider, it is important to predefine the elements of the contemplated service before listening to sales representatives,” he insists. “For even the smallest firm, I would recommend preparing an RFP.”

As he details, “Make sure you define in this RFP all the needs of your organization that the potential supplier must meet.” These may include what you expect to provide in information and timing of the same to the supplier, such as status of inbound shipments, open purchase orders, part numbers, and part number field length. Other crucial elements are descriptions, description field length, units of measure used, kitting requirements, environmental constraints, lot number tracking needs, and stock rotation requirements.

“One should also define expectations of the firm with respect to the service provider,” he adds. These primarily include informational needs like shipment arrivals, damaged-in-transit reports, inspection and check-in time, and when it is added to inventory. Other questions that may need to be satisfied and detailed include the following:

- Will you have to visit the third-party provider to conduct periodic assessment of stock count or condition?

- When will the item be removed from inventory?
- How will inventory reconciliation be accomplished between your records and the service provider?
- What happens when inventory shrinkage occurs?
- Who pays for lost goods?

“Ask the prospective provider for at least three current client references as well as bank and insurance contacts,” he reminds. “If a significant portion of the provider’s workforce is temporary, ask for the temporary employment agency contact as a reference.”

Five Managerial Practices That Ultimately Lead to Successful Logistics Relationships

A team of researchers from the University of Maryland conducted an in-depth survey of logistics professionals to identify the requirements for establishing effective third-party relationships. The team (Sandor Boyson, Thomas Corsi, Martin Dressner, and Elliott Rabinovich) reported the following in the *Journal of Business Logistics*:

1. Firms should identify potential third-party logistics providers by using sources of information close to the firms’ immediate business, and with no vested interest or biases in providing the information.
2. Firms should rely on internal knowledge capabilities in order to evaluate the potential costs and process improvements proposed by third-party logistics providers.
3. Contracting agreements are central to logistics outsourcing relationships. In general, outsourcing firms prefer to take a risk-averse position toward logistics outsourcing. They favor the adoption of preventive measures to ensure the success of their relationship with third-party logistics providers. These measures are reflected in contract clauses explicitly outlining the charges for services, monitoring the performance of the providers, and establishing a structured set of responsibilities.
4. To manage the relationship effectively, it is best for firms to consolidate core logistics capabilities within a single office (headed by a chief logistics officer who reports to a CEO or VP of operations). Internal logistics experts need to maintain organizational control of the outsourcing process.

5. Firms must be aware that to build effective outsourcing relationships, they need to rely on knowledgeable in-house managers to audit and monitor third-party logistics providers. The extensive use of metrics is a key tool in managing the performance of third-party logistics providers.

Bottom line: The “burning” issue demands careful management of third-party relationships. The University of Maryland researchers conclude, “Maintaining an internal capability to manage the logistics outsourcing process has emerged as a critical issue.” Firms engaging third-party logistics providers need to have the internal expertise to perform a thorough, up-front review of the providers’ systems and capabilities. Internal logistics experts also are required to maintain ongoing organizational control of the outsourcing process, they insist.

“Increased gains from outsourcing multiple logistics functions suggest that firms take a strategic approach to outsourcing,” the team advises. A strategic approach involves the identification of long-term goals and the separation of supply chain activities into those that are essential to achieving core goals. Outsourcing, they remind, should only be considered for non-core activities.

“Companies should evaluate the costs and benefits of insourcing versus outsourcing for each of the activities, and when advantageous, outsource multiple activities,” they advise. Furthermore, “companies should ensure that gains from outsourcing do not dissipate after the initial year by building into the relationship steps for continuous improvement.”

CERTIFICATION EFFORTS MUST BE RENEWED TO BOOST SUPPLIER QUALITY

It might be the right time to take another look at supplier certification. Purchasing professionals are complaining of falling supplier quality. Yet, *Supplier Selection and Management Report* reader surveys find that the activity in supplier certification and efforts to help the supplier community improve its quality performance have been dwindling. In the most recent survey, these efforts are virtually nonexistent.

Improved supplier quality and supplier certification go together. We are not alone with these concerns. For instance, Jerry W. Claunch, CPM, president of Claunch & Associates, Inc. (Palm Beach Gardens, Fla.; 561-626-

0347), argues, “Many companies desire certified suppliers, yet they are not developing suppliers who meet the criteria of delivering 100% quality products.”

Robert J. Trent, Lehigh University (610-758-4952), and Robert M. Monczka, Michigan State University (517-432-2086), charge, “Many purchasers become complacent once a supplier receives certification. This reflects a belief that quality certification guarantees total quality from certified suppliers,” they told a recent NAPM Annual International Purchasing Conference.

There may be some validity here. For example, only four years ago, one in three *Supplier Selection and Management Report* survey respondents reported having active certification processes in place. Today, that number is down to just over 10%.

Supplier certification demands continuous commitment. What many ignore is that supplier processes, management, and workforces change over time. To the NAPM audience, Trent and Monczka emphasized, “Certification demands a continuous commitment of resources for regular reassessment.”

Addressing the same NAPM meeting, Claunch charged, “Based on the desire to eliminate inspection, most companies have reduced the number of employees in the receiving inspection department, but they haven’t gotten the supply base to the level necessary to meet their quality requirement.”

To assist purchasing pros rekindle the certification process, he offers an eight-step process (see sidebar).

Meanwhile, others still forge ahead with their own supplier certification initiatives. For instance, a purchasing director at a midsize producer of die castings says, “Our purpose in certifying suppliers is to ensure we have a consistent supply of products conforming to our requirements.”

Included among the certification requirements they insist their suppliers adhere to are a long-term, spotless record of quality and delivery performance; an assurance that an SPC process is currently in place; and an assurance that an internal quality audit is periodically performed. “We always request they make their records available to us,” he notes.

Currently, they have about 25 suppliers certified. “We purchase 80% of our production materials from this group of suppliers,” the director reveals.

Adopting a strong certification program in a merger. Robert A. Juergens, director of supplier management and procurement at McDonnell Aircraft and

Eight Steps That Will Make Supplier Certification a Reality

1. *Find suppliers who are willing and able to improve their processes.* Without process improvement, your efforts to transform are of little use. Once you begin this transformation, the supplier must then prove that they will improve their processes.

2. *Differentiate between specification and tolerance within your company and your suppliers.* To get your suppliers to the level of performance required for certification, it is recommended that all the information you provide to suppliers separates the specifications from the tolerance. This includes information on prints, drawings, handbooks, purchase orders, operation or routing sheets, and results of receiving inspection. All information provided from receiving inspection should identify and picture the spread and target of the items checked at receiving.

3. *Conduct risk analysis to determine the features that are important to your product performance.* Have suppliers conduct risk analysis on their processes to ensure your risk features are controlled in their processing. Failure Mode and Effect Analysis (FMEA) is the recommended risk analysis tool.

4. *Require control plans of all suppliers.* The makers of the parts are responsible for the quality; your job is to provide meaningful data about the features; and the supplier must plan how they are going to monitor their processes to ensure that you get 100% conforming product.

5. *Require run charting by supplier on all features identified in the risk analysis (step 3) to accompany all product that enters your facility.* This run chart is just as important as the product; if it does not accompany the product, rejection of the lot must occur, and the material be returned. This may delay your production, but it will only happen once. This step will ensure that the suppliers accept ownership of quality and your receiving inspection will be able to verify accuracy.

6. *Insist that receiving inspection provide information that makes the supplier focus on their processes and verify that improvements are realized at your company.* Have receiving inspection provide histograms on all product they inspect. This histogram must be based on your receiving inspectors readings, not the run chart supplied by the supplier.

7. *Conduct incoming product capability analysis.* This is received material capability information and is a very useful tool to improve the quality performance of suppliers. Organized data provides facts. Make decisions on facts and provide monthly reports on Cp and Cpk of incoming product capability.

8. *Insist on a performance level that gets the supplier to a fallout of 0.* This will require that the supplier apply the tools listed above and that they improve their processes. This is the step that you need to have achieved in order to certify a supplier.

Source: Jerry W. Claunch, CPM.

Missiles Systems, the Boeing Company (St. Louis; 314-233-7337), shares a unique experience.

“McDonnell Douglas came into the Boeing merger with a supplier certification process recognized in the aerospace industry as the best,” he explained at an Annual Performance Measurement for the Purchasing Function Conference (sponsored by the Manufacturing Institute, a division of the Institute for International Research; New York).

“We’re moving forward, taking that process, improving it, and using it for all of the Information, Space & Defense Systems group,” he advised. The program has three major elements:

1. Continuing performance as determined by supplier performance measurements
2. Supplier implementation of statistical process control
3. Appropriate processes in place for running their business now and for the future

“I ask the strategic sourcing teams for each category to get me the right supply base, develop long-term strategies for that category, and to work on the improvement of that part of the supply base by identifying the suppliers we want to certify,” Juergens outlined. “We want to certify only those suppliers that are strategically important to us, and that’s probably 10% to 15% of our supply base,” he allows.

Tracking qualified suppliers and identifying candidates for certification. Steven M. Rose, CPIM, purchasing agent at Exide Electronics (Raleigh, N.C.), explains that their supplier qualification program has been developed internally by a self-directed materials/purchasing team. “The process continues to evolve over time as the team builds on its successes and collective experience,” he told an audience at a recent Congress for Progress, sponsored by the Mid-Atlantic Chapters of APICS.

Candidates for supplier qualification are typically manufacturers of higher-technology, highly critical components, including circuit breakers, contactors, batteries, fans, transformers, printed circuit assemblies, cable harnesses, and custom switchboards.

Prior to qualification, a supplier must submit a self-survey and a copy of its quality manual. The Exide team then performs an on-site evaluation of the supplier’s facility. Once the supplier is qualified, the parts received from

them are tracked throughout the facility and become candidates for certification. "The parts must first meet a predetermined number of successive lots received with no defects," Rose explains.

"Certified parts bypass receiving inspection, saving on incoming inspection, manufacturing defects, downtime, and overhead costs," he describes. The initiative is paying dividends.

Defect percentages from nonqualified suppliers have been 0.49%, while they are only 0.03% from the qualified group. And since the inception of the supplier qualification program, he offers, "there has been a 97% overall reduction in defects." Additionally, the Large Systems Group currently buys 80% of its purchased dollars through qualified suppliers.

What these practitioners understand, and what Claunch affirms: "It's incumbent upon purchasing professionals to select suppliers that have a desire and management to improve quality, reduce lead time, and provide the correct quantities of items purchased." And a vigilant supplier certification is the start.

FUTURE SUPPLY CHAINS WILL REQUIRE TIGHTER SUPPLIER INTEGRATION

Purchasing professionals can prepare for an onslaught of new supply chain initiatives, with more information technology solutions. That is our conclusion from reviewing the findings of a comprehensive, recently released *Vision in Manufacturing* study, from Deloitte & Touche and Deloitte Consulting.

The renewed commitment to supply chain management. Executives in high tech, chemical, aerospace and defense, automotive, consumer product, and pharmaceutical industries "increasingly" regard supply chain integration as an indispensable element for success in manufacturing. Now, 73% of the respondents have a high commitment to the future supply chain integration with suppliers; 68% indicate the same commitment to customer integration. Five years earlier, it was about 40%.

James H. Quigley, managing director of manufacturing services at Deloitte & Touche LLP (St. Louis, 314-694-7883), observes, "This new era will require market leaders to recast their enterprises to improve new product development, create customer-centric organizations, tighten global supply chain links, and harness the intellectual capital of the organization."

The challenge for purchasing professionals. What the industries' top executives may be thinking will require purchasing professionals to initiate.

The report, done in collaboration with Aleda V. Roth of the Kenan-Flagler Business School at the University of North Carolina at Chapel Hill, notes, "As the pendulum swings toward globalization, innovation and customer orientation, supply chain superiority will be a decisive competitive advantage. Manufacturers must be able to adapt quickly to the increasingly unpredictable shifts in customer demand. To achieve greater efficiencies in product development, sourcing, production and distribution, a company must interface closely with its suppliers. Efficient supply chains are also necessary to extend the links to new overseas markets."

Current supply chain integration less than ideal. The results of the *Vision in Manufacturing* study reveal that a "typical" manufacturing company is far from achieving ideal supply chain integration. While nearly half the survey respondents described their own organization as well integrated, only 40% indicate a high level of "cohesiveness" with their suppliers and customers.

For the future, however, there will be an all-out push to improve the level of integration with every partner in the supply chain. And this initiative will be led by an additional emphasis on more supplier integrations. The report observes, "As manufacturers continue to feel the pressure to reduce unit costs, they will further scrutinize the price of materials and supplies. Many will economize by consolidating and rationalizing their supplier bases." This conclusion confirms the results of our reader surveys.

Tighter supplier integration is a worldwide theme. Regionally, executives in North America and Europe emphasize integration with raw material suppliers and other suppliers far more than those in the Asia-Pacific region.

Three-fourths of North American and European executives place a high priority on tightening these links. By contrast, it is only 45% in the Asia-Pacific area. According to the report, "The complex distribution channels in industrialized markets, coupled with the pressure to reduce cycle time, is forcing executives to prioritize supplier integration."

Technology to play a major role in improving supply chain performance. Two-thirds of the respondents say that they plan to use electronic links, such as EDI and related Internet-based technology platforms, to enhance supply chain relationships (see Figure III-1.22). Technology platforms like EDI and

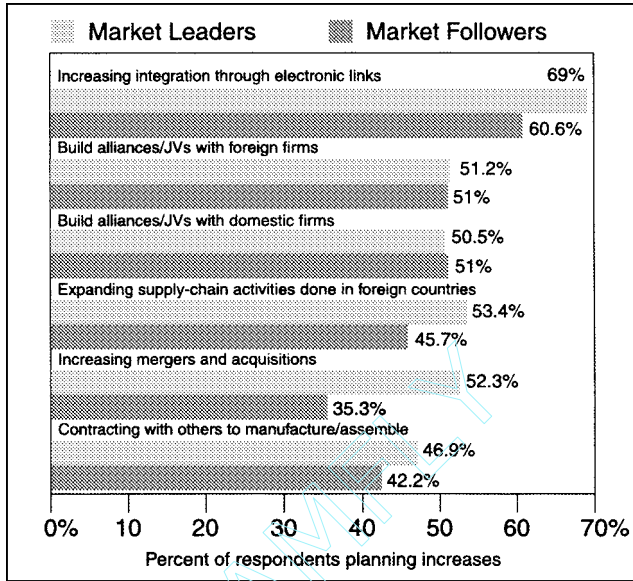


Figure III-1.22 Strategies That Will Be Used to Improve Supply Chain Performance in the Next 3 Years

Source: Deloitte & Touche and Deloitte Consulting.

ERP systems (SAP, ORACLE, BaaN, PeopleSoft) are integrating suppliers, manufacturers, and retailers in delivering value to customers.

The Internet provides buyers with a new channel from which to get virtual product information and make purchases. While this adds to the challenges, the report offers, “it also opens immense opportunities for suppliers to gather information on consumption patterns and demand changes. This, in turn, can make manufacturers more responsive to their customers by anticipating their needs.”

Leading manufacturing companies using ERP. The study finds that these companies are using ERP systems to deploy advanced planning and scheduling systems and sales force automation tools. Currently, over one-fourth of the market leaders use ERP systems compared to only 10% of the “followers.”

This trend is expected to continue over the next three years. Almost one-half (45%) of the market leaders and 27% of market followers give high emphasis to using these systems. Part of this difference is explained by the facts that market leaders tend to be larger and that they are more likely to make ERP investments.

Cross-border alliances and joint ventures to grow. The second most preferred strategy for supply chain improvement is through cross-border alliances and joint ventures. The report observes, “Forging these alliances allows manufacturers to expand global reach, open new distribution channels, and facilitate access to lower-cost suppliers and cheaper labor. Partners also help each other overcome regulatory barriers and investment restrictions.”

For more information about *Vision in Manufacturing* global reports or specific industry reports, call 212-492-4267 or visit www.us.deloitte.com/manufacturing.

SUPPLIER SELECTION WITH A DIFFERENCE: GETTING USERS DEEPLY INVOLVED

“We’ve discovered—often the hard way—that selecting the supplier with the lowest price does not always equate to selecting the supplier that can provide the best product/service,” acknowledges Lorrie K. Mitchell, relationship manager, Supply Chain Management Department, BellSouth Telecommunications (Atlanta, Ga.: 404-420-6068).

“Nor does it guarantee a successful relationship between buyer and seller,” she says. “The goal of supply chain management today is first to facilitate the selection of a supplier who can best meet the ‘client’s needs’ and then at the fairest price.” The “new” process begins with your in-house client, then moves on to your suppliers. And that experience stems from a supplier selection process at BellSouth.

Develop your own in-house client guidelines. “Everything you need will flow from your client guidelines,” Mitchell declared at a recent NAPM Annual International Purchasing Conference.

This document is shared with the client to set their expectations and identify the deliverables they will need to provide you. “Communicate your game plan to your client,” she offers. “Let them know the activities and information they will be responsible for providing.”

When used to its potential, the client guidelines are a one-stop shopping tool you use to educate and guide your clients through their project, Mitchell asserts. She detailed the following as the essential elements required to “ensure the clients include all the pertinent and necessary information for a supplier to provide a good reply”:

- *Identify what your client is looking for.* From this point on you will be working as a team. She reminds, “As the supply chain manager, you’ll be setting the scene of the activities to follow; therefore it’s important they understand the process and realize how important their input is, so they’ll be willing partners.”

- *Specifically, help clients develop their specifications/capabilities document.* Usually, Mitchell relates, they have never done this before. “True, you don’t write specs either, but you at least know what a supplier is looking for when they respond to a solicitation or any request for product or work.” Get the group to identify and detail the scope of the work to be done.

- *Identify applicable documents to be included.* This may cover company publications or applicable forms. “Actuals and forecasted quantities for the next three to five years, as appropriate and applicable, also can be quite helpful to the prospective suppliers,” Mitchell suggests. The client also will have to identify what property or services they will provide, and what the supplier is expected to provide.

Questions they might address include, “What systems will be interfaced?” and “What are the anticipated quality standards and performance criteria?” Also, include progress report requirements that describe how the supplier is doing. “If you share your project timeline with your suppliers, you’ll be surprised at the cooperation you’ll receive, not to mention the lack of requests for extensions,” Mitchell observes.

- *Decide which suppliers have the product/capabilities you need.* In this stage you will develop the “most important” document in selecting the “perfect” supplier. It is known as the supplier technical/capabilities questionnaire. “The reason these questions are so important is that without their answers you and your client have no way of knowing if a supplier understood what you were looking for and if they indeed have the capability to provide it,” Mitchell advises.

To learn what the supplier can do, ask the suppliers two types of open-ended questions. First, your client needs to identify the general questions to determine supplier capabilities, size, past business experience, and similar items. Secondly, specific questions addressing the product/service outcome need to be documented.

Once the questions are identified, the technical selection team determines the importance or weight associated with each. “This organized systematic approach in selecting a supplier ensures selection based on capabilities and requested outcome, not solely based on price, while eliminating

subjectivity to a large degree,” Mitchell explains. The approach not only ensures the client that the best supplier has been selected, but also can provide a documented summary of reasons why they were selected.

- *Negotiate a fair, reasonable price.* One important tip she imparts: “When you issue your solicitation to the suppliers, ask them to package their technical/capabilities responses and economic responses separately.” The reason? When you meet with the technical selection team to review the technical responses, explain to them that while they are evaluating the technical/capabilities responses, you will be analyzing the economics. “And do that,” she emphasizes. “Your client wants and needs to know exactly how far this project will set their budget back—capital and expense. This needs to be explained to the team up front.”

Explain to the team that when they complete the technical evaluation and a subgroup of suppliers is selected, you will provide them with an analysis of the supplier pricing for discussion with the team. However, it’s still up to you to negotiate the price once the subgroup of supplier finalists is selected.

- *Develop and maximize the relationship.* This step determines which suppliers would be interested in sharing risk and success with you. “The development of the buyer/supplier relationship and the establishment of a performance-based contract will ensure a successful working relationship with the selected supplier,” she assures.

A performance-based contract is the necessary tool to foster a long-term relationship with a supplier. Both the buyer and seller focus on their long-range financial and value-added benefits. “In the past, contracts were negotiated solely with a set fee structure. Occasionally, a penalty clause would be negotiated, and less frequently an incentive clause was included,” she notes. “A performance-based contract is the true win-win scenario of the perfect union of these concepts,” she allows.

A performance-based contract provides an opportunity for shared risk while maximizing the opportunity for mutual success. It also develops a strong mutually beneficial arrangement where both parties have something to gain and something to lose if their “partner” is experiencing a problem.

The right type of environment makes it work. There should be strong communication and sharing of information between the supplier and buyer, as well as between the supplier and the customer/end user.

Additionally, a good specifications/capabilities document is critical.

“Communication and buy-in of the customer/end user are critical since ultimately, they will be implementing the performance-based contract,” Mitchell explains. “Both parties need to know the other will go beyond the agreed-upon terms and conditions to make this a successful and profitable relationship.”

Determining the performance factors. The identification and establishment of performance indicators and the associated outcome criteria are a must, she insists. Although performance measurements will vary, each relationship needs to determine exactly what it will take to make it a success.

EXPERTS REVEAL HOW THEY MEASURE THEIR SUPPLIERS' PERFORMANCE

Easily one of the most pressing concerns for purchasing professionals today is the development and initiation of meaningful supplier performance metrics. With the growing number of supplier partnerships and the increasing pressure to form supply chains, performance measurements are even more critical than previously advocated.

As an example, Terry Suelman, vice president of supply management at Industrial Automation & Control, Honeywell Inc. (Phoenix; terry.suelman@iac.honeywell.com), insists, “Even as you may talk of partnerships, or having supplier representatives on-site, you still have to go back to the basics and manage supplier performance. You just don’t turn over the business to them and forget about it,” he says. “You must measure the supplier’s performance and tell them how they’re doing, or what you expect from them.”

Defining just the right factors and parameters. For instance, William S. Wehr, CPM, director of quality systems at Lewis-Goetz and Company, Inc. (Pittsburgh; 412-341-7100), declares, “Measurement criteria comprise the first process area to be addressed in starting our supplier partnership management process. The buyer’s performance goals that are critical for effective support of his/her customers must be translated into associated goals for the supplier,” he told a recent NAPM Annual International Purchasing Conference.

“In developing a supplier rating system, we ask two questions,” offers Patrick S. Woods, CPM, CPIM, APP, commodity manager at Emerson Electric/Fisher Controls (Sherman, Texas; 903-868-8160):

1. What types of performance measures of a supplier are important to my firm?
2. What are the minimum acceptable criteria in each of these measures?

Debating the specific factors before selecting them. Mark S. Miller, CPM, CIRM, purchasing manager at Case Corporation (Racine, Wis.; 414-636-6565), acknowledges, “We had much debate as to the most important factors that should be used to measure supplier performance and about the weighting the individual factors should get in the overall supplier rating.”

At Case, he told the NAPM audience, they formed a team to study other companies to decide which factors and weights were being used. As a result of their benchmarking study, they decided to use delivery (30%), quality (30%), value (20%), and partnering (20%) as the factors and weights.

The team then had to define, in greater detail, each of the four factors being measured. As an example, he shared how they measure the supplier’s value performance. “We decided that value would be calculated from a subjective survey that buyers would fill out quarterly,” he describes.

The value survey asks the buyer to look at total acquisition cost, not just price. “Total acquisition cost considers all costs: freight, handling, quality, administrative, and not just the price quote,” Miller defines. Cost reductions and cost increases compared with the inflation rate are also considered by the buyer.

“Soft” cost reductions, such as cycle time reductions, inventory reductions, EDI transactions, and assistance in initial designs are also given consideration when rating a supplier’s value performance.

For the supplier’s partnering performance measure, a survey is completed by a team of buyers, engineers, expeditors, and representatives from receiving, accounts payable, and quality.

There are five main areas that are measured (accessibility, responsiveness/attitude, engineering/technology, administrative practices, and proactive/innovation). Questions in the partnering survey ask the team to consider issues such as supplier sense of urgency, process control plan, use of EDI, invoicing process, billing procedures, customer service support, design process, and quality of supplier personnel.

The scoreboard approach to supplier performance measurement. Edward J. Ram Jr., senior supply chain manager at Allegiance Healthcare Corporation (McGaw, Ill.; 847-473-0400), believes in limiting the number of performance measures to “provide focus on each one that is selected.” At Alle-

giance, Ram and his team identified four service measures and three resource measures.

The service measures include EDI, supplier fill rate, supplier fill time, and distributor service level. The resource measures are return on managed capital (ROMC), days inventory on hand (DIOH), and excess inventory.

“Since the measures we selected are dependent on other processes in the supply chain, they indirectly measure those processes,” he explained at a recent Supply Chain Forum (Institute for International Research; New York).

For example, return on managed capital is affected by accounts payable to suppliers and product cube, while excess inventory is influenced by forecast accuracy and return policies. “In our case we found that of the seven measures, five were readily available each month in an automated format,” Ram notes. For instance, supplier fill time is captured using the ship date from either the EDI supplier ship notice, or the bill of lading collected by inbound transportation.

For the two others, different approaches were required. Supplier fill rate, for example, needed to have a proxy developed, since Allegiance is not yet receiving EDI ship notice from all suppliers. “A program was written that counted as first ship, any PO lines that were received within a four-day window of the first line received against a PO,” he explains.

Developing meaningful rating formulas. “Rating criteria at Emerson Electric/Fisher Controls are established via formulas, and each formula is developed and reviewed in such areas as quality, delivery, and supplier lead time,” Woods explains.

There are innumerable ways to measure supplier on-time performance. At Emerson Electric/Fisher Controls, the acceptable criteria as defined by the committee are supplier promise date and customer request date.

“The supplier promise date is a reflection of the supplier’s ability to meet its commitments to you and to do what they say they are going to do,” Woods explained at the NAPM conference. “Delivery by request date is an attempt to rate the supplier in their ability to meet your customer’s request for your product that will incorporate the supplier’s item.”

At Case, they also wrestled with the shipment date or receipt date as a measure of supplier delivery performance. Miller explains the rationale for their choice: “Since most of our contracts call for FOB-supplier plant, we decided to measure on-time based on ship date, using ASN. This removes the performance of carriers or the promptness of internal receiving operations from the measurement,” he states.

Communication is critical to program's success. Suelzman is an ardent advocate of providing suppliers with feedback from the performance rating process. "We just don't send them something on a monthly basis, we actually go to them and talk about it, going over every point. We also tell them why we need a specific kind of performance from them."

At Allegiance, Ram explains, "We encourage the scoreboard be used routinely whenever meetings are held with the suppliers." This, he believes, reinforces the importance of the scoreboard across all functions. "It also leads to concrete steps to improve the factors that impact the performance measures on the scoreboard," he maintains.

TWO NEW STUDIES FIND MISSED OPPORTUNITIES IN SUPPLIER MANAGEMENT

Surprising, if not shocking, conclusions from two recent studies should sound the wake-up call for purchasing and supplier management. Basically, the independent findings reveal that they are not applying practices and concepts proven to bring efficiency and effectiveness to the supplier management process in a meaningful manner.

Specifically, in a research study of supply chain best practices (see sidebar), Kevin McCormack of Complete Business Solutions, Inc. (Birmingham, Ala.; kevin_mccormack@cbsinc.com), determined that "many specific best practices that they propose as solutions for improving supply chain management do not have as much of an impact as they are often presented to have."

Additionally, Greg Hackett, president of the Hackett Group (Hudson, Ohio; 330-656-3110), which conducts ongoing benchmark studies of procurement, observes, "It's remarkable there are established methods for improving costs and efficiency in procurement and yet they're not widely used."

A wealth of opportunity being squandered. According to the most recent findings from the Hackett Group's research, companies using such practices as bar coding, EDI, procurement cards (P-cards), and blanket purchase orders are "reaping the benefits of cost savings, better information, and higher levels of customer satisfaction." Yet, none of them are widely used.

For example, Hackett reports, while top performing organizations use bar coding to expedite processing, more than 80% of material receipts at the

Preliminary Supply Chain Management Study Revealing, but Needs More Input

Admittedly, the first supply chain management study commissioned by the Supply-Chain Council (Pittsburgh; www.supply-chain.org) and conducted by Complete Business Solutions, Inc. (Birmingham, Ala.; 205-733-2096), is considered preliminary as the database is rather small. However, at a recent Supply-Chain Council conference Kevin McCormack agreed, “The descriptive statistics, although not entirely representative at this point, indicate clear areas of agreement on the current state of the supply chain decision processes.”

The survey, distributed to the members of the Supply-Chain Council, was organized to match the Supply Chain Operations Reference (SCOR) model areas of Plan, Source, Make, and Deliver.

Several results in the Source process stand out as “interesting.” “The initial expectation of the research team was that the Source process was going to be the most mature in regards to structure and process (measures, documentation, team structure),” McCormack explains. The preliminary results indicate otherwise.

For instance, there is a strong correlation about the importance of the measurement and feedback of supplier performance. Yet 30% of the respondents report this is “never” or only “sometimes” done in their source process. Only 12% report that it is always done.

Considering the level of emphasis that has been placed on supplier interrelationship and procurement process documentation, the response level again is “surprisingly low.” According to the survey, respondents answered “never” or only “sometimes” 35% of the time for supplier interrelationship and 28% for procurement process documentation.

The lack of sharing planning and scheduling information with suppliers also is unexpected. Almost half (47%) of the respondents answered “never” or only “sometimes.” “With all of the publicity about supplier cooperation and now collaboration, this is really a surprising percentage,” McCormack reports.

Nevertheless, this study provides the beginning framework for comparison and discussion about practices and principles that relate to supply chain decision process performance. Further studies will follow.

average company are processed manually. Similarly, EDI is used, at most, about 30% of the time.

“Order placement, release and acknowledgment, and shipping notices remain manual-intensive at the average company,” he reveals. First quartile companies in the survey use EDI about a third more than average companies.

Only 4% of transactions are executed with P-cards. According to Hackett, these cards could possibly handle an estimated 40% to 50% instead. First quartile companies use P-cards for twice as many transactions as the average company. “Procurement cards not only reduce transactional costs in purchasing, the cards typically reduce the cost of making a payment by more than 85%,” Hackett declares.

Blanket orders are also underutilized. Two-thirds of transactions are processed without blanket POs, while the best companies use blankets more than half the time. Top performers also rely on long-term contracts to a greater extent. At the average company, only about 60% of contracts are of a long-term nature (greater than one year). For companies in the first quartile, it’s 72%.

Other findings show that there is room for much improvement. More than 1,200 organizations participate in *The Hackett Group Best Practices Benchmark Study of Procurement*. Other significant findings of the study include the following:

- *On average, a company spends 1% of its purchased costs to manage the procurement function, but the range is wide.* This cost includes basic transactions such as requisition and PO processing as well as activities such as supplier performance measurement and strategic sourcing.

There are four components to the cost: fully loaded labor (wages, salaries, benefits), outsourcing, systems (run time and maintenance for procurement systems only), and others, such as facilities, supplies, and corporate allocations.

While procurement costs the average organization 1% of purchased costs, the range between the lowest and highest is large. First quartile companies in the study have costs as low as 0.3%, and the fourth quartile have costs greater than 1.8%.

“Examination of first quartile companies reveals they have simplified their procurement processes by incorporating best practices in their day-to-day operations,” according to Hackett. “In addition, they’re integrating systems to provide high-quality contract and price information across the enterprise.”

- *Procurement spends bulk of its time on operational support activities.* With 76% of procurement’s overall time focused on lower value-added activities (requisition and PO processing, supplier selection and material receipts processing), an appreciable number of purchasing managers and professionals are engaged in routine, day-to-day control and risk management activities.

In fact, according to the study, the typical purchasing manager spends less than 2% of the time helping to develop strategic alliances.

- *Procurement staffs have an average of 157 full-time equivalent employees per billion dollars of purchased goods.* Similar to the earlier finding, only 42% of the staff are buying specialists, while 46% are clerks and administrative personnel. Typically, the breakdown includes 113 operational support employees, 15 in control and risk management, 23 for decision support, and 6 in procurement management.

- *As much as 56% of all supplier price negotiations occur at the business-unit level.* As a result, price and best practices information is seldom shared, limiting the buying leverage across the corporation.

- *On average, a billion-dollar company contracts with 12,200 suppliers.* However, the spending distribution among them is far from balanced. Some 90% of dollars are directed to only 18% of suppliers. The remaining 10% are disbursed as small-dollar transactions among the other 10,000-plus suppliers. First quartile companies are about 28% more concentrated in spending their purchase dollars.

- *A trend toward reducing the total number of suppliers is underway.* The average company presently has 10% fewer suppliers than one year ago, as rationalization and strategic alliances take hold.

According to *Supplier Selection & Management Report* reader survey data, supply base reduction is more than a trend. We consider it to be an ongoing, continuously applied best practice. For the past six years, supply base reduction has been the top rated practice, always cited by the majority of our survey respondents.

- *Single sourcing remains beyond the reach of most procurement organizations.* While the total number of suppliers is slowly being reduced, some 76% of companies report low or low-medium utilization of single sourcing. In contrast, only 3% claim high usage.

- *Procurement is systems-intensive.* The typical company has almost 30 procurement systems per billion dollars of purchased costs, according to Hackett. It is one of the largest in the corporation.

These systems tend to be customized, complex, and not highly integrated. Furthermore, the average age is just over seven years. “Given that every six to eight years a company typically replaces most of its procurement systems, many companies are due to update and replace their procurement infrastructure,” he opines.

Based on the data, Hackett encourages, "Finding ways to boost procurement's spending effectiveness just 2% could mean an increase of \$100 million in shareholder value for a billion dollar company."

USE THESE SCORECARDS AND AUDITS IN THE SUPPLIER MANAGEMENT PROCESS

In this emerging age of supply chain management, supplier selection has become an even more critical issue for purchasing professionals. It's no longer just a process to select a party to do business with. Now it presents the opportunity to evolve into a partnership, or an alliance.

This is why many purchasing professionals are giving more credence to the selection process itself. For instance, Tony Noe, CPM, director of purchasing at Macklanburg-Duncan (Oklahoma City; 405-557-3528), insists on creating a documented information file on all suppliers.

Probe into the supplier's qualifications. "We gather basic information such as its size, capacity, and history, and we scrutinize its customer list," he said at the NAPM Supply Chain Management conference. "Additionally, we look closely at its equipment, paying attention to its age and upgrades."

Another important element is to review its management team, including their experience and time with the company. "This is helpful should there be a sudden and significant change within the organization or its business practice, as it could provide an insight as to the reason why," Noe explains.

Creating a supplier benchmark audit. Meanwhile, Patrick S. Woods, CPM, CPIM, APP, commodity manager at Emerson Electric/Fisher Controls (Sherman, Texas; 903-868-8160), has created a supplier benchmark audit to "define the standard by which to measure a supplier." For him, the audit is the precursor to supplier approval.

An essential element is the benchmark audit document (see sidebar). "It is nothing more than an in-depth questionnaire that allows you to gather information about the supplier's technical, operational, or financial capabilities," he explained at a recent NAPM Annual International Purchasing Conference. Items may be added or deleted depending on the importance to your organization.

He further advises, "The sample questions represent many different

Sample Supplier Benchmark Audit Questionnaire

Quality Assurance

1. Does the supplier have a documented (in writing) quality system in place?
2. Is a copy of their Quality Assurance (QA) manual available for you to review?
3. Are Statistical Process Control (SPC) techniques incorporated as part of their system?
4. Is there a continuous quality improvement plan in place?
5. Does the supplier set annual quality objectives with appropriate measurements?
6. Does the supplier have a QA department and do they have the authority to stop production material at receiving, inspection, production and/or final shipping?
7. Is there a documented quality training program in place for hourly and salaried employees?
8. Are process capability studies conducted for new products prior to production release?
9. Does the supplier have a documented supplier evaluation and certification policy for its suppliers (2nd tier)?
10. Does the supplier have its own receiving inspection system in place that segregates incoming material and verifies identification, lot quality and supplier performance history?
11. Are systems in place to insure that only your latest drawings and specifications are available for use?

Technology

1. Does the supplier have an organization chart?
2. Do they participate with you in joint development efforts in technology?
3. Is there a program for continuing education of technical personnel?
4. Are technical personnel involved in the up-front quoting and planning process to assure that parts can be manufactured/services can be provided?
5. Do routers and operation sheets identify specific operations for each component?
6. Is the supplier's equipment adequate to meet your requirements?
7. Does cross-training for critical skills exist?
8. Are there currently sufficient people resources to support current and future business?

(continued)

9. Is there a union affiliation?
10. Is there a sufficient outside labor pool to support your growth and/or employee turnover?
11. Does a procedure exist to provide feedback from production to the appropriate function?
12. Does a defined preventive maintenance schedule exist?
13. Do backup plans exist to continue production in the event of machine downtime?

General Management/Financial

1. Does the supplier have a written policy on integrity?
2. Does a formal system exist for the development of an annual business plan?
3. Is the supplier's overall mission identified (Mission Statement)?
4. Does the supplier's management possess a high level of organizational and managerial skills?
5. Are educational opportunities offered to all employees?
6. Is a system in place to insure that the supplier covers all PO requirements?
7. Is there good work interaction between the workers and management?
8. Are the supplier's company values posted?
9. Is there an ongoing program to reduce cycle times?
10. Is technical and administrative help available to fix problems?
11. Is full responsibility for product warranty accepted if product failures should occur?
12. Is excessive follow-up required with the supplier?
13. Are communication meetings held with employees to discuss the supplier's performance measurements on quality, delivery, other?
14. Are financial audits performed annually?
15. Are financial audits performed by outside companies?
16. Is the supplier willing to share key financial data with you (e.g., assets, liabilities, total, debt, sales, cost of sales, other key financial measurements)?

Delivery

1. Is the supplier aware of your delivery and cycle time goals?
2. Does the supplier positively respond to requested schedule changes?
3. Are schedule push-outs accepted?
4. Does the supplier have an effective planning system to insure the timely delivery of raw material from its suppliers (2nd tier)?

5. Does the supplier have an effective inventory system in place that will consistently meet your schedule and inventory requirements?
6. Does/will the supplier work with you on consignment inventory programs?
7. Are the supplier's packing slips, invoices and necessary paperwork properly and accurately completed?
8. Are PO acknowledgments returned within the time frame, accurate and complete?
9. Are records and supplier personnel available to review current delivery status on POs?
10. Are you or your designated representative promptly notified of delivery problems or schedule slippage?
11. Is there a plan for reducing lead times?

Pricing

1. Does the supplier have defined programs to control its utility and operating costs?
2. Are there processes for controlling and leveraging raw material costs?
3. Is there sufficient knowledge of industry and market trends to control raw material costs?
4. Does the supplier submit alternative proposals on quotations to reduce costs?
5. Are productivity improvement suggestions submitted for cost reduction?
6. Are quotation prices fixed for an acceptable period of time?
7. Are POs accepted for required quantities without a minimum-buy requirement?
8. Are scheduled adjustments allowed without premium or unit price increases?
9. Is unit pricing within a competitive range of market served?
10. Is total cost within the competitive range of the market?

Environmental Safety

1. Do hazardous conditions exist beyond normal business operations?
2. Is operator safety a priority?
3. Is the work environment clean and maintained?
4. Are all OSHA and EPA regulations in compliance? Are certificates available for review?
5. Are environmental issues discussed with the supplier's employees?
6. Are MSDS sheets available for review by all the supplier's employees?

(continued)

Sample Supplier Survey Scorecard

Assign points to each question, such as a scale of zero to five, where zero is the worst, and five is the best. Then assign a weight to each section, as each is not considered equally.

Quality—Possible 20 Points Max Score

A. Formal Quality Plan	(4 Questions)	20
B. Management Quality Commitment	(2 Questions)	10
C. Quality Training	(1 Question)	5
D. Process Capability	(1 Question)	5
E. Material Control	(2 Questions)	10
F. Drawing & Spec. Control	(1 Question)	5

Total = 55

Quality Point Adjustment Factor = Total \times .3636 = 20

Technology—Possible 20 Points Max Score

A. Technical Depth	(3 Questions)	15
B. Process Planning	(2 Questions)	10
C. Facilities and Equipment	(2 Questions)	10
D. Resources	(3 Questions)	15
E. Customer and Production Feedback	(1 Question)	5
F. Preventive Maintenance Program	(2 Questions)	10

Total = 65

Quality Point Adjustment Factor = Total \times .3077 = 20

General Mgmt./Financial—Possible 20 Points Max Score

A. Integrity and Ethical Practices	(1 Question)	5
B. Business Planning	(2 Questions)	10
C. Effective Organ. & Operations	(3 Questions)	15
D. Management Behavior	(2 Questions)	10
E. Ownership and Service	(4 Questions)	20
F. Leadership	(1 Question)	5
G. Financial	(3 Questions)	15

Total = 15

Quality Point Adjustment Factor = Total \times .2667 = 20

Delivery—Possible 15 Points Max Score

A. Schedule/Product Support	(3 Questions)	15
B. Prod. Planning & Inv. Mgmt	(3 Questions)	15
C. Contract Compliance	(2 Questions)	10
D. Delivery Service	(3 Questions)	15

Total = 55

Quality Point Adjustment Factor = Total \times .2727 = 15

Pricing—Possible 20 Points		Max Score
A. Cost Effective Management	(3 Questions)	15
B. Cost Reduction Program	(2 Questions)	10
C. Pricing Policy	(5 Questions)	25
Total = 50		
Quality Point Adjustment Factor = Total \times .4000 =		20
Environmental/Safety—Possible 5 Points		Max Score
A. Environmental Safety	(6 Questions)	30
Total = 30		
Quality Point Adjustment Factor = Total \times .1700 =		5

Source: Patrick S. Woods, CPM, CPIM, APP.

important areas. Therefore, representatives from each of these areas within your company should be involved in the development of the questions, and as part of the team involved in benchmarking the supplier.”

Evaluating the supplier. Assign points to each question, such as a scale of zero to five, where zero is the worst, and five is the best. Then assign a weight to each section, as each is not considered equally. At Emerson Electric/Fisher Controls a perfect score is equal to 100 points.

Applying this logic to the audit questions could present a problem, he concedes. Listed in the audit are 67 questions. Assuming that each question, on average, would rate a three, the total points possible would equate to 201.

“To correct for this situation, each major section is assigned a maximum number of points with a quality point adjustment factor, and then the sum of the points for all sections is equal to 100 points,” Woods details.

“It also would be beneficial to allow the supplier to review a copy of the benchmark study ahead of time, and rate themselves,” he advises.

Developing the supplier survey scorecard. The specific ratings for each survey question, both supplier self-assessment and team assessment, are then summarized in a scorecard format. The overall rating equates to “best in class” (85 points or higher); “acceptable” (75 to 84 points); “marginal” (60 to 74 points); or “unacceptable” (below 59 points).

“Before benchmarking your supplier,” Woods recommends, “first choose another company, preferably in the same commodity industry or

related industry that has demonstrated best-in-class capabilities, to benchmark. This will give you a true basis of comparison that your supplier should work toward in its continuous improvement program,” he emphasizes.

Applying the findings. “The standards will allow you quickly to sort out the supplier’s strengths, weaknesses, and neutral points,” he describes. Key questions to consider would be:

- Do this supplier’s strengths outweigh their weaknesses?
- Are such weaknesses acceptable, or do they need to be corrected?
- Does this supplier already have an action plan in place to correct its deficiencies, or is there an attitude of complacency?
- Are the supplier’s deficiencies correctable, or should I move on to another source?

Should you choose to share the data with the supplier (and our recommendation is that you should), Woods notes, “They also can benefit since you evaluated them in a clearly defined, quantitative method, targeting specific areas for improvement.”

ARE YOU RESPONSIBLE FOR YOUR SUPPLIER’S FLSA COMPLIANCE?

Purchasing professionals, as part of their routine supplier management responsibilities, often must wrestle with the complexities of contracts, commercial law, the UCC, and the CISG (see sidebar). Now, they also must become aware of the provisions of the equal opportunity and fair employment laws. It appears that there are instances where purchasing professionals can be held accountable for the actions of their suppliers or the employees of independent contractors.

The following highlights some key issues that are of special interest to purchasers. The excerpts are taken from the authoritative *Purchaser’s Legal Adviser* (Business Laws, Inc.; Chesterland, Ohio). As always, when confronted with one of these situations, consult with your legal counsel.

Purchasing is responsible for sexual harassment by outsiders. Sexual harassment in the workplace has received extensive publicity, and most companies have

Fair Employment Laws: Compelling Issues Purchasers Should Know About

1. Sexual harassment by outside salespeople against your employees is illegal, and the company may be held responsible if it knew about the harassment and did nothing. Has the purchasing department clearly stated to vendors that harassment will not be tolerated?
2. Has your company clearly stated to vendors that harassment of the vendor's employees by your company employees will likewise not be tolerated? Have you provided a specific procedure or person to contact if such harassment occurs?
3. The law on what the company is required to do in addressing harassment is rather complex, but it almost always requires a prompt investigation. Do your purchasers have a clear understanding of this, and do they know whom within the company to contact? Have they been cautioned against trying to fix the problem themselves?
4. The ADA requires the company to provide accessible facilities, including off-site facilities used for various functions. Do your contracts and procedures for arranging for the use of outside facilities comply with the ADA's requirements? Do you inquire of your own people about specific arrangements that must be made to accommodate certain people?
5. The ADA requires that new construction comply with detailed accessibility specifications. Do your contracts and procedures for new construction (including remodeling) account for these specifications?
6. While most laws in the commercial environment do not require the company to police the fair employment practices of their suppliers, sometimes as a business decision, doing so would be desirable. Do you have provisions in your contracts that allow you to terminate a supplier if it does not comply with fair employment laws and practices?
7. Many laws and company policies require or encourage a drug-free workplace. How do you address this in contracts for work to be done on your premises:
 - (a) a simple prohibition against drugs on the company's property and against allowing any independent contractor's employees who are under the influence of drugs onto the property?
 - (b) a policy requiring the contractor itself to have a drug-testing program?

Source: Purchaser's Legal Adviser.

appropriate policies and procedures addressing this matter. Less publicized and not recognized is the harassment of your employees by outsiders. This may involve a representative from the supplier community, or an employee of an independent contractor who is doing some work in your facility.

Most sexual harassment litigation involves sexual harassment between employees of the same company. However, the position of the Equal Employment Opportunity Commission is that “companies are responsibly for sexual harassment by outsiders just as they would be for harassment by their own employees.” According to *Purchaser’s Legal Adviser*, this ruling has never been “expressly rejected by a court.”

What purchasers must do to avoid liability. Typically, the company is responsible for harassment by outsiders if it has reason to know that the harassment is occurring and fails to take steps to deal with it. Therefore, purchasing professionals should not ignore a coworker who complains about being the victim of unwanted advances. Instead, you have a responsibility to promptly refer the complaint to the appropriate person within the company. This should be done within hours of receiving the complaint.

The reason: In cases where the company has been absolved of liability by the courts, they had undertaken a “very prompt and thorough investigation of the complaint.” This has been interpreted as a matter of hours and days, rather than weeks or months.

Communicate the antiharassment policy to your suppliers and contractors. Some purchasers publicize a policy that is distributed to suppliers that makes it clear that any harassment will not be tolerated. Also, include the antiharassment policy in the contract with independent contractors when people will be coming onto your property to work.

Make sure that the policy addresses both sides. For instance, encourage any supplier employee who is harassed by anyone in your department to promptly report it. *Warning:* Because of the seriousness of the situation and its legal implications, do not try to resolve the problem yourself (unless that happens to be the company policy).

Become familiar with the ADA’s Title III requirements. In many cases, purchasing professionals arrange remodeling or similar work to be done on the company site. Therefore, you also must be aware of the Americans with Disabilities Act’s (ADA) Title III provisions.

Essentially, if a company is a commercial enterprise, it is required to “make sure that any new construction complies with the detailed physical specifications of barrier removal contained in the Act.” And the emphasis is on the word “detailed.”

Therefore, purchasers should make sure that contracts for construction work are reviewed by someone within the company or by an outside consultant who is knowledgeable of the specifications and can ensure that the provisions meet those detailed requirements.

Are you responsible for your supplier's compliance with equal employment opportunity laws? It depends. If you are purchasing under a government contract, depending on its size, you have a legal obligation to get a representation from the supplier that they do not discriminate. You might even have to get additional representation that they also have an affirmative action program to hire and promote minorities.

However, in “purely commercial” procurement, there is no legal responsibility to “police” the equal employment opportunity compliance or fair employment practices of the suppliers. Nevertheless, purchasers should exercise some caution here, too—especially where a supplier may be employing illegal immigrants in this country, or a foreign supplier who is abusing child labor.

One suggestion offered by *Purchaser's Legal Adviser* is to include provisions in your contract to the general effect that the supplier agrees to comply with all fair employment laws. The intent is to have negotiation leverage in this kind of situation rather than to actually use it to police supplier compliance.

Extending the “drug-free workplace” to independent contractors. The behavior of the employees of independent contractors working on company property is a legitimate concern for purchasing professionals. In general, there are three options that can be taken, according to the publication:

1. *Do nothing.* A purely commercial entity having no government contracts and no other special factors can probably get away without addressing drugs in the workplace in independent contractor agreements.

2. *Include a specific provision.* It should state that the contractor understands that the company has a drug-free workplace, that no drugs can be brought onto company premises, and that no one under the influence of

drugs can be sent to work on the premises. The prevalent thinking is that this is a far better approach than doing nothing.

3. *Be explicit.* This requires a certification from the contractor that it also has a drug-testing program and that all employees it sends to your facility will have passed a drug test.

SCORECARDS: POSITIVE REINFORCEMENT ABOUT SUPPLIER PERFORMANCE

The supplier scorecard has proven to be the defining tool for many purchasing managers navigating the transition from transactional to strategic planning (though it has its drawbacks—see sidebar). Where other supplier performance measurements fail because of narrow scope, poor communication, and the like, the scorecard provides a comprehensive and consistent approach to ongoing improvements.

The anatomy of the scorecard. “The scorecard should be a compilation of supplier-to-buyer transactions or events that have been individually coded based on mutually established measurement methods,” explains William S. Wehr, CPM, director of quality systems at Lewis-Goetz and Company, Inc. (Pittsburgh; 412-341-7100). Included in the scorecard, he maintains, is the time period covered, total number of transactions, total number of conforming and nonconforming transactions, and an indication of current performance relative to the goal.

“All scorecard elements should be included on the agenda for all review meetings to permit discussion and understanding of performance trends,” Wehr said at a recent NAPM Annual International Purchasing Conference.

Meanwhile, R. David Nelson, vice president of worldwide supply management at Deere & Company (Moline, Ill; dn49010@deere.com), who calls his program “Achieving Excellence,” has the scorecard focus on supplier ratings for quality, delivery, warranty, and cost management. “In addition, it has a ‘wavelength’ rating, which is a subjective measure,” he noted at a recent Annual Strategic Sourcing Management Conference (Institute for International Research; New York). The wavelength rating relates to the supplier’s responsiveness, technical support, and attitude, as determined by Deere’s employees.

The Downside of Report Cards

Granted, the benefits of a report card program outweigh the negatives. However, before embarking on a scorecard initiative, Williams suggests looking at some of the negatives. For instance:

- *The scorecard takes time to develop and sustain.* “I like to do things in baby steps,” she notes. “At first, we only took a couple of suppliers and did the scorecard in a pilot form. As we gained experience, we expanded it to a couple more, and a couple more.”
- *Many statistics are manually developed.* “While most of the data can be attained automatically, you’ll find that there’s a volume that cannot be automated, especially the subjective ratings.”
- *Methodology changes are difficult to implement and bridge.* “We change our methodology frequently, probably two times a year, sometimes three,” William explains. “But we let the suppliers know we’re making the change and merge them into the change.” One tactic she has found successful when making changes is maintaining two scorecards for a short period. “In this manner we show the supplier what their report card is under the new methodology and what it would have been with the former process.”
- *Pulling quarterly meetings together is challenging.* “Scheduling everybody can be a problem,” she concedes. At Compaq, for instance, the supplier scorecard quarterly management reviews are attended by a cross-functional group. Representatives include the commodity manager, purchasing and quality manager, development engineer, and manufacturing engineer. Also, the director of quality and supplier management, the supplier quality engineer and buyer, customer engineering, and the manufacturing vice president.

The power of the scorecard. Margaret (Peggy) A. Williams, CPM, director of procurement at Compaq Computers, Inc. (Cupertino, Calif.; williams_peggy@compaq.com), declares, “The supplier scorecard is the process that moved us from a tactical organization to a strategic one.” As an example, she notes that her staff was previously 100% tactical and was achieving about 2% in annual cost reductions. Since implementing the supplier performance program, with scorecard, her staff is about 40% strategic, and annual cost savings are in the double digits.

Joseph V. Joy, vice president of business and supplier development at Solectron (West Columbia, S.C.; joejoy@sc.slr.com), maintains, “It’s almost less important what the scorecard is, but it’s essential to have one with your

strategic suppliers. It enables you to meet with them, go through the issues, and let them know you are there for them.”

Compaq’s supplier scorecard totals 100 points and considers two primary elements. The broad scorecard elements are service, support, quality, and reliability. However, within each is a more detailed listing of measures. For instance, under support and service, suppliers are measured on factors such as on-time delivery, lead-time reduction, flexibility, value-added contribution (primarily engineering support), receiving discrepancies, and responsiveness. Within quality and reliability are product quality performance, reliability, sustained performance, and quality management system.

Solectron’s initiative part of continuous improvement process. The Supplier Valued Added performance measurement tool is used by Solectron’s supply base management group to “improve the performance and value-added by our suppliers,” explains Joy. The elements of the SVA scorecard (see Figure III-1.23) include quality/reliability, delivery/flexibility, technology, price, and service.

“We use data to manage the supply line process,” he maintains. “A monthly report card is developed that includes five key metrics for each preferred supplier.” These 32 suppliers, he notes, represent 80% of the company’s incoming needs. “Solectron SBM focuses its attention on those ‘vital few’ suppliers that account for the highest dollar value received or the high-

Weight	Element	Measurement	PerformanceContribution		
			Score	Wgt.	Adj
30%	Quality/Reliability	Quality Performance (DPM)	30%		
		Receiving Inspection Performance	20%		
		Line Performance	20%		
		Reliability Performance	20%		
		Field Retrofit Required	10%		
20%	Delivery/Flexibility	On time Committed Receipt Date	30%		
		On time Requested Receipt Date	10%		
		Standard Interval Performance	30%		
		Delivery Error Performance	20%		
		Flexibility & Lead Time	10%		
20%	Technology	Technology Roadmap		20%	
		Technology Management			
20%	Price	Target Price			
		Price Aggressiveness		95%	
		Price Index Adjustment		5%	
10%	Service				

Figure III-1.23 SVA Scorecard

Source: Solectron.

est return to our customers,” Joy explains. “We depend on these preferred suppliers to consistently provide us with the highest standard of quality and on-time delivery performance.”

Focus on key suppliers. Compaq’s Williams notes, “With the scorecard we’re talking about the high-level supplier. The suppliers we measure are the preferred and strategic suppliers.” Obviously, due to time and other restraints, a report card cannot, and should not, be maintained for every supplier. She further reveals, “Our supplier scorecard measures major business and performance elements over time. That’s the most important thing. I don’t care where the supplier starts on the scorecard; what I care about is what trend they have.”

The process also promotes continuous improvement. As Joy relates, “We provide a balanced scorecard for measuring performance and for regularly communicating status as well as our expectations and goals to strategic and key suppliers.” As evidence, he points to some results of the program.

The average SVA score increased from 53 to 86 over a two-year period. Further, three suppliers, accounting for 32% of what Solectron Systems Engineering and Services spend, achieved ratings above 90. Expanding on this, Williams explains that the scorecard also provides a forum for setting goals and celebrating achievements.

The report card provides a visual method of communications, especially to management. “Our scorecard gives the procurement function visibility with upper management, about what we’re doing, and how we’re helping the customer,” Williams describes. In fact, at the quarterly supplier review, Compaq executives meet with the top management representatives of these key supplier companies.

Similarly, Joy mentions that the executive supplier review is held with the Solectron executive team and the executive team from each of the preferred suppliers. “The main purpose of the executive supplier review is to provide an executive level forum to discuss the overall business relationship in the context of TCO and mutual competitiveness,” he describes.

As a final note, Williams says, “The scorecard process is really evolutionary. It’s always changing. We’re always revising it, and we’re always raising the bar.”

MORE PURCHASING MANAGERS BENCHMARK INTERNAL CUSTOMER SATISFACTION

Traditionally, purchasing has been associated with managing supplier relationships. For a growing number of companies, however, it is becoming a supplier of services for its own set of customers. Today, many purchasing professionals emphasize the satisfaction of their internal customers while seeking feedback on their performance.

How are we doing? The recent Annual Strategic Sourcing Management Conference (Institute for International Research; New York) provided timely examples of this trend, as well as useful tips for those who want to get on board. Ronald D. Casbon, CPM, general manager of purchasing and transportation at Bethlehem Steel Corporation (Bethlehem, Pa.; rdcasbon@bethsteel.com) shares, “Every year we conduct a survey of all our key clients throughout the corporation.” The purpose, he stated, is to “provide feedback on how we’re doing, what we should change, and how we can improve our performance.”

Similarly, Mark S. Miller, CPM, CIRM, purchasing manager (Mmiller@Casecorp.com), and Steven R. Fogle, CPM, purchasing team leader (Sfogle@Casecorp.com), Case Corporation (Racine, Wis.), describe the tactics they use to improve the “customer focus of our purchasing department.” They are to

- *Establish common customer service goals.* “We have established common customer service goals for everyone in the company based on customer service index,” they described at a recent NAPM Annual International Purchasing Conference. The customer service index is based on customer surveys that are done continuously to measure “how we’re doing in the customer’s eye.”

- *Establish a process organization.* “We have established a process versus a functional organization,” they maintain. One solution was the formation of cross-functional teams with the charter to improve processes. Also, they consolidated some functional areas to form work teams using a matrix approach. “For example, we combined purchasing, inventory control, and expediting into material control teams,” Miller and Fogle describe. “Forming teams to improve processes and combining functional groups into teams are good ways to improve customer focus,” they agree.

- *Get out and talk with customers.* “To better serve the customers you first must meet and understand their needs,” they declare. “Hold meetings with your internal customers and identify areas that can be improved. Then form cross-functional teams to improve the processes you have identified,” they insist. At Case, they hold monthly meetings with their internal customers to review the results of the process teams and to identify new areas of opportunity.

- *Include suppliers in the process.* “We involve our suppliers in customer service, too,” Miller and Fogle explain. “Each time we meet with suppliers we explain how we measure customer service and show how they can contribute to our customer satisfaction.”

- *Move away from the transactional.* At Merck & Co., Inc. (Rahway, N.J.), purchasing moved into a different direction. According to Jennifer L. Hunt, manager of Rahway procurement (huntjenn@merck.com), purchasing pros moved from a transactional focus to one that is strategic. This involved a change in many former existing practices and philosophies, and the implementation of new technology. But above all, she told a recent Annual Performance Measurement for the Purchasing Function Conference (Institute for International Research; New York), “We want our ‘stakeholders’ to look at us as supplying value, not in just cost savings, but also in the service we provide.” A tool they use to evaluate just how well they are perceived is a procurement customer satisfaction survey.

- *Ask procurement’s customers for input.* At Merck’s Rahway facility, of the 4,500 employees at the site, more than 2,200 are procurement “customers.” About 1,000 end users were randomly selected to receive the first survey conducted at the site. Its focus was to determine how the client base viewed purchasing’s service, skills and knowledge, values, principles, and systems, in terms of satisfaction and importance. There also was a provision for the respondent to offer general comments as to the activities’ strengths and weaknesses. Using the company intranet, each was asked to fill in all of the fields in the survey. In addition to the example, the survey asked for personal information (name), and demographics (how often do you use procurement services, which of the global procurement services have you taken advantage of in the past six months, and which commodities are most of your transactions with; also site location, division, and type of procurement system typically used).

- *Provide feedback to the customers as well.* One of the major failings of a customer satisfaction survey is that the results are compiled and procurement

fails to take action on the responses, or they don't even share the details and comments of the survey. Not so with Merck. In fact, the reason Merck requires respondents to identify themselves is to provide them with a copy of the survey results. Similarly, Casbon also shares the survey results with the respondents. "Every employee who participates in the survey has the benefit of feedback that we receive across the company." In fact, the survey results are put on display at Bethlehem Steel. "If there are things that we're not measuring up on, and need to be addressed, it's up to us to address them," Casbon states emphatically.

NEW RESOURCE HELPS MANAGERS CONDUCT SUPPLY CHAIN AUDIT

There's been a flurry of activity surrounding the formation and operation of the supply chain. Little initiative, however, has been focused on helping purchasing professionals to assess their current status and plan for the advancement of supply chain activity. But help is at hand.

Transform Your Supply Chain: Releasing Value in Business (International Thomson Business Press) offers a practical approach to developing and applying supply chain management strategies.

How to measure your supply chain's present state. What especially impressed us was the comprehensive supply chain audit outlined in the book. Clearly identifying business priorities and supply chain initiatives—it provides all the information that supply chain practitioners, managers, and executives need to benchmark their present performance (see Figure III-1.24).

The information can also be used to map improvement implementation or to identify the next level of supply chain initiative. For instance, a business focus we highlight (see Table III-1.10) concerns "developing relational competence." Within the category, there are 10 "levers of change" to consider, along with four audit questions that, when answered, provide an excellent guide for what steps to take.

The authors (Jon Hughes, Mark Ralf, and Bill Michels) have established the necessary credentials through their experience in developing and applying supply chain strategies in over 30 countries worldwide. The lessons they have learned are shared in this book. Hughes is senior partner, Windsor Foundation for Business Development; Ralf is group purchasing and

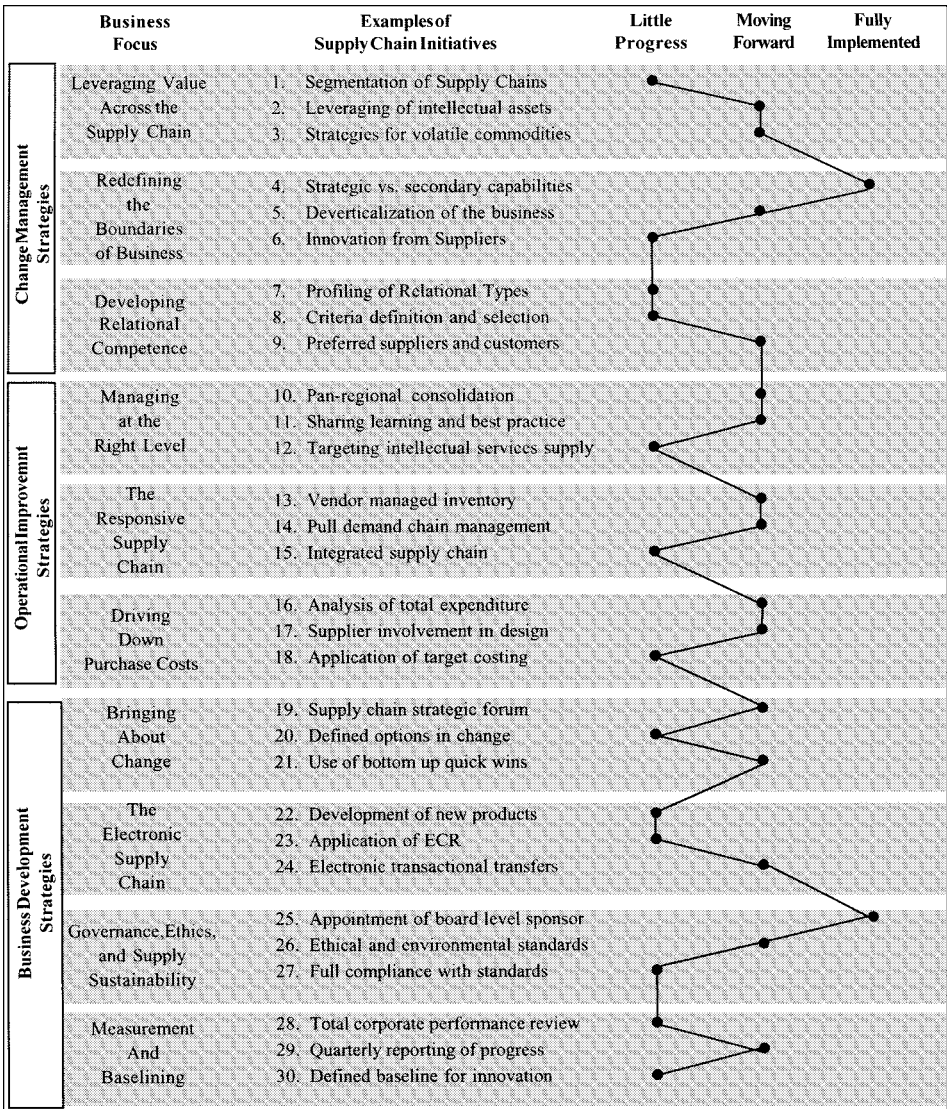


Figure III-1.24 Supply Chain Audit Summary Showing Typical Profile of a Midsize Company

Source: *Transform Your Supply Chain: Releasing Value in Business.*

Table III-1.10 Sample Business Focus Guides Assessment of Progress Across Supply Chain

Theme No. 3: Developing relational competence

A wide array of relational strategies are now being developed across the supply chain. They embrace both collaborative and competitive forms of trading. The key is to develop appropriate criteria for the selection of these different types of trading relationships.

<i>Levers of change</i>	<i>Business Priority</i>			<i>Little Progress</i>	<i>Moving Forward</i>	<i>Fully Implemented</i>
	<i>Low</i>	<i>Moderate</i>	<i>High</i>			
3.1 Develop a clear business understanding of the full range of relational types.	A	B	C	1	2	3
3.2 Map different trading relationships to different business needs.	A	B	C	1	2	3
3.3 Profile the key factors in specific relationships with different suppliers.	A	B	C	1	2	3
3.4 Structure the selection criteria for the application of business relationships.	A	B	C	1	2	3
3.5 Align relational types to strategic and secondary capabilities.	A	B	C	1	2	3
3.6 Recognize the role of power and dependency within supply chains and relationships.	A	B	C	1	2	3
3.7 Develop preferred supplier and preferred customer approaches.	A	B	C	1	2	3
3.8 Assess the contribution of early supplier involvement in a range of business practices.	A	B	C	1	2	3
3.9 Use relational skill to capture and deploy innovation ahead of competitors.	A	B	C	1	2	3
3.10 Provide training, coaching, and action learning in strategic negotiation.	A	B	C	1	2	3

Executive audit:

- Q1: What range of relational strategies is available from acquisition through to the spot market?
- Q2: What business criteria need to be applied to evaluate the appropriateness of relationships?
- Q3: Where should executive resource be applied to derive the greatest business benefits?
- Q4: What risks are associated with different relationships, and how can they be minimized?

property director, BUPA; and Michels is chief executive officer, ADR North America LLC (313-930-5080).

Transform Your Supply Chain can be ordered from ADR North America LLC, 24 Frank Lloyd Wright Drive, Lobby C, P.O. Box 366, Ann Arbor, MI 48106. Price: \$19.99.

PURCHASERS CAN USE THE SUPPLY CHAIN TO EXTEND ITS CAPABILITIES

Supply chain management is the purchasing profession's, maybe even the industry's, most discussed, analyzed, and practiced philosophy. While some practitioners merely adopt the supply chain management banner, focusing only on fundamental activities, purchasing's leaders and visionaries seize the opportunity to extend their scope of responsibility and achieve increasingly sophisticated supplier management.

Redefine your role in the supply chain management philosophy. The ongoing question purchasing professionals wrestle with is, "How far can I go?" The parameters are not easy to define.

For instance, Timothy L. Ortel, CPIM, new products materials project manager, Applied Komatsu Technology, declares, "Suppliers can make or break supply chains." He pointed out at a recent APICS Annual International Conference, "As higher percentages (up to 80%) of direct cost originate outside the enterprise, careful supplier selection early in product development enables repeatable supply chain success." This is clearly an extension of the traditional purchasing responsibility.

In addition, Walter J. Pietrak, CFPIM, internal consultant, North American MRPII development team, Procter & Gamble, believes that "supply chain management is not a stand-alone process, and is much more than just procurement."

Creation of extended supply chain linkages. Michael Katzorke, sees a "growing number of increasingly strong linkages between buyers and their suppliers." Katzorke, who designed and initiated the supply chain management rollout as director of materials at AlliedSignal before moving to Cessna Aircraft as vice president of material, lists the following examples of extended purchasing responsibility:

- Suppliers are now managing the inventory of their products at their customers' facilities.
- Direct computer-to-computer interfaces of MRP-generated requirements and supply data are becoming common between buyers and suppliers.
- The whole just-in-time and efficient consumer response movements require direct linkages from customers to suppliers.
- Some companies ask key suppliers to place planners and others into their plants and facilities to ensure that the suppliers are knowledgeable about their needs.
- Receiving inspection at the buyer's facility has been replaced by process control at the suppliers's locations.

Move beyond the primary supply base. Leading companies such as Harley-Davidson are advancing toward Tier 2 and 3 suppliers—"their supplier's suppliers." It's an attempt, says Leroy Zimdars, CPM, director of development purchasing, to include and align them to become a value-added part of the supply chain.

Meanwhile, Portland State University's Lee Buddress, CPM, and Alan Raedels, CPM, explain that one large multinational firm observed that many of the suppliers in its third tier and below were not even aware that they were suppliers to the multinational.

Virtually all agree that there is a definite need for the purchasing professional to move further up the linkage in the supply chain and work with these suppliers as well. And many probably do need the direction as they are smaller and have fewer resources.

As Buddress and Raedels observe, "Leading-edge practitioners are increasingly concerned with their suppliers' suppliers, processes, and systems. In fact, they tell of one electronics manufacturer that has a 15-person group within the purchasing organization whose sole function it is to evaluate and improve lower-tier suppliers.

Purchasing professionals can influence movement of goods throughout the chain, too. Another key consideration is addressing supply chain coordination required to move goods and products throughout the supply chain. "Transportation coordination and management is becoming as much of a supply chain management issue as are lower tier suppliers," the Portland State duo declare.

“Minimizing suppliers of transportation services the same way we have done for product suppliers” is one suggestion they offer. Further, by “directing the coordination of supply chain processes from the OEM level, supply chain costs decrease and collective efficiencies increase.”

Supply chain communication. If, via EDI or other electronic or Internet means, information can be made to flow more accurately and efficiently, an OEM’s order to its first tier supplier for subassemblies is disaggregated by the supplier’s computer. Purchased parts are automatically ordered by the first tier supplier’s computer from the second tier’s. Similar disaggregation flows the many orders down through multiple levels of the supply base. This can be done in minutes without the data entry steps at each level that often create errors.

Avoid becoming the supply chain’s weak link. “When a company has poor customer service, it becomes the weak link,” declares James P. Knechtges, director of purchasing at Impact Products, Inc. “When a company is not profitable in the supply chain, at any customer or supplier level, it becomes a weak link.”

Cash flow, cycle times, poor quality, inventory, excessive transportation costs, and poor communication can all create weak links in the supply chains, notes Charles A. Watts, CPIM, John Carroll University (Cleveland), copresenter with Knechtges at APICS. “The more positive impact small businesses can have on improving these processes, the better off they will be,” he offers. “Small businesses can take advantage of a number of techniques and breakthroughs in supply chain management.”

Where small companies can fit in the supply chain equation. Knechtges and Watts have developed a matrix of potential supply chain relationships (see Figure III-1.25). In quadrant one, for instance, powerful supply chain members, whether manufacturers, wholesalers, or retailers, often force their will on suppliers and customers.

This quadrant is the worst one for small companies to be in because they are at the mercy of the more powerful members and because relationships do not matter. In quadrant two, there is a more long-term relationship as the controlling supply chain leader recognizes the need for selecting suppliers for a longer term based on their capabilities. This is a better quadrant for smaller businesses, as long as they are continually improving and satisfying the supply chain leader.

Basis for Supply Chain Member Selection

Locus of Control	Product Based	Capability Based
<p align="center">Adversarial</p> <p>Powerful supply chain leader controls the chain to minimize its own costs</p>	<p align="center">1</p> <p>Short-term (tactical) emphasis Contracts are given based on the lowest price Multiple sources (buying mix changes based on the best deals) Conformance to most powerful chain member's requirements</p>	<p align="center">2</p> <p>Long-term (strategic) emphasis Dictated price based on most powerful member's price points Competitive multiple sourcing (will terminate relationship if concessions are not given) Must be reliable and capable to satisfy member's requirements</p>
<p align="center">Cooperative</p> <p>Supply chain members minimize total landed costs for the final customer</p>	<p align="center">3</p> <p>Longer term (tactical) emphasis Value-based (price & services) Technical and managerial assistance to weakest links in the chain Reduced members in the chain (single source in some steps)</p>	<p align="center">4</p> <p>Longest term (strategic marriage) Cost reduction through function optimization and coordinated inventory deployment across the chain Technical cooperation Single sourcing at each step in the chain</p>

Figure III-1.25 Supply Chain Relationships Matrix

Source: James P. Knechtges and Charles A. Watts, CPIM.

Smaller companies do better in a cooperative relationship. In quadrant three, selection of the supply chain member is based on value, which includes price, quality, and service. In these supply chains, members will commit resources to help improve those who may need to improve technical or managerial capability.

A small business that can willingly function in quadrant three will eventually move into the fourth quad. Most chains follow an evolutionary step that begins in quadrant three and ends in four, Knechtges and Watts observe. And small companies that are flexible with specific capabilities will survive in this quad. “The reason that supply chains in quadrant four are the most successful is that it allows firms to truly coordinate their activities,” according to Knechtges and Watts.

Chapter III-2

Supply Chain Management:

IOMA Readers Report What Works

EXCLUSIVE SURVEY: REDUCING SUPPLIER BASE STILL TOP STRATEGY FOR PURCHASING PROS

Purchasing professionals have been aggressively reducing their supplier base for a decade. Many of the initiatives have achieved such astounding success that the activity still remains a top priority in most organizations, large and small alike. Recent *Supplier Selection and Management Report* reader surveys find that almost half of the respondents are still working in this area.

More responsible reductions through innovative approaches. Routinely, the respondents provide us with descriptions of their methodologies as well as their results:

- “We had 25 PCB [prototype circuit board] suppliers but have reduced the number to only five and have realized a cost savings in excess of 15%,” reports a materials director at a large assembler of electronic assemblies.
- “We not only consolidated our supplier base but also entered into longer-term agreements with the suppliers to give us leverage for greater yearly costs savings,” explains a purchasing manager at a small manufacturer of medical devices.
- “Our focus on reducing the supplier base includes combining purchases from multiple plants, establishing longer term contracts with fewer

MRO suppliers, and using price indexes with raw material suppliers,” a purchasing manager at a midsize producer of carpet backing describes.

Others developed programs and established practices that were ingenious.

Consolidate 240 MRO suppliers into only one. “We implemented a supplier-managed in-plant store for designated categories of MRO materials that resulted in an annual cost reduction of \$100,000,” maintains a manager of corporate purchasing at a midsize manufacturer of temperature sensing devices. This action also eliminated the processing of 6,200 annual transactions related to POs, receipts, and invoices.

Realize price reductions up to 30%. “It’s not uncommon to see price reductions from a supplier consolidation process,” agrees a purchasing director at a large producer of industrial flow control equipment and systems. “However, we’ve also seen an improvement in service levels from being a national account and in many cases are receiving value-added services and assistance in implementing best practices.” The supplier reduction process was under the direction of commodity teams, members of which were appointed by the CEO and division presidents. “Their responsibility was to develop the selected suppliers,” he maintains.

Create an entirely new process. A resource specialist at a major management consultant firm shares that they went to work on their own supplier base, especially for office supplies. “We gathered data on the total number of suppliers we used in each category, selected new suppliers, sent out RFQs [requests for quotes] and invited potential suppliers in for a workshop,” she explains. Finalists were then selected from which the eventual supplier was chosen. “We consolidated the spend with the newly selected supplier while also instituting rules for compliance and have realized savings in excess of 15%,” she details.

Share manufacturing resource planning (MRP) data with the supply base. A purchasing manager at a midsize producer of disposable medical supplies explains that they have “balanced their purchasing from a reduced supplier base while still ensuring a consistent supply of material.”

Major suppliers, she relates, “now receive their own copies of the MRP for a rolling six-month horizon.” The suppliers now can commit for raw

materials and produce in one- to two-month requirements. "This process now reduces their inventory levels, and ours, which also reduces the likelihood of obsolescence and enables the suppliers to produce in mutually agreed upon EOQs [economic order quantities]," she maintains.

Educate first, reduce base next. The purchasing director at a large producer of ductile iron pipes, valves, and fittings concedes that cultural barriers and prior performance of the purchasing department originally made it difficult to even think about reducing the supplier base. "Two years ago we began a massive teaching effort discussing the concepts of and the pros and cons involved with supplier selection, relationships, and alliances," he explains. "We still have a few problems in some locations with who controls the supply base, but we're making headway."

Recently, he shares, "We've been providing the consolidated supply base with our production plans and schedules, and have saved from 5% to 15%, depending on the commodity. Where we've had the opportunity to trim the number of suppliers, we've also experienced better delivery performance and reduced stockouts through better communications and cooperation," he maintains. "This has made an impression on those few sites that are still holding out, and they're now starting to come around."

Switch to distributors and move away from a "standard" supplier/manufacturer base. "On-time/complete [OT/C] is probably the most important metric we hold our suppliers to," explains the purchasing vice president at a large builder of "vertical" transportation equipment and systems. "If suppliers are not OT/C, our costs associated with delays can soar."

The company has 60 U.S. locations, and the most successful technique has been switching to distributors for some goods. "We now utilize a key electrical distributor in lieu of nearly 500 electrical products companies that we had been using," he cites as an example. "Savings are realized not only in single invoicing, volume discounts, and similar matters, but also throughout our branches, which now can focus on their core business rather than seeking supply solutions to their electrical needs."

Breaking prior relationships is hard to do. The director of purchasing at a major builder of residential furniture realized that the supplier base had become too large and that the existing buyers "were not on top and really in control of the selection process." They began a program to leverage the buy of top raw material purchases by reducing the number of suppliers. "Quite frankly,

the prior relationships established by some of the divisions were hard to break for this program to be successful,” he explains.

“In fact, our senior management had to step in and take a firm stance and make a commitment to support us in this endeavor.” Once done, the resistance began to fade, albeit very slowly. “With fewer suppliers we were able to realize better pricing, have them agree to consigned inventory, rebates, and 60 day terms with discounts,” he explains.

Increase leverage with a smaller number of suppliers. “We maintain a quality index of supplier performance,” explains a materials manager at a small producer of lawn and garden tools. “Obviously, defective parts cannot be used even if on time and economically priced.”

This became the primary tool for evaluating the supplier base when the decision was made to review it with an eye on cutting the number of suppliers with which they do business. “For those that successfully passed our scrutiny, we increased the volume of business we gave them, to improve our leverage,” he explains. “The increased volume made our ‘packages’ much more attractive to them, which also allowed our suppliers to take advantage of economies of scale and long-term planning,” he declares. “In fact, they began a similar program with their suppliers, also, to all of our benefit.”

Lowering total supply chain costs also an achievement. The materials manager at a large manufacturer of sensors reveals that they undertook and realized complete supply chain integration of demands from the customer through to the second and third tiers of suppliers.

“This added value by freeing up our buyers to spend more time sourcing, selecting, and negotiating cost reductions,” he explains. “It also led to the rationalization and consolidation of our supply base, with the remaining suppliers receiving increased volumes of orders, which in turn lowered the prices we paid.”

EXCLUSIVE SURVEY: SUPPLIER CONSOLIDATIONS CAN ACHIEVE 20–30% PRICE REDUCTIONS

Reducing the supplier base has become a double-edged sword for many purchasing professionals. While it is still considered a primary best practice by a large bloc of *Supplier Selection and Management Report* readers (41.8%

according to our latest survey), others (20.8%) list it as their biggest challenge (see sidebar).

And many work to surmount the problem. Internal and external forces are working against supplier consolidation, readers report. Yet the advantages of a smaller supplier base greatly outweigh the negatives, forcing purchasing professionals to continue on.

As an example, the procurement director at a leading maker of refrigerators acknowledges, “Supply base rationalization was a major obstacle in our drive toward strategic improvements. However, through measurement and high visibility, we have been able to reduce our supply base by more than 50% in the last 12-month period,” he explains.

The benefits of optimization are real. In another example, the purchasing director at a midsize producer of industrial flow control equipment remarks,

Why Reducing the Supplier Base Is a Problem

Overwhelmingly, readers responding to the open-ended question cite the “special” relationship between the end user and the supplier.

For example, the purchasing redesign director at a large chemical manufacturer anguishes, “We are nowhere close to resolving our objective of reducing the supplier base. The biggest barrier that we continually encounter is the established relationship between the end user and the supplier.”

Similarly, the purchasing vice president at a midsize manufacturer of electrical components offers, “How do you tell a supplier with whom you’ve dealt with for many years and have a special relationship that it’s over? It’s the most difficult decision we must make, and the hardest to deliver.”

A global commodity team with the task of optimizing the supply base was thought to be the answer at a producer of shocks and suspension systems for automobiles. However, the purchasing director explains, “We formed teams in select areas and included representatives from each business group to review products, supplier performance, and other parameters. Yet, we still have some sites steadfastly hanging on to their local suppliers instead,” she complains.

The most unique response came from the executive vice president at a midsize metals service center. He finds “most suppliers are ‘niche-ing’ themselves more and more, which makes it difficult, if not impossible, to get everything from only one or two suppliers.”

“It’s not uncommon to see 20% to 30% price reductions from supplier consolidations. We’ve also experienced improved service levels, received several value-added services, and gained major assistance in implementing best practices,” he notes.

What leading purchasing professionals are doing to optimize their supplier base. To their credit, procurement professionals are not of the slash-and-dash school of supplier reduction. Instead, according to our poll and their unaided responses, much study and analysis go into making the decision. And the methodology is often creative. For example, the purchasing director at a midsize manufacturer of extruded products introduced a “new approach to buying: initiating a supply chain program and focusing resources on fewer suppliers.” They formed cross-functional teams, made wish lists, met with suppliers, and visited supplier sites.

“We conducted very structured negotiations and awarded multiyear supply agreements,” he reports. The savings have gone beyond 20%, and a “significant amount of administrative time also has been removed,” he notes.

Consolidating multisite requirements. One of the more popular approaches is the attempt to consolidate the needs and requirements of various plant locations and individual divisions, located both domestically and internationally. “We consolidated the commodity spend information from six domestic manufacturing facilities and used this information to reduce the supply base to a single source,” reports the division purchasing manager at a large maker of electrical circuit protection devices. The first commodity completed was chipboard. On a \$2 million spend, they achieved a 46% cost reduction. Work is now actively focused on corrugated cartons, fasteners, and solder and screw machine parts.

Instituting a supplier-managed in-plant store program. A corporate purchasing manager at a large producer of lawn and garden equipment consolidated 240 suppliers of MRO material into one. “We implemented a supplier-managed, in-plant store program for designated categories of MRO,” he relates. This action resulted in annual savings of \$100,000 and eliminated more than 6,200 annual transactions relating to POs, receipts, and invoices.

Increasing leverage with fewer suppliers. “Our most successful strategy over the past year was the reduction of the supplier base,” says the materials manager at a small maker of household appliances. “By increasing our volume with

fewer suppliers, we also were able to improve the leverage we had with them.” He relates, “This increase in volume made us much more attractive as a customer, and enabled our suppliers to take advantage of the economies of scale and long-term planning.”

Entering into long-term agreements. “We once had 26 PCB suppliers, and have reduced them to only five,” reports the director of materials at a large computer components manufacturer. “Our savings are upwards of 15% and were achieved by entering into a major renegotiation based on the expanded volume and a longer-term contract.”

“Longer-term agreements with fewer suppliers definitely gives us much more leverage in dealing with the supplier base,” agrees a purchasing manager at a midsize maker of medical devices. “We’ve also been able to implement performance measures for yearly cost savings, and have the advantage of fewer POs and invoices, besides.”

“We’ve rationalized our supply base to increase volume for the remaining suppliers, which has reduced our total cost,” maintains a materials manager at a large producer of sensors. “Fewer suppliers enable us to strengthen our remaining partnerships, and the improved leverage enables us to demand additional improvements in quality and lower overall supply chain costs.”

EXCLUSIVE SURVEY: SUPPLIER CONSOLIDATION STILL TOP PRACTICE, BUT NEW ONES EMERGING

For the sixth consecutive year, “reducing the supplier base” tops the list of practices that *Supplier Selection and Management Report* readers say have been most effective for controlling costs. Most impressive is the staying power of this practice. Not only is supply base rationalization the only one to draw a majority of the response this year (53.2%), but its popularity continues to grow, as it widened its margin over the runner-up practice (renegotiated existing supplier contracts) to six percentage points—the largest spread to date.

Why supplier base rationalization remains a top practice. One reader explains it best: “Our procurement infrastructure could not support the multitude of continuous improvement initiatives without a dedicated process to rationalize our current supply base,” declares the purchasing director at a major manufacturer of consumer appliances.

“Our procurement center identified the issue of supply base rationaliza-

tion and subsequently formalized it within our strategic procurement plan,” he describes. The plan is known by an acronym denoting the number of suppliers they intend to have corporate-wide and the quality level they anticipate the reduced supply base to achieve. “We have realized tremendous opportunities and benefits that directly correlate to the supply base reduction process.”

Consistency marks top six best practices. It is apparent that readers retain a high degree of loyalty to the practices that work best for them. The top six (see Table III-2.1) have been the same (although their relative positions—two through six—change year to year) since we launched the first reader survey in the early 1990s. Examples of comments we received relative to the runners-up include this: “For us, renegotiating existing supplier contracts have saved a substantial amount of money, estimated at \$400,000 for the first two quarters of 1998,” explains a purchasing engineering manager at a midsize manufacturer of printing ink.

Readers are also tough on price increases. For instance, a purchasing manager at a midsize die caster shares, “We notified suppliers that price increases would not be accepted. In cases where suppliers forced an increase, the item went back out for quoting. This usually resulted in an alternate or new supplier that either lowered cost, gave us better terms, or maintained minimal price increases,” she details.

A decided shift to foreign suppliers. Despite year-to-year consistency, we applaud our purchasing professional readership for a sense of dynamics among the practices they introduce each year. For instance, the practice that showed the greatest year-to-year gain is “global sourcing.” We have reported on this activity, and anecdotal evidence continues to build about domestic buyers moving offshore to foreign suppliers.

However, our surveys just did not indicate significant movement in this arena. In fact, only two years ago, a mere 4.9% of the respondents said that they were sourcing offshore. Last year it more than doubled to 10.2%. This year, foreign sourcing soared to 18.3% of the audience. A surprise, however, is that the activity is being “driven” by respondents in the small and midsize companies (18.9%) by a slight margin over their larger counterparts (17.8%).

Typical responses among those moving to foreign suppliers include the director of procurement at a large maker of motion control products. “We shifted domestic procurement of an item offshore, and in the first year alone

**Table III-2.1 Supplier Selection and Management Report Reader Study of Cost Reduction Best Practices
(current year and three prior year survey results; in percent)**

	All Respondents	Companies with <500 Employees	Companies with >500 Employees	All Respondents (Y-1)	All Respondents (Y-2)	All Respondents (Y-3)
Reduced supplier base	53.2	50.4	56.1	51.5	54.1	51.4
Renegotiated existing supplier contracts	7.2	48.6	45.8	50.0	50.6	40.4
Taken tougher stand on price increases	0.8	38.7	43.0	47.0	38.8	46.6
Created new supplier partnerships	7.2	32.4	42.1	39.8	45.3	45.2
Implemented blanket POs for some goods	4.9	40.5	29.0	47.0	36.7	45.9
Shifted inventory to suppliers	2.6	29.7	35.5	38.3	33.9	45.9
Made production plans/schedules available to suppliers	6.1	27.9	24.3	23.5	20.4	24.0
Improved supplier quality	4.8	30.6	18.7	20.5	24.9	29.5
Established cross-functional teams	0.6	15.3	26.2	20.1	32.7	32.2
Initiated/reviewed total supply chain management performance	18.8	13.5	24.3	12.1	16.3	14.4
Strengthened/expanded supplier certification	18.3	18.0	18.7	10.6	14.7	14.4
Shifted to foreign suppliers/global sourcing	18.3	18.9	17.8	10.2	4.9	4.8
Encouraged/required earlier or more supplier involvement in design process	17.4	19.8	15.0	19.3	16.3	15.8
Involved engineering/design earlier in supplier selection process	15.1	22.5	7.5	14.4	13.1	12.3
Establish purchase card program, electronic commerce process	14.7	11.7	17.8	—	—	—
Altered supplier payment terms	14.2	14.4	14.0	15.5	15.1	15.8
Introduced value analysis/determined total cost of ownership	13.8	9.0	18.7	9.8	13.9	13.7
Switched to using distributors for some goods	11.0	9.9	12.1	7.9	6.1	8.9
Implemented supplier EDI relationships	10.6	10.8	10.3	5.7	11.8	8.2
Switched to JIT buying process	10.6	11.7	9.3	12.1	14.3	13.0
Used more make versus buy in production process	7.3	11.7	2.8	6.1	10.2	7.5
Implemented ISO 9000 standard	7.3	8.1	6.5	9.8	6.5	8.9
Contracted out MRO buys	6.4	6.3	6.5	6.4	12.7	4.1
Increased/expanded use of bar coding	6.0	7.2	4.7	4.2	9.4	4.1
Switched to use of third-party logistics	2.8	1.8	3.7	2.6	3.3	2.1

Source: *Supplier Selection and Management Report.*

we realized a 56% net savings, that is, after freight, duties, and start-up costs,” he shares.

Similarly, a procurement manager at a midsize service provider tells of “a cost savings of almost 40% within one material category since shopping among offshore suppliers.”

A renewed look at supplier quality and certification. One particular result in the survey heartens us. It is in the “resurgence” of boosting supplier quality initiatives. For instance, supplier certification was cited by almost one in five (18.3%) respondents. This is more than a 70% improvement over last year’s response. Additionally, efforts to improve supplier quality moved up 21%, to 24.8%.

As an example of what is happening in the quality improvement area, a senior buyer at a small manufacturer of electronic test equipment shares, “During the past year or two, we have been implementing a series of activities, but the one that’s been the most successful has been in improving supplier quality. We’ve also undertaken an intensive process of qualifying suppliers with the capabilities required of our most intricate parts.”

Supply chain management practices making rapid strides. This year’s reader survey finds respondents making a greater push in initiating total supply chain management performance activities. Almost one in five (18.8%) participants say that they are making the effort, which represents the largest response to date.

This is up an impressive 55% over last year’s result. As expected, this activity is definitely being driven by the respondents in larger companies. For example, a purchasing manager at a large producer of baked goods explains, “We have focused on developing the supply chain as there are a lot of dollars wasted in hidden costs and redundancy that are just being uncovered. From our initial efforts we know that there are many more opportunities that will be realized as we refine the supply chain.”

Purchasing card (P-card) draws well in its initial appearance. In previous years, readers, unaided, frequently mentioned the application of P-cards as a successful method of controlling costs. It had reached a level where we believed it should be listed as a separate item on the questionnaire.

In its debut among 25 cost control practices, almost 15% of the participants cited P-cards as one practice that they successfully employed. This is indeed an impressive first-time showing, and it bodes well for the future.

Two responses, in particular, made an impression about P-card practice. A manager of procurement and sourcing at a midsize producer of eyewear products and supplies offers, “We had a global roll-out of the P-card, in the U.S., Europe, and Asia. Already we’ve realized a reduction approaching 40% in purchasing and accounts payable transactions. We’ve also eliminated non-value-added activities and have reassigned some of our resources to other cost savings teams,” she details.

The group vice president at a midsize producer of replacement parts also launched a P-card program during the year. “This has improved lead times and reduced paperwork that in turn has reduced time in purchasing, accounts payable, and in our support groups,” he explains.

Two significant practices not faring as well as might be expected. We may be extremely critical, but we anticipate that a couple of related practices will receive a lot more attention, according to our reportage and discussions with purchasing professionals throughout the year.

One is the activity of cross-functional teams (which is holding around the 20% response level, after a drop-off from the mid-30s two years ago). The other is involving the supplier earlier in the design process. Since first including this practice in the survey three years ago, and despite all the rhetoric, it has not made any significant movement from the upper teens.

Yet those who practice one or both are impressed. For example, a purchasing manager at a small manufacturer of telecom monitoring systems shares, “Since we began involving suppliers early in the design process, we’ve been able to avoid designing in costly processes and materials. We include the suppliers in our concept and design reviews as we consider them an extension of our design team.”

The senior director of materials management and purchasing at a government agency finds value in using cross-functional teams. “Since we established cross-functional teams, we have been better able to focus on specific inventory/supply problems which affect end users, accounts payable functions, procurement, and suppliers. Some teams are product-specific, some department-specific, and others, supplier-specific. All groups focus on the desired results and bottom-line cost issues,” he details.

In review, what we may be seeing in the results from the latest reader study may actually be the threshold to a new era of some very new and interesting practices taking hold in supplier management.

EXCLUSIVE SURVEY: SUPPLY BASE REDUCTIONS CONTINUE, BUT NOT JUST TO CUT COSTS

Within the purchasing community, experts are working diligently to determine not only the right suppliers with whom to do business but also the optimum number to include. This is borne out by the priority that purchasing management continues to give to its supplier base optimization initiatives.

For the past six years, *Supplier Selection and Management Report* surveys consistently found that supplier base consolidation ranks as the number one focus of readers. And since the NAPM began asking its members two years ago, they also concur that optimizing the supply base is their top strategic initiative.

Moving beyond purchase price considerations is the new objective. There is still a fair amount of purchasers who are reducing their supply base just to gain price leverage. And that motivation will always remain. However, the leaders of the profession have moved beyond price into new vistas. More than half (53.2%) the respondents to the most recent *Supplier Selection and Management Report* survey say that they are actively reducing their supplier base. Few, however, mention price as their primary reason. Instead, the new goals span a wide range of strategic objectives. With the expectation that they will stimulate new ideas and tactics, we share some of the hundreds of responses purchasing professionals provided us.

Support for continuous improvement initiatives. “We have a goal to get down to 300 suppliers corporate-wide at a quality level of 3 ppm within four years,” shares the purchasing vice president at a major manufacturer of consumer appliances. “Our procurement infrastructure could not support the multitude of continuous improvement initiatives without a dedicated process to rationalize our current supply base.”

They identified the issue of supply base rationalization and subsequently formalized the initiative. “The process of supplier selection can be very emotional,” he acknowledges. “Establishing an objective process of supply rationalization through auditing of key business and quality criteria has been instrumental to our success.”

Reduce total cost of acquisition. “We’re concentrating our material requirements into fewer—although not necessarily single or sole—source

suppliers,” maintains the purchasing vice president at a midsize producer of alcoholic beverages. “Essentially, our objective is to be ‘important’ to existing suppliers.” To date, “We’ve been able to lower our cost of acquisition via improved internal efficiencies and better machine utilization on the part of our suppliers.”

Less time for buyers to work on the traditional aspects of purchasing. “By consolidating our supply base to fewer key suppliers, our buyers benefit by spending less time contacting suppliers, preparing orders, and doing other transactional duties,” offers the sales/purchasing manager at a midsize provider of electronics assemblies. “Our buyers are now more involved with studying the markets, developing supplier selection criteria, and other strategic activities.”

Global consolidation leads to longer-term contracts. “We’ve formalized a program for consolidating worldwide requirements into global procurement initiatives resulting in corporate contracts,” reports the director of worldwide supplier management for a large provider of over-the-counter pharmaceutical products. “We’ve also entered into a number of longer-term contracts, out to three years, as opposed to the typical one-year pacts.”

There was some resistance to the plan by individual regions, as they believed they would lose local autonomy, he explains. “To alleviate this situation, we solicited the input from regional purchasing, plant, and quality people in drafting the RFPs [requests for proposals]. Further, we instituted supplier days at the local plant level to review the requirements and hear supplier presentations.”

Consolidated purchasing initiative removes suppliers and saves cost. “We did a company-wide sweep of suppliers and found we were doing business with more than 20 suppliers for business forms alone,” reports a division purchasing manager at a large manufacturer of circuit protection products. “We immediately instituted a forms management process, which enabled us to move to just one supplier. We expect our first year savings will be as great as \$200,000, which we’ll track and report monthly,” he shares.

Better specifications are the outcome of supplier reduction initiative. The operations vice president at a small maker of laboratory wares tells of consolidating the suppliers of plastic resins and packaging materials. “This situation directly led to improved cooperation between our engineering and

manufacturing operations. As a result, they worked together and with purchasing and the suppliers to jointly develop better specifications, which improved our yield and processing operations, reducing our costs overall.”

Less inventory with fewer suppliers. “Since reducing the supplier base and contracting with a regional distributor, we’ve been able to reduce miscellaneous transaction charges, have fewer deliveries, and reduce our on-hand inventory,” maintains the materials management director at a midsize provider of health care products.

Cross-functional teams help “right-size” supplier base. The director of key supplier development at a large forest products company shares, “We now have beneficial long-term supplier relationships since we used a series of cross-functional teams to help us determine the proper number of suppliers we required in each of several categories.”

The director acknowledges that the challenge was in managing the change created in the supplier base but with improving supplier relationships and better performance by the suppliers. “Our internal customers came around to accepting what we’re doing now as an ongoing initiative.”

Stronger relationships with suppliers now possible. A plant buyer at a small maker of specialty chemicals finds that reducing the supplier base has enabled him to develop a stronger relationship with those suppliers that remain. “Our raw materials are delivered more frequently, and we now have less on-hand materials that we have to store,” he notes. “Besides, I now have time to learn more about the supplier and their capabilities.”

Supply base rationalization accounts for \$6 million in savings. “In one area we started with five suppliers and established a series of success criteria,” explains the chief purchasing officer at a large preparer of frozen food products. After three years, and based on the ability to meet the criteria consistently, the number of suppliers was cut to two.

“The success of our supplier rationalization process, which originally was met with much skepticism, is attributable to top management support and the formation of cross-functional teams which drove the selection and review processes.” He did not downplay the need for a great deal of internal selling and believes that the team participation helped turn the project into a winner—“especially when we held the teams accountable for the supplier selection,” he notes.

EXCLUSIVE SURVEY: PURCHASING PROS TACKLE THEIR TOUGHEST SUPPLIER PROBLEMS

Like you, your peers are confronting wide-ranging challenges. They extend from the perennial—price increases and supplier quality issues—to those of a more recent vintage—supplier alliances, cross-functional teaming, and foreign sourcing. In the latest *Supplier Selection and Management Report* survey, respondents share both the nature and resolution of their most pressing problems (see sidebar).

The following excerpts, culled from hundreds of responses, provide a real-world, practical compendium for purchasing problem solving.

Some Problems Don't Ever Seem to Go Away

While the majority of respondents report success in meeting specific challenges, others still have difficulty resolving theirs. Some found the time to explain their continuing difficulties:

- “Changing suppliers of major components is a slow and arduous process of supplier selection, prototype production, and engineering testing here and at our parent company in Japan,” explains the general manager of purchasing at a midsize manufacturer of material handling equipment. “Significant barriers remain in communicating with the Japanese engineers, and in having an insufficient local engineering staff to address the priority projects.”
- “Offshore sourcing for medium-volume purchases remains a problem due to a lack of management commitment to the up-front investment required to develop sufficient, quality offshore sources,” maintains a purchasing director at a large gear manufacturer.
- “Having a supplier certification process intuitively seems like a good idea,” a purchasing manager at a large maker of electric tools explains. “However, I can’t get it past the management board because of the difficulty in justifying the extra administrative costs involved.”
- “I’ve attempted to implement a procurement card program but have only met with resistance from our finance group,” explains a purchasing manager at a large producer of wireless products. “It’s no closer to being resolved as the primary barrier is finance’s adamant resistance to change existing procedures.”

Get management's acceptance for supplier partnerships. “One of my most pressing problems has been to get executive management to allow us to treat suppliers as partners rather than adversaries,” related the senior director of materials management and purchasing at a large government agency. “It was resolved when we demonstrated the potential cost savings of a cooperative effort. Naturally, we kept management aware of our progress as we developed the plan.”

Work through supplier's subpar quality and delivery performance. “Due to rapid, unplanned growth, a key supplier/partner's quality and delivery performance plummeted,” maintains a purchasing manager at a small producer of telecom test/monitoring systems. “To resolve this situation we have implemented an intensive program that involves weekly conference calls, formed project improvement teams to look at all problem areas, and begun to issue monthly report cards on performance.” The project teams include representatives from the supplier.

Maintain the focus of internal resources on the desired goals. “We have set some aggressive goals, such as a 30% purchase part cost reduction over five years, 100% quality of purchased parts through our manufacturing process, and 100% on-time delivery,” specifies a procurement manager at a midsize maker of aircraft safety systems. “We realized early on that these goals could not be met without the support of engineering, manufacturing, and quality assurance,” he acknowledged.

Since each of these functions also has its own priorities, it was decided to “synergize the goals of the four departments and allocate resources from each group to form a cross-functional team.” The team meets regularly and publishes meeting minutes that include action items listed by commodity, completion dates, and specific personnel for ownership. The team also gives an executive review twice a year. In the last year, the effort of this seven-person team has generated more than \$800,000 in savings.

Replace foreign supplier due to repeated, major problems. “We were not pleased with our European manufacturing supplier,” maintains a purchasing manager at a small software producer. “We attempted to correct the situation by working more closely with the supplier, but it didn't take. Finally, we had to conduct a supplier search. We assembled a cross-functional team and visited three candidates, reviewing their capabilities and facilities,” he explains. “It's

an expensive process, but the results we've been achieving more than repay the investment."

Alert engineering about working alone with suppliers. "Our engineers and plant people have their own preferences when it comes to specific suppliers," a purchasing engineering manager at a midsize producer of printing inks remarks. "The suppliers know this as well, and it creates a very noncompetitive situation for us." The solution was discussing alternative options with engineering and operations personnel before they make the purchase. "One point we stressed was that they had to get at least two bids on specific purchases," he explains.

Resolve lead-time issues to maintain correct inventory balances. A scheduling supervisor at a large producer of lighting fixtures relates that unresolved lead-time issues are causing them to have either "too much or not enough of certain critical materials." Electronic data interchange (EDI) has helped somewhat. "However, we are in serious discussion with our suppliers to open miniwarehouses and distribution points to supply us more often with smaller lots," he explains.

Break from the "three quote and a cloud of dust" philosophy. The manager of procurement at a midsize producer of heat exchangers relates how they are trying to do away with a traditional practice: getting three quotes on everything. "Now, we are starting to have the various suppliers come into our facilities and meet representatives from other departments, such as engineering, materials, production, and quality," he explains. "It's part of our new initiative to break down the barriers that may exist between our suppliers and ourselves. We're beginning to see some positive results from these new relationships."

Chapter III-3

Supply Chain Management

Case Studies of Success

VERMEER GAINS BETTER SUPPLIER MANAGEMENT BY GOING LEAN

The transition to a lean corporate culture has dramatically impacted the procurement organization at Vermeer Manufacturing Co. (Pella, Iowa). For one, there has been a pronounced change in the procurement mission and methodology at the major manufacturer of construction, environmental and agricultural equipment. Here is why, how it was done, and what it achieved.

A radical shift in purchasing culture. “We put together a corporate procurement team that developed and implemented a total acquisition cost reduction system to provide us with a competitive advantage,” explains Randy L. Gard, vice president of global planning, who previously was director of corporate procurement (rgard@vermeermfg.com). The objective was to “accomplish our mission through long-term value-added partnerships with suppliers, other manufacturers and customers.”

The overall strategy for corporate procurement was to leverage volume to lower costs and to purchase best value from best-in-class suppliers. Because Vermeer is a private company and holds its financial data proprietary, they describe their success for fiscal year 1999 generically as the following:

- Steel supplier consolidation and renegotiated contracts resulted in a significant savings in purchase price variance.

- Freight supplier consolidation and renegotiated contracts resulted in major “hard” dollar savings.
- Long-term alliance with Vermeer’s major hydraulics suppliers resulted in a rate of projected savings into the double digits.
- Other initiatives resulted in additional projected savings, which are described as “very significant.”

Creating a new procurement organization and over-communicating to gain buy-in. The change began in October 1998 with the formation of a procurement group that sets purchasing strategy and policy at the corporate level through the director of procurement. Additionally, the company created six supplier alliance specialist positions, one for each commodity.

“The individuals filling these positions were either senior buyers or materials managers at our focus factories,” Gard explained at a recent NAPM Supply Chain Management Conference. “They no longer cut POs or fight fires.” Instead, within the new organization, they now are responsible for negotiating, leveraging, and managing the long-term agreements with selected best-in-class suppliers.

Buying steel in the new organization. The supplier alliance specialist who handles steel shows an example of the impact of the new organization. “Previously, we had 28 different suppliers, and each focus factory bought the same steel from the same company, but each would pay a different price, depending on the aggressiveness and behavior of the individual buyers at the focus factory,” Gard describes.

Today, Vermeer has only two suppliers for their steel requirements, with a consistent price package. “We went through the entire exercise of walking through and doing site surveys,” he notes. “Internally, the people at the focus factories, from the buyers to the operations managers, told us we couldn’t cut 26 of their suppliers. But we did, and successfully, at that.”

Part of the solution was to over-communicate. “We found that we had to regularly meet with the buyers and materials people, sometimes almost daily, to get our message across,” he explains. Part of the problem was that Vermeer is located on an 88-acre campus, in eight plants, with each operating autonomously.

Currently, the procurement staff includes 11 at the corporate level (six supplier alliance specialists plus support people). Recently they added two other positions to handle corporate warranty matters. They found one of

their highest costs was not work in the field, but warranty variances in the process. So, now they're more aggressively recovering costs from the suppliers of faulty product.

There are 25 buyer/planners at the focus factories who manage the inventory and provide the materials for each manufacturing division. They handle the day-to-day activities and continue to report to the focus factory management.

Emphasizing new series of metrics. At the start of this reorganization, Vermeer had 4,000 suppliers. They are now at 2,000 and are trying to reduce it still further, to 400 suppliers. A Pareto analysis they did found that 195 suppliers account for 83% of the annual spend.

"For the procurement team to be successful, we need to measure exactly what we want to accomplish and to develop a plan to accomplish that," Gard explains. For instance, they measure ppv, like many others. Also, they looked at payment terms.

"As a culture, for a long time we said that net 30 is how we would pay our bills, so we could hold onto our money as long as possible," he recalls. "When we analyzed this and developed several scenarios, we found that when we went to 2% ten, taking that 2% gave us a far greater return than holding onto the cash."

Introducing supplier report cards and performance indices. "We measure supplier performance in quality and delivery, and they also measure our performance," maintains Gard. The entire purpose is to be a better customer and to drive down the total acquisition cost.

"The report card quantifies the things we know or think we know," he mentions. However, he does emphasize that they keep the measurement simple. "We don't get into a lot of bizarre algorithms, like ppm," he notes. "It's essentially, did you get it here on time, yes or no?"

In addition, they have created a value-based supplier performance index. It takes into consideration the part cost plus the nonconformance costs to provide an index. The nonconformance cost equals those charges associated with warranty, time-based delivery, poor quality as gathered from the report card, and others (see Table III-3.1).

"Essentially, we put a number against that nonconformance, or what does it cost us when that particular event occurs," he explains. For example, when a part comes in early by a day, or is late by a day, what is the cost to the company. When the part is a day late, there are phone calls to be made; when it is early, you have to find a place for it.

Table III-3.1 Typical Nonconformance Costs

Warranty: field and point-of-use
Late delivery
Early delivery
Multi vs. single communication
Incoming inspection
Failure at point-of-use
Packaging
Timing of deliveries
Inbound logistics less-than-truckload or consolidation

Source: Vermeer Manufacturing Co.

“You can make it as subjective or tangible as you would like it,” Gard explains. “We said, as an example, for every day early or late it costs us \$60 (not the real figure).”

When you roll all of the nonconformance costs into the formula, the resultant performance index when calculated into the bid provides a definitive “value” determination. Now, Vermeer has a report that it shares with the supplier, and can use as a counter to a supplier’s low price bid argument. “The index tells me how much more it costs to deal with that particular supplier, based on its past performance,” Gard explains.

Creating more opportunities for the suppliers. The new philosophy means greater supplier involvement. But first, Vermeer’s supplier partners must meet certain qualifications. As Gard details, they must

- Understand Vermeer’s business and proactively help them reach their goals
- Seamlessly integrate themselves into all facets of Vermeer’s business, from new product development Kaizen teams to current operations
- Lead their industry in quality, total cost, innovation, and continuous improvement plans (which they must present to Vermeer)
- Grow their business as Vermeer grows

However, Gard emphasizes, this is not a one-way street. Vermeer will

- Give its supplier partners the information and feedback they need to improve
- Provide significant growth and new business opportunities for its supplier partners

- Help partners improve their business systems
- Grow their business as Vermeer grows
- Shift volume based upon performance, not awards

Primary initiatives for this year include supplier consolidations in engines and cylinders commodity groups. Also mandatory participation by supplier partners in Kaizen events, and the expansion of the Kaizen events into supplier facilities for even further cost reduction opportunities. Additionally, Vermeer is converting to an integrated supplier for MRO requirements. “The supplier will control that inventory completely and save us a significant amount of inventory investment,” Gard adds.

WHAT HONEYWELL REQUIRES OF ITS RESIDENT SUPPLIERS

One of the more controversial concepts in supplier management is that of the resident supplier. In practice, all it means is having a representative from a critical supplier on site, who has “ready” access to your information and people. While traditionalists pan the initiative, forward thinking professionals like Terry Suelzman, vice president of supply management at Industrial Automation & Control, Honeywell Inc. (Phoenix; terry_suelzman@iac.honeywell.com), advocate it.

Resident suppliers respond. “Our study clearly shows more cost savings come from resident suppliers than from nonresident partners,” he explains. Further, the latter group also accounts for more cost savings than from suppliers that are in a more traditional relationship with Honeywell IAC. And the benefits do not stop there. Suelzman maintains that resident suppliers have a better on-time delivery performance and provide better quality than other types of supplier relationships. They also make more improvement suggestions.

Honeywell’s survey also found that the sales with resident suppliers grew at a higher rate than the overall supply base expenditures. The program is a success, as there are 25 suppliers on site at Honeywell IAC, and more than 100 at other Honeywell Inc. locations, he told a recent NAPM Supply Chain Management Conference. Success is also spelled AlliedSignal. Since the merger, Suelzman has been asked to extend the concept to the former AlliedSignal locations.

The criteria for a resident supplier. Suelzman is quick to point out that each program must be unique to the needs of the specific location. “There should be sufficient current and future business for the supplier to justify the investment,” he told *Supplier Selection and Management Report* in a post-conference interview. “We require no specific dollar amount, but most likely \$1 million to \$2 million minimum annual business would be needed.” He insists that the supplier must see an advantage to doing this, “so pre-thinking about the win-win for both customer and supplier is helpful to determine the probability of success.”

Honeywell creates a win-win supplier/customer matrix, which the buyer must fill in. For example, if a resident supplier is a benefit to the customer (Honeywell, in this case), what is the benefit to the supplier? Among the supplier wins are more business, access to new product designs, less selling expense, assured sales, and access to information earlier.

The progression to resident supplier status. “Next, there should already be a good relationship with the supplier,” he continues. When starting a resident program, Suelzman advises starting with a pilot program so that both parties can learn to do it right. “Be committed to making it successful,” he emphasizes. “There should be a defined and measurable set of goals for both parties. Review progress regularly on a monthly or quarterly schedule.”

These relationships need time to develop. Suelzman also recommends pursuing the resident supplier concept (see Table III-3.2) with a supplier whose products you expect to buy for at least two to three years and whose business is likely to grow rather than decline. “A world-class supplier to us is the result of mutual supply chain development and improvement,” he maintains. “Some people think they need to find a world-class supplier, but most likely, they just need to invest resources in developing the current relationship.”

Valuable advice on managing the resident supplier relationship. According to Suelzman, “The essence of the resident supplier concept is that the supplier be integrated into the business more than a traditional relationship would allow and that it generate value beyond what would be possible otherwise.”

One challenge is to get the supplier and the person representing the supplier accepted by various groups within the company. For this, he insists on getting buy-in from all groups involved. Another challenge is to keep working for greater value in the relationship and not letting it stagnate at a tacti-

Table III-3.2 Principles of the Honeywell Resident Supplier Concept

-
- On-site full time resource (at least 3 days/week)
 - Location can vary with assignment:
 - Supply management
 - Manufacturing
 - Design engineering
 - Logistics
 - Human resources
 - Integrate into the business
 - Has a Honeywell Badge
 - On e-mail and voice mail
 - Access to MRP information
 - Assignments
 - Manage inventory & generate own orders
 - Cost reduction ideas
 - Design advice: Technical info, cost, life cycle, status, standardization
 - Work with other suppliers
-

Source: Terry Suelman.

cal role for the supplier. “After a few years the challenge is to keep the relationship fresh and adding value to both parties,” he acknowledges. Sometimes a change in resident personnel will trigger this.

“I also believe that we have a responsibility to look after the resident person who has a unique situation by being remote from their own company, yet not being a fully accepted part of the customer’s company either,” Suelman discusses. “Their job satisfaction needs to be a shared responsibility.”

Curb the supplier’s appetite to seek a price hike, or other unwarranted concessions. Having a supplier on-site and creating value for the customer can result in a temptation for the supplier to increase the price for this service, he admits. The supplier may believe that the cost to the customer is too high to change the source, while ignoring the benefit of increased business. This may occur after two or three years and must be challenged and prevented. Part of the reason, Suelman admits, is to discourage the other resident suppliers from following suit, believing that they too can raise prices unilaterally.

He points out that if a supplier starts to look at having a person on-site as a cost of doing business, “we don’t need them.” There are other suppliers waiting on line to participate in the program.

Honeywell's policy insists on final approval over the supplier rep in residence. “We interview and approve the person who comes on site,” he notes. “Some suppliers offer to hire one of our retirees as an on-site representative, which we always firmly reject. We want somebody here who knows the supplier's business.”

The residents are colocated throughout the organization. Therefore, the skill set of the resident person will depend on the goals set for the resident supplier project. For example, if the resident is in development engineering, then he or she should be technically knowledgeable of the supplier's product or offerings. If the rep is to be in the factory with the goal of reducing inventory and shrinking replenishment times, then the skill set would be focused on knowing the supplier's production system.

“The rep is definitely expected to call upon the supplier's expertise to help with any issues that arise,” Suelman explains. “One advantage of having an on-site person from the supplier is that he or she would know the supplier's organization better than we, so would know where to go for answers and get issues resolved quickly.” The rep is also expected to know who to contact within Honeywell and is encouraged to be proactive in communicating with Honeywell people.

Communication and involvement are critical. “Communicate with the supplier is key,” says Suelman. “This is how I get the supplier and supplier reps to respond.” For example, although many purchasing professionals still do not share information with suppliers, Suelman goes to another extreme. “We involve the resident supplier in our business,” he declares. “I have a half day quarterly all-employee meeting. We have someone from finance come in to talk to us about profits, financials, and other issues.” Speakers come from other functions, like engineering, sales, and HR. This may be counterintuitive, but Suelman requires the supplier rep to attend the meeting. “I want them to know we're doing great, or are having a problem, whether it's about budgets, headcounts, or whatever.” After all, he insists, “they are part of the family.”

BUYERS GAIN INFLUENCE IN HENNESSY'S SUPPLIER DEVELOPMENT PROCESS

Hennessy Industries (Nashville, Tenn.) defines “supplier development” as the actions undertaken by both the supplier and the buyer to strive for continu-

ous improvement in quality, delivery, and cost. “Part of the development process for the suppliers is clearly articulating the expectations we have,” explains Michael C. Moody, CPM, CPIM, purchasing and materials manager. “We must ensure that they know our expectations for quality, delivery and cost.”

“Since our customers (automobile assembly plants) expect our products to work out of the box, first time, every time, we cannot develop a partnership with any supplier until they have demonstrated their capability to provide 100% usable parts in every shipment,” Moody declared at a recent APICS Annual International Conference. “We must expect our suppliers to meet our delivery needs, first time, every time. They must demonstrate their process capability and control, or they cannot be our supplier.”

Buyers are now responsible for the supplier's quality. At Hennessy, the quality department is no longer responsible for the supplier's poor quality: the buyer is. “The buyer must help suppliers in their efforts, or find another supplier,” he emphasizes. The cost of poor quality is high, as it can create line stoppages, customer service issues, and customer unhappiness with the product. Further, it can increase total costs through increased warranty costs, Moody explains.

At Hennessy, quality is measured in several different ways. They measure line rejects, but they do not inspect parts at receiving. They also measure quality through warranty claims from the customers. When they detect a supplier with a major quality issue that is affecting quality to customers, they review the quality issues with the suppliers and request corrective action.

Supplier documentation is via 8-D analysis form. “The supplier's root cause analysis and countermeasures for permanent elimination of the quality issue are required,” according to Moody. The analysis form notes the issue, root cause, corrective action, responsibility for the action, and date of completion. Oral feedback is no longer accepted.

Once the quality problem has been identified, the buyer is responsible for ensuring that the supplier provides satisfactory corrective action.

The suppliers also are evaluated using a formal supplier development manual, which documents the Hennessy certification process. The supplier life cycle encompasses the following:

- *Approved supplier.* A supplier approved for business transactions.
- *Qualified/preferred supplier.* A supplier that has demonstrated a level of performance to allow incoming skip lot inspection of product and has a potential for business growth. Qualified status may be awarded if an approved

supplier achieves high marks on Hennessy's internal business survey form, which evaluates their production and quality processes.

ISO registration also helps support this rating. In addition, to achieving a "good" rating on the business survey, suppliers must demonstrate delivery of conforming products to the factory for two consecutive quarters.

- *Certified supplier.* A supplier at the highest level of achievement, allowing access to all business within the corporation. Status can be awarded if a qualified/preferred supplier achieves a rating of "excellent" on the business survey and demonstrates four successful quarters of quality deliveries to the factory.

Hennessy purchasing professionals develop a plan to audit and certify their key suppliers by month. Each buyer develops their plan for each supplier, schedules onsite business surveys with the supplier, and then conducts the audit along with a quality control (QC) engineer and/or a manufacturing engineer. "We track our progress and provide countermeasures should we fall behind our schedule," he explains.

Buyers also teach and coach suppliers in the ways of kanban. "After quality, delivery of quality parts from the supplier to support our customer's delivery expectations is important," Moody notes. Short lead times are essential to meeting the company's just-in-time (JIT) production requirements. Additionally, working capital turns and lower inventory levels are essential.

"Kanban is the delivery method of choice we have selected," Moody maintains. "This term has been much overused and greatly misunderstood, but has been proven to lower inventory levels, while providing more consistent delivery of products."

The buyer's role at Hennessy is to teach and coach the supplier into a kanban delivery process. This not only helps them to lower inventory levels and ensure consistent delivery of parts, Moody explains. "It also helps the supplier understand how kanban can help them manage their production levels," he offers.

"Suppliers with long lead times must either reduce their lead times or carry a calculated amount of finished or semifinished parts on their shelves to meet our lead time expectations," Moody describes. In many cases, the suppliers learn how to improve their processes to avoid increasing their overall inventory levels.

Total cost is the only true measurement for purchased parts. Hennessy's buyers consider all aspects of costs, including

- Delivery costs (transportation)
- Inventory costs (increased levels for suppliers with long lead times)
- Cost of poor quality (low productivity, increased inventory to buffer poor quality performance, warranty costs, customer unhappiness/lost future sales)
- Lost time for buyer and plant personnel (resolving quality, delivery, or cost issues from poorly performing suppliers)

“It is the purchasing department’s responsibility to drive quality, delivery, and cost improvements to their current supply base,” Moody declares. It is also their role to reduce their supply base to the minimum number necessary to support their operation. “Only through the reduction in the total number of suppliers we buy from can we focus our efforts more effectively on helping suppliers develop and learn how to implement continuous improvements in quality, delivery and cost,” Moody explains.

Continuous improvement and the buyer’s increasingly critical role. “Total cost improvement is an expectation, just like continuous improvement in quality is an expectation,” insists Moody. Once buyer and seller negotiate a price, the supplier is expected to continuously review its processes, materials costs, and quality costs, and to make ongoing improvements to its costs.

As he explains, “We help our suppliers reduce their total costs. We single-source our total business needs to those suppliers who can meet our needs. And, we share our business changes with our suppliers.”

AGGRESSIVE SUPPLY CHAIN MANAGEMENT PAYS OFF FOR AMERICAN AIRLINES

There is a broad misconception that supply chain management strategies and techniques that work well in the manufacturing sector cannot be successfully adapted to the service sector. John R. MacLean, vice president of purchasing at American Airlines, Inc. (Dallas; john_maclean@amrcorp.com), has led the effort, since joining the airline seven years ago, to dispel the fallacy. In a compelling presentation at a recent Annual NAPM-New York Conference, MacLean described how he uprooted myths of supply chain management and replaced them with seeds of progress.

You can build a strong supply chain management organization in a service company. “One of the first steps was to change the reporting relationship of

purchasing, which we did,” MacLean argued. When he arrived at American Airlines in 1992, purchasing was “very deep within the bowels of the organization.” Purchasing now reports one level below the CEO. “As a consequence, we are able to discuss and even educate our executives on the benefits of supply chain management and get their support to build a strong organization,” he maintains.

Carefully scrutinize new department hires. “In the past few years we have upgraded our organization of professional people so that 100% have degrees, with more than 20% holding advanced degrees,” he describes.

In 1992 purchasing’s main function was to process POs, do contracts, and meet sales people. “We reshaped the purchasing agent’s job to a commodity manager and built an organization to support an integrated supply chain management activity,” according to MacLean. Today, commodity managers are supported by a team of supply quality specialists, cost, systems, and logistics analysts, strategic planners and warranty specialists.

Manufacturing’s supplier management strategies can work in a service company. American now uses 14 different strategies in the management of its supplier base. It spends \$4.5 billion on purchases as diverse as jet fuel (its biggest buy), which is a traded commodity, to food and beverage (second), to parts and repair services required to maintain the aircraft. MacLean reviewed several of the “manufacturing” strategies employed:

Use integrated suppliers for nonstrategic buys. “We use integrated suppliers for business forms, office supplies, employee uniforms, and parts management for our ground equipment,” MacLean explains. One example he cited is using an integrated supplier for employee uniforms. “It used to take six weeks for ordering uniforms, and 20-plus suppliers to provide ties, jackets, sweaters and vests,” he detailed. “None of the pieces would arrive at the same time. Some never arrived at all.”

Today, the cycle time for ordering uniforms is only 48 hours, and the employees can expect to get all the “components” to arrive at the same time and in the right size “98.6% of the time,” he attests. Additionally, they have removed 10,000 monthly transactions from the system as they reduced the supplier base from 20 to just one.

Involve the suppliers earlier. “We also found a way to adapt earlier supplier involvement into our business,” he offers. For instance, when an airline buys new

airplanes, it specs the interior and the features it wants. For the purchase of the new 777 and 737 aircrafts, purchasing established a cross-functional team from marketing, engineering, and purchasing to select the supplier for the seats.

MacLean describes the process: “We had to find a supplier that understood early supplier involvement. We also established pricing to target costing which guaranteed the supplier an agreed upon profit level. Since weight is critical, we also assigned a target weight for the seats as well.” Additionally, purchasing was active in conducting joint design reviews, establishing project milestones, and design freeze dates.

Global sourcing is now a key element in American’s strategic sourcing plans. Today, they source more than \$700 million offshore—a triple increase from earlier. The strategy follows two paths. One is geographic, where they source local suppliers (jet fuel, security, catering, and food) to support their operations in each of the cities they service. The second is strategic, where they select the best worldwide supplier for a particular commodity, “one who will support our worldwide needs from a single point,” he explains. Examples include aircraft seats, galley equipment, aircraft engine parts, chinaware, flatware, and electric power ground equipment.

Measure nonproduction supplier performance. “We have stolen shamelessly from manufacturing on this one,” he acknowledges. However, they have designed their own process to measure nonproduction supplier performance. It is their Supplier Excellence 2000 process that communicates American’s expectations to the suppliers, assesses their capability, measures their performance, and ultimately recognizes and rewards the “best of the best.”

“We measure all our suppliers in four categories: cost, quality, delivery, responsiveness,” he describes. “It’s the same categories across the board. What’s different is that each category is defined uniquely to the commodity.”

Supply chain management strategies create strong value for American Airlines. Dispelling the myth of value creation, MacLean declares, “This is my favorite.” And for good reason, as he details:

- “We have reduced our supply base by 80% since 1995, which drives down costs, workload, quality defects, and complexity.”
- “We have improved our suppliers’ performance by 31% in just two years through the implementation of Supplier Excellence 2000.”

- “We’ve increased our spending with diversified suppliers by 39% since 1995,” he notes. “We consider that value-added as it is very important to us to have our profile of suppliers mirror that of our customers.”
- “We have improved the cycle time of order delivery of our non-strategic buy from integrated suppliers by 11 times, and provides our employees with a hassle-free procurement process.”

The measure MacLean is most proud of is purchasing’s direct contribution to the bottom line. “We have driven down the cost of what we buy each and every year for the past five years,” he maintains. “We can say with a high degree of certainty that we have had deflation for five years, and because of our strategies and training, that deflation has translated into \$250 million of cost savings right to the bottom line.”

SUN MICROSYSTEMS SETS OUT TO DEVELOP A LONG-TERM SUPPLY CHAIN STRATEGY

In an effort to build long-term plans, Sun Microsystems’s European operations designed a supply chain strategy that would ensure that its logistics and information technology processes were scalable for the future. “We weren’t good at looking too far into the future,” says Hugh Aitken, vice president of European operations for Sun’s computer systems. “We moved from quarter to quarter in a reactive mode.” To solve problems, Aitken designed the Sun supply chain strategy to take the company out three years. A logistics team worked through the firm’s current state of affairs, future goals, and what it would take to achieve them, explains Aitken.

Bringing Suppliers and Customers Together

“First, we needed information technology that would get the information passed quickly to our trading partners when they needed it. The second priority was improving our logistics processes. Our former one-size-fits-all approach was killing us. High-volume products have to be moved differently. That includes everything from geography to delivery methods.”

One of Sun’s more radical supply chain strategies is getting customers to talk directly with suppliers. “We spend \$4.4 billion outside of the company and \$3.8 billion of that is with less than 20 suppliers. So we haven’t got thou-

sands of suppliers.” Aitken says that by introducing key customers to suppliers, Sun is removed from the process. Such meetings are still in the early stages, but moving forward.

When an order is received at Sun, it is sent to the supplier who fills the demand. Aitken says suppliers have access to Sun’s inventory, which takes time out of the process and improves response time. “This has made a big difference in bridging the gap between our supplier base and the customer.”

Zero Warehouses

The final aspect of Sun’s supply chain strategy is to have zero warehouses within the next three years. Aitken admits the complexity, since it sometimes takes six suppliers to fill one order. “Rather than having those components sit in a finished goods warehouse, we would like to have the parts merge while in transit.”

But the key will be a stronger information technology base and a sound logistics process, he says. “In the computer industry, our customers are constantly raising the service level bar and it is up to us to meet their cost, availability, and time-to-market demands.”

EASTMAN SETS UP CPFR IN ITS LOGISTICS OPERATION

Eastman Chemical Company (Kingsport, Tenn.; 423-229-6031) had three familiar logistics problems:

1. A legacy forecasting system
2. Layers of decision-making
3. Realization that forecasting customer demand was critical to competitive advantage

It turned to collaborative planning, forecasting, and replenishment (CPFR) as the next great supply chain initiative, creating efficient flow of information among trading partners. A great resource for CPFR information is the Collaborative Planning, Forecasting, and Replenishment Committee. Check out their site at www.cpfr.org.

“We had multiple forecasts throughout the organization,” says Eastman’s

John A. Hewson, manager of global forecasting, who spoke to an audience at a recent Logicon conference. "Nobody knew who was accountable, everything was random. There was no forecasting; customer involvement and changes were made unilaterally, resulting in lots of uncertainty."

"Collaboration can change all that as it is focused on the information process," says Andrew White, vice president, product strategy for Logility, Inc. (Atlanta, 404-264-5967). "It is all about sharing information about consumer demand with multiple layers of the supply chain at the same time."

While getting its start in the retail industry, experts believe that CPFR should be of interest to any logistics organization that wants to get closer to the customer in meeting their demands.

Benchmarking at Eastman

Eastman contracted the University of Tennessee to do a Forecast Benchmark and identified the weaknesses noted above, along with a series of steps that could be utilized to improve the forecasting process.

One of the components involved setting up a central forecasting group at Eastman that would "own" the forecast process. Another was adoption of a sophisticated Advanced Planning and Scheduling software package that would enable delivery of a "one number planning" forecast.

At the conclusion of the benchmark study, Eastman began a software selection process that sought a solution that would meet the need for more accurate forecasts, develop SKU demand forecasts generated from the bottom-up, support timely input from a global sales force, and be compatible with its SAP R/3 enterprise resource planning (ERP) system. Ultimately, Eastman selected Logility's Demand Chain Voyager.

The Voyager product allows for remote users, featuring a secured access to the database of forecasts over the Internet. "The Internet is very hot now," says White. "It provides global access 24 hours a day."

Savings Are Anticipated

Hewson says that it is still too early to predict what savings Eastman will achieve with CPFR, but he is anticipating some very significant results. "Initial results show a reduced cycle time in forecasting by 75%, a 10% increase in accuracy, and a reduction in costs in terms of time and data collection." He also expects annual supply chain savings in the range of 2% to 4% of total company revenue, which is approximately \$100 million to \$200 million.

WHY INTEL INTEGRATED ITS SUPPLY CHAIN USING THE INTERNET

The Internet can benefit the supply chain in wide-ranging, lucrative, and, in many cases, immediate ways. But conducting electronic business has its challenges, says Mary Murphy-Hoye, manager of strategic programs at Intel. “We need to relearn how to market, produce, accept, and fulfill orders and supply our product to this larger customer base,” she said at a recent Logicon conference.

Integrating the Supply Chain

By integrating supply chain partners through the Internet, Murphy-Hoye anticipates four key results:

- A more synchronized supply chain
- Optimized customer response
- Real-time detection and correction
- Rapid adaptability to customer issues

The bottom line, she says, is that all the trading partners will have complete visibility to the product’s life cycle.

Supply Chain Activities on the Net

Murphy-Hoye identifies five areas that are ideal e-business strategies to conduct via the Internet (see Table III-3.3):

- *E-procurement/e-commerce*: This is the capability to engage in on-line commerce transactions between business entities. This can take the form of electronic catalogs, on-line approval, on-line contracts, electronic purchase orders, invoices, and payment.

- *E-collaboration*: This is the capability to facilitate real-time communication and interaction between multiple business entities to drive synergy. For instance, at Intel, Murphy-Hoye says that e-collaboration has been particularly useful in working with the design and engineering teams. “We have on-line discussions with these groups, which has led to more rapid product designs.”

Table III-3.3 E-Business Strategies for the Supply Chain

<i>Strategy</i>	<i>Business Functions</i>	<i>Metrics</i>
e-procurement/ e-commerce	Cross-enterprise system-to-system integration	Productivity, reduced cost/ cycle time, contract compliance, customer reach
e-collaboration	Cross-enterprise technology/ design interaction	Design cycle time, design synergy, reuse revenue
Integrated planning/ manufacturing	Cross-enterprise planning/ execution, system-to-system integration, outsourced manufacturing visibility	Lead time, margin accuracy/ flexibility, inventory levels, on- time delivery
Integrated delivery	Cross-enterprise logistics, management/consignment visibility	Logistics cycle time, reduced cost, lead time
On-line marketing	Product boundary extension, new products/services creation, new markets/ channel creation	Market segment share

Source: Intel.

- *Integrated planning/manufacturing*: This involves the electronic transfer of system-generated information between business entities to provide demand/supply visibility. Product forecasts, inventory status, and supply/demand requirements can be communicated across the supply chain via the Internet.

- *Integrated delivery*: Here, the company reviews sales data against targeted forecasts and adjusts production accordingly. Information about sales and inventory levels is provided real-time over the Internet to the distribution center and throughout the supply chain.

- *On-line marketing*: “You want to give customers an Internet experience about the product they are looking at if you want to compete in your marketplace,” she says. “The site has to offer them more than a place to just view your product. You want them to be able to experience the product.” This is especially critical for Intel, as it wants consumers to test the products they are interested in right on line.

There are several issues to keep in mind before integrating the supply chain via the Internet:

1. *Know what drives your business*. “Select the top three reasons you want to go after new business this way and make your decisions based on those

reasons,” says Murphy-Hoye. Some might include better inventory management, improved supplier relationships, logistics management, continuous improvement, cost reductions, faster cycle times, integrated supply chains, and to go after new markets.

2. *Provide access control.* It is critical that your Web site provide security, privacy, and authorization from the consumer’s perspective.

3. *Understand the concept of personalization.* “More and more customers want things their way and the Internet gives you a chance to rise to that challenge,” she says.

4. *Perform data mining.* “From our perspective, we did a great job now of collecting data, but not a good job changing that information into ways to better serve our customers.” Thanks to the Internet, Murphy-Hoye says the information is collected and used to develop better products and services.

5. *Build upon relationships and trust.* “You have to change the way you treat your integration partners because without the supply chain, you are nothing.”

6. *Assign risk.* Murphy-Hoye says: “If you want to optimize the supply chain, someone will have to hold inventory and they will need the incentive to do that. This will make the supply chain more powerful.”

7. *Set communication standards.* There are many ways to communicate electronically: EDI, on-line chats, interactive Web, and various Internet standards. Figure how you want to communicate and take advantage of as many as you can.

If these above issues are addressed, the benefits of e-business will be plentiful: improved customer satisfaction, reduced operations costs, the ability to communicate with more constituents in the supply chain, increased knowledge of the behavior along the supply chain, and increased revenue.

She says, “The capabilities of Internet technology will change the way we do business with our suppliers and customers, as well as change the face of business, in its process and techniques and in the definition of business itself.”

KELLOGG’S OPTIMIZATION MODEL ENSURES IT ADDS VALUE TO THE SUPPLY CHAIN

Adding value to the supply chain, and decreasing non-value-added activities and costs is a critical element of supply chain integration. All parties must work together to do this. Many firms are turning to optimization models to

help in this endeavor. This was a key topic at a recent Logicon conference. Here, attendees learned how such models are being used at Kellogg's to make a difference in their supply chains.

"You can't optimize only one portion of your supply chain or else the supply chain will be suboptimized. You need a holistic approach," says Don Scott, vice president of North American Logistics for Kellogg's Company.

Making the Right Product at the Right Plant

In the late 1980s Kellogg's relied on traditional MRP and DRP systems to run its business. However, those solutions did not account for the costs associated with manufacturing or inventory deployment. Therefore, the company built optimization models for the cereal portion of its business.

More recently, Kellogg's has been using its optimization models to help determine where to manufacture its products, based on transportation costs. "Getting products to customers faster puts pressure on the supply chain to react," says Scott.

Weekly optimization production plans are now used to determine what to make, when to make it, how much to make, and where to make it. The model then helps optimize the deployment of the product once it is made. In the first year alone, Kellogg's saved \$4.5 million thanks to improved sourcing decisions.

Integrating the Key Players

The logistics organization at Kellogg's is responsible for capacity planning, transportation, forecasting, and customer service. In addition to integrating those functions within one department, the company has integrated its total supply chain—from the supplier to the retailer—in an effort to make all partners successful in their endeavors.

This has proven especially worthwhile in bringing supply and demand closer together. "Key managers from both sides meet once a month to integrate planning decisions for the next one to six months," explains Scott. "They discuss the risks and opportunities involved in forecast planning and meeting customer demand. The optimization model allows them to carry out this task within hours."

Overcoming Planning Challenges

Scott says that the planning challenge at Kellogg's is making sure that information is available to predict the future. For instance, trade deals are common

in the cereal market, and these drive demand over short periods of time as high as 200%. In addition, new products are being introduced all the time in this very competitive sector, forcing the logistics folks to ensure that enough inventory is in the channel to meet the demand surge at introduction.

“We have turned to our optimization model to help us set aside the capacity and inventory to meet these demands,” says Scott. “The model helps us predict production line throughput and uptime to maximize our capacity.”

Driving Out Nonvalue Dollars

The financial and logistics departments work closely at Kellogg’s to share the company’s mission with its suppliers. The idea is to “drive out every non-value-added dollar from the supply chain because each one that doesn’t add value takes away from the perception that our customers have about our products,” says Scott. “We make sure that every component and activity in the supply chain adds value.”

If, for example, Kellogg’s were not able to deliver to a retailer because the retailer was unable to accept the shipment at the time of delivery, Kellogg’s would work with that customer to see why that occurred and how it can be prevented in the future, explains Scott. “If our product is not in the stores when the consumer wants it, that impacts our value.”

Kellogg’s has invested in customer logistics representatives to preserve that value. These representatives will actually visit the retailer to find out why a delivery could not be carried out.

The State of Affairs So Far

Since implementation five years ago, Kellogg’s has increased inventory turns by 6%. “It’s not a lot in the general scheme of things, but with our volume [one billion pounds of cereal/year], it is a lot,” says Scott.

HOW PIONEER-STANDARD APPLIES SCM STRATEGIES IN ITS DISTRIBUTOR NETWORK

Although distributors cannot mandate supply chain management, they are a strategic link in the process. As mediators, they can point out the benefits of supply chain management to suppliers and customers and reap their own rewards in the process.

One company that has done this successfully is electronics manufacturer Pioneer-Standard Electronics, Inc. (Cleveland; 216-587-3600). Since making a focused effort to integrate supply chain management strategies, the company has increased sales per employee from just over \$650,000 to nearly \$900,000 over three years.

SCM Softens Distributor Pressures

Pioneer-Standard is a primary example of the competitive pressures electronics distributors are facing today—namely, to deliver product quickly and efficiently at the lowest possible cost. Here is how they addressed these daily pressures through the use of SCM:

Cost containment. Many distributors are under profit margin pressure and cannot raise prices. Instead, they move to reduce internal costs and total acquisition costs for their customers.

“Take out costs or else” is the message that many electronics distributors are getting from suppliers and customers, says Cynthia Bova, director of Pioneer-Standard’s Integrated Inventory and Logistics Services. Distributors that succeed as a strategic link between suppliers and customers keep the business they have and gain a competitive advantage over others who insist that the costs of specifying, acquiring, delivering, and using products and services are fixed.

Differentiation. Distributors have the opportunity to stand out in a value-added way by working with suppliers and customers to create demand for suppliers’ products, instead of fulfilling demand that would be there even if the distributor were not part of the supply chain, says Bova.

Pioneer-Standard differentiates itself in the supply chain by introducing its suppliers’ technology to target markets, incorporating the technology into its customers’ products, and improving its customers’ profit opportunity with business solutions that exceed their expectations, she explains.

Increase sophistication. “Distributors don’t have to keep large inventories of all products,” says Jim Kosakowski, Pioneer-Standard’s director of supply chain management. “We stock the most important and use forecasting information and the relationships with customers and suppliers to meet all other needs in a timely, cost-effective way.”

Three Focus Areas

In an effort to tackle the pressures that it faces daily, Pioneer-Standard is focusing its SCM strategies on three primary areas:

- *Develop a new way of thinking so that the entire supply chain works together as an extended enterprise to benefit customers.* In many cases, says Bova, the solution is for designers, manufacturers, and distributors to standardize as many parts and components as possible and to introduce the differentiators much closer to the customer and the time of purchase.
- *Cultivate new business processes and relationships that focus on partnerships, common goals, and shared performance measures.* “We’re educating our customers and suppliers, and at the same time, learning from them,” Bova says. “We must understand how their internal processes work, how our processes should link with them, and how all of us might have to change for the benefit of the supply chain.”

In one instance, Pioneer-Standard is helping a large electronic contract manufacturer (CM) simplify its component ordering and sales forecasting functions. It is providing order quoting for an entire computer board by aggregating the costs for the commodity parts. The relationship has the potential to reach a point where all bills of material are handled electronically and Pioneer-Standard manages the manufacturer’s warehouses.

“Establishing trust and respect has benefits for everyone,” says John Kump, Pioneer-Standard’s director of interactive sales and marketing. “We gain a large customer, the CM gets less costly and simplified procurement, the CM’s customer has shorter lead times, and the end customer has inexpensive access to leading-edge technology.”

- *Invest in technology as an enabler that automates processes and connects members of the supply chain.* According to Kosakowski, technology can only be applicable and efficient if it can accommodate three types of transactions: day-to-day, planning and decision making, and strategic analysis.

Pioneer-Standard’s Internet services are designed as interactive customer service tools, says Kump. The company’s Online Catalogs and Order Center provide online ordering of more than 350,000 electronic components. Customers get real-time order tracking, inventory management, shipping information and account administration. An automated e-mail program helps customers track orders placed through other sales channels.

In addition, EDI connections with suppliers and customers facilitate two-way sharing and information transfer as well as the movement of

products through the supply chain. The company also helps customers use its Warehouse Integrated Network software to automate ordering and inventory management processes.

SCM Benefits at Pioneer-Standard

Pioneer-Standard believes that its focus on supply chain management strategies will result in a reduction in total acquisition costs, time to manufacture, and time to market for customers, as well as improved customer access to new products and technologies, and supplier access to growth markets and new customers.

Supply chain management has also enabled Pioneer-Standard to improve its internal processes, making employees more efficient and more responsive to customer demands.

HOW HONDA'S GLOBAL SUPPLY CHAIN IMPROVES ITS INVENTORY CONTROL

Honda Trading America Corporation (Marysville, Ohio), in 1993, recognized that to support its growth opportunities and meet its strategic objectives to become a complete global supply chain organization, it had to gain better access to its information. Its most pressing issue was the management of the entire steel and aluminum supply chain.

According to Greg Norval, senior manager of accounting/administration, there were "four crucial events that had to be met for the supply chain to be considered a success":

- *Inventory had to be completely visible throughout the system.* Steel and aluminum are received directly at Honda of America Manufacturing, Inc., or at as many as five different processing centers (for slitting, cutting, stamping) and 30 to 40 subassemblers. "Operating in a tight delivery environment, Honda Trading must be assured that inventory is available to meet demand throughout the supply chain while maintaining minimal floor inventory," Norval explains.

- *Steel and aluminum have to be tracked and costed through slitting, cutting and stamping at the processors.* The system has to provide comprehensive transformation audit trails with a history of the converted product back to the plant.

In fact, every steel piece and part has to be tracked back to its original steel coil for complete quality management.

- *Waste resulting from slitting and cutting at the processors had to be visible.* “To efficiently control finished costs through the entire transformation process, tracking the costs related to the waste and recycling the scrap had to be managed within the software solution selected,” he describes.

- *Integrity of inventory cost had to be maintained at the SKU level.* There was also the critical requirement to report raw material inventory cost as it moved through its various transformations.

Other needs required from the supply chain management software solution. Honda Trading America also had to consider its export/import needs. “We needed a system that allowed us to upload and track multi-line orders, often greater than 1,000 lines, validate the information, and prepare all export documentation,” Norval offers. Operating in a global trading environment, the company required a system that supported multiple languages for documentation and multiple currencies for accounting purposes.

Further, the solution also had to have a solid integrated accounting system. “The proper solution would provide us with the ability to balance our accounts quickly so we could pass accurate information to other enterprise-wide systems at our business partners.”

Honda finds solution at a small niche software developer. For the supply chain management implementation to be successful Honda Trading had to support its steel procurement and inventory management group; its metals, plastics and recycling group; its import and export department; and provide complete cost control throughout the system.

After an in-depth search and review of potential solutions, Norval reports the team decided to partner with Blinco Systems Inc. (Toronto). “The company demonstrated to us a significant expertise in international supply chain and logistics solutions,” he declares. “And a review of its 3RDWAVE software model convinced us it was adaptable to the rigors of our environment.” Additionally, he offers, “Blinco representatives exhibited a quick and comprehensive understanding of our current and future requirements.”

Honda/Blinco collaboration leads to achievement of primary objectives. Edward (Ned) Blinick, vice president of Blinco Systems, reflects, “3RDWAVE’s

fully integrated core solution provides a comprehensive foundation that could be customized to meet Honda Trading's specific needs."

For instance, the core solution of purchase order management, traffic control, inventory management, sales order processing, and accounting modules touched on Honda's main business processes. "The solution also provided us with gateways to automate communications with our suppliers, customers and other corporate systems," Norval describes. "Through the collaboration with Blinco's development team, we have been able to achieve all of the primary objectives," he reports.

Inventory visible throughout the process. Today, Honda Trading is able to closely match its supply and demand requirements. With 3RDWAVE providing complete inventory status throughout the global supply pipeline, Honda Trading can "immediately" determine availability of inventory to meet demand.

Working closely with its processors, Honda gathers demand data within the software, analyzes it, and drives its purchase orders to the mills. "This process ensures that the right product is produced and delivered according to actual demand needs," Norval explains.

EDI receipts of advanced shipping notices (ASNs) from its suppliers streamlines Honda Trading's receiving processes. "This virtually assures the accuracy of inventory throughout the supply pipeline," he notes.

If delivered to a processor, 3RDWAVE monitors the inventory derived from the parent, its waste and its cost. "Providing visibility into the status of inventory through the transformation process insures that delivery to Honda of America Manufacturing and its tier one suppliers are met according to its tight JIT programs," Norval insists.

Benefits realized in related supply chain activities as well. With the software's integrated purchase order management, sales order management, documentation, traffic and accounting modules, Honda Trading has full visibility into the status of domestic, export and import orders.

For instance, the company has been able to increase the accuracy and dramatically streamline the time required in documentation preparation for its export business. A process that took days to complete is now accomplished in several hours.

With 3RDWAVE, Honda Trading generates the pro-forma invoice, commercial invoice, packing lists/manifests, bills of lading and other documentation in multiple languages, as required.

In addition, the company has achieved its accounting objectives. “Maintaining accounts in the currency of their transaction and being able to mediate exchange rates against the U.S. dollar provides us with accurate account statuses,” Norval details. In addition, the system provides complete exchange rate profit and loss analysis.

“With the complete cost integration within 3RDWAVE, we’re also able to balance inventory costs with the general ledger and analyze any variances quickly,” he explains. “We now close our books within days of period end to provide more timely accounting reporting.”

Norval adds, “Since we now have access to accurate information in real-time, we’re better able to support the functional needs of our operators and the strategic requirements of management.” The new solution ensures that accounts are in balance throughout the system with complete audit trails. “The information we report across the system now has full integrity,” Norval declares.

HOW GTE’S SUPPLY CHAIN MEETS CUSTOMER DEMAND WITH 40% LESS INVENTORY

One perplexing problem for inventory managers is reducing inventory while supporting a guaranteed service level to customers. The major challenge is predicting and optimizing the inventory required to meet this objective. Rick Balla, group manager, purchasing and materials management, GTE Supply (Irving, Texas; 972-751-4305) faced a similar situation (see sidebar). However, he solved the dilemma by using inventory planning software that optimizes the inventory required to provide the guaranteed availability.

The solution he adopted streamlined GTE’s supply chain activities to support a 98.5% service level with 40% less inventory within six months, for an annual cost savings in inventory of almost \$30 million.

Improving the typical tradeoff between inventory turns and service level. “To initially address product availability, there was a large planning effort within GTE Supply guided by results-oriented and meaningful metrics,” Balla explained at a recent Council of Logistics Annual Conference. “This resulted in multiple inventory strategies deployed across different types of inventory.”

The process, he allowed, did hit the availability target. “We obtained the material needed to address customer requirements, but we also incurred

How GTE Supply Applies the LogicStock Solution

LogicStock analyzes each item and its total demand to determine the item's stocking strategy. In determining which items to stock, the software considers each item's unique situation concerning sales activity, criticality and supply strategy. In the case of GTE Supply, the stocking rules consider the criticality of the item and the item's level of sales activity.

When determining stocking quantities, LogicStock calculates the overall availability level given each item's constraints and specifications. It determines the stocking quantities that yield the most availability per cost. "Since there are a number of variables influencing our inventory decisions, LogicStock has the flexibility to allow us to incorporate a number of them into the model," Balla notes. They include:

Business environment. Specifically, LogicStock's flexibility models varying environments and conducts 'what if' scenarios. As an example, in one business unit, there are 1,000+ suppliers and two GTE Supply logistics centers. From the logistics centers the product flows directly to the end-user customer.

"For rapid implementation, GTE Supply used the supply chain as a fixed input to LogicStock," explains Uhrig. The implementation focused on improving the inventory stocking logic that goes into the process, and GTE Supply gauged the improvement potential without making changes to the supply chain.

"There was no consolidation of distribution centers, no changes to the ordering patterns from suppliers, and customers continued to order to the same schedules," Balla offered. Further, LogicStock also considers financial objectives such as targeted number of inventory turns.

Customer demand. While customers require off-the-shelf availability within a 24 hour period, the demand for products is seasonal and full of spikes. Inventory strategy, thus, changes with changes in seasonal demand forecasts.

The software considers the accuracy of the demand forecast. Demand patterns are subject to a validation/verification/sensitivity process to determine the reasonableness of the pattern.

GTE Supply updates the forecasts on a monthly basis, therefore, LogicStock is also run monthly to obtain the new inventory model. It also determines where to stock an item in the supply chain.

Item characteristics. The items in inventory change constantly. The model identifies these changes through the item planning process. At the item level, LogicStock can specify the minimum availability target.

While the user can establish parameters for a class of items, the software enables them to provide a higher resolution of stocking by allowing them to specify parameters on an individual, item by item basis.

Supply strategy. The amount of inventory GTE Supply has to carry is very dependent upon the suppliers and their capabilities. Therefore, the TLCLogic model incorporates factors such as manufacturing lead times, order policies and order multiples. It then decides whether to order direct or stock those items.

a large inventory investment,” he acknowledged. Inventory turns were a low 3.3.

Examining the inventory stocking issues. Not satisfied that they were achieving the availability target with the least cost inventory, Balla began to investigate the following:

- What inventory does GTE Supply need to meet guaranteed service levels?
- Is it possible to lower the inventory level and still maintain a 98.5% service level?
- Which items does GTE Supply need to stock and which items can they obtain directly from the supplier?
- What quantity of each item should GTE Supply stock?
- How much will it cost?
- What is the optimum mix of items to stock?

To answer these questions, Balla used LogicStock, a PC-based inventory optimization software system (TCLLogic, LLC; Indianapolis).

Software model finds stocking strategy out of sync. To determine the least cost inventory stocking strategy, TCLLogic ran a pilot at GTE Supply that modeled the operating environment. The pilot revealed 300 large impact items.

According to Thomas C. Uhrig, president of TCLLogic (317-464-5152), “These items were greatly out of sync with the stocking strategy suggested by LogicStock.” There were almost 100 items understocked, and 200 items overstocked.

“Our planners looked at the items and made sure there were not outside factors the model did not consider, such as supplier capacity issues,” Balla explains. “We then made extensive use of the item-level strategy lists and focused on the large impact items.”

By focusing on the 300 large-impact items, inventory levels were decreased from \$12.2 million to \$7.1 million over five months while maintaining the guaranteed 98.5% service level. The current inventory level, according to Balla, is \$5.3 million.

Expanding the LogicStock application to other business units yields additional benefits. GTE Supply then applied the software at five other business units. The business units vary from a retail, customer-oriented business unit to an industrial-supply business.

Each business unit required the application of different rules. For example, in the consumer-oriented business, the product life cycle is so short, new products supersede older products before the older ones can generate a sufficient demand history for creating valid forecasts.

“The implementation process highlighted a number of data requiring cleanup or verification,” Balla maintains. Previously, a scorecard process informed the material suppliers if the data with which they were working was good enough for making decisions. Because of data verification through LogicStock, material planners are now making better decisions, he assures.

For all business units, GTE Supply uses the new software for

- Service guarantee analysis (what it is going to cost to maintain different service levels)
- Monthly item planning (what changes are needed in inventory stocking levels to accommodate forecasted demand)
- Determining what must be stocked (location by location)

Improvements do make a bottom-line difference. LogicStock reports the overall strategy and a detailed strategy for each item, Balla offers. “The reports make it easy for the material planners to focus on high impact activities,” he explains. “It changes the way the planner spends his/her time, especially in reducing the time spent reacting to situations and handling transactions and orders.”

Now, the material planners spend more time analyzing events and planning. Further, the software generated data now points out high impact areas on which the planners should focus.

“In our case, those high impact areas were supplier lead times and forecast accuracy,” Balla reveals.

In addition, he cites the following benefits that have been achieved and can be attributed to LogicStock:

- Inventory reduction of 30% to 40%
- Line item availability of 98.5%
- Reduced inventory carrying costs
- Improved inventory turns, from 3.3 per year to 7.3 annually
- No changes needed in the existing supply chain
- Results achieved with current purchasing and planning systems

PHARMACEUTICAL GIANT SCORs WITH WINNING SUPPLY CHAIN INITIATIVE

Supply chain management is a driving force in the pharmaceutical industry. Take the case of Boehringer Ingelheim’s Roxane Laboratories (Columbus, Ohio). It used a combination of the Supply-Chain Operations Reference Model (SCOR) and a system of benchmarks to initiate a series of actions that improved inventory turns by 44%. Simultaneously, the company’s customer service level improved significantly, catapulting it into a world-class industry performer.

“You can improve service levels by throwing inventory at it,” claims James P. Mellody, head of materials management (614-272-4709). “Our goal was to improve our customer service while simultaneously reducing inventory.”

SCOR gets everyone moving in the same direction. “We look at supply chain management as a real marquee activity in our business,” Mellody cites. “The twin external factors of growing our market share and driving costs out of the supply chain to maintain our margins provided the incentive to make supply chain management a core competency,” he offered at a Supply-Chain World conference (Supply-Chain Council, Inc.; www.supply-chain.org). “However, if you talked with our executives about supply chain management four years ago, you would have gotten wildly different ideas from each,” he concedes. That’s where the SCOR model (see Figure III-3.1) initially proved itself.

	Level		Schematic	Comments
	#	Description		
Supply Chain Operations Reference-Model Not in Scope 	1	Top Level (Processes)		Level 1 defines the scope and content for the Supply Chain Operations Reference-model. Here basis of competition performance targets are set.
	2	Configuration Level (Process Categories)		A company's supply chain can be "configured-to-order" at Level 2 from approximately 19 core "process categories." Companies implement their operations strategy through the configuration they choose for their supply chain.
	3	Process Element Level (Decompose Processes)		Companies "fine tune" their Operations Strategy at Level 3. Level 3 defines a company's ability to compete successfully in its chosen markets, and consists of: <ul style="list-style-type: none"> • Process element definitions • Process element information inputs and outputs • Process performance metrics • Best practices, where applicable • System capabilities required to support best practices • Systems/tools by vendor
	4	Implementation Level (Decompose Process Elements)		Companies implement specific supply-chain management practices at this level Level 4 defines practices to achieve competitive advantage and to adapt to changing business conditions (Source: Supply-Chain Council, Inc.)

Figure III-3.1 SCOR Contains Three Levels of Process Detail

“The SCOR model gave us the framework and nomenclature to do many things,” Melody says. “One most important was a consistent definition of elements like plan, source, make and deliver.” Armed with this structure and definition, they were able to benchmark.

Benchmarking helps to focus on “real” problems. “One of the biggest problems we faced was trying to figure out what to work on first,” he offered. “First with SCOR, then through benchmarking, we were able to define where to focus our efforts.” They use an industry service that gathers and provides benchmarking data within the pharmaceutical industry. It provides a profile of 20-to-30 metrics that compares the specific company, item by item, against its competitors. While not commenting specifically about Roxane Laboratories’ specific profile, one of the metrics may indicate relative comparison in an area of inventory planning. “It’s a detailed benchmarking study

of supply chain performance measures,” he explains. “They’re very quantitative and measure on a consistent definition, which is where SCOR is helpful.”

Response to market pressures complicates supply chain. Another situation that focused Mellody on supply chain management was the decision to rationalize production facilities. Manufacturing of all product lines now would be concentrated in two facilities, one in Ohio and one in Mexico City. “It complicated the logistics and supply chain,” he reported. “We were faced with shipping products across borders, and we also had to transfer the technology and inventories for our products to these locations.”

However, they seized the opportunity to use the supply chain project as a “way to ensure that the consolidation activities would be successful.” They focused on

- Improving processes and systems.
- Increasing customer service and inventory performance
- Creating flexibility to do away with the uncertainty of the markets

Again, the SCOR model was most helpful. “We used the SCOR model to communicate not only among ourselves, but also with our external partners (suppliers and customers),” Mellody explained. “Despite many different definitions of a supply chain that were out there, through SCOR we had a language that was consistent.”

Getting one’s own house in order first. The first step was to form a sales and operations planning (S&OP) group. “We integrated two major groups into a business process that would manage the supply chain activities of source, make and deliver,” said Mellody. “We then focused on what other opportunities there were within our own arena of source, make, and deliver that could result in performance improvement, such as boosting customer service and increasing inventory turns.”

The conversion to an S&OP operation enabled the introduction of balanced scorecard metrics. “We put in a number of financial metrics on the same page. This enabled the executives from marketing, operations, and finance to jointly look at business performance across a broad spectrum instead of just focusing on their own specific functions.

“That was a powerful change for our company, to move away from a focus on a single functional metric,” he maintains. “It forces us to look across the full range of make, source, and deliver and how a decision impacts the performance of the total supply chain.” Previously, each function did a great job optimizing its own activities—often at the expense of others.

“Moving to S+OP forced us to address the supply chain as an end-to-end process from an organizational standpoint,” Mellody maintains. “That enhanced the trade-off decisions we make over the inventory we managed.”

Extending the supply chain beyond the “four walls.” The pharmaceutical giant partnered with consultant Pittiglio Rabin Todd & McGrath (Waltham, Mass; www.prtm.com), a driving force and developer of SCOR. “We looked to PRTM to provide a disciplined approach to supply chain performance,” he explains. “We used it to map a supply chain grid, to extend the SCOR concept beyond our company.”

Says Mellody, “We have thousands of suppliers but only a handful that can be considered key. To these we wanted to extend our S+OP approach and share our production plans. Additionally, some of our suppliers are located on-site.” Overall, these steps have sliced the lead times and improved delivery performances—further assisting inventory reduction.

The next step is to extend this concept to the customer. “We’re getting more involved with the customer in determining how to service them better and give more value,” he explains. A final key to success is the internal supply chain council. It consists of top executives from marketing and sales, finance, operations, and the supply chain manager. “Clear, strong, cross-functional executive leadership is essential.”

HOW ELI LILLY WORKED WITH SUPPLIERS TO ATTAIN 95% ON-TIME DELIVERY

In recent years, key performance measures at the Dry Products plant of Eli Lilly and Company (Indianapolis, Ind.) have been on a continuous roller coaster ride. To prevent this constant up and down cycling, an effort was initiated to become an MRP II Class A Certified factory.

One essential element was to improve supplier relationships. “Our belief was that formal processes, policies and performance measures dictated by MRP II would instill operational discipline in the plant and help stabilize and im-

prove our key performance measures,” according to Robert Daniel, CPIM, senior purchasing agent, and Allison Leer, CPIM, MRP II project leader. “We also identified supplier on-time delivery performance as a key requirement for the plant to achieve Class A performance.”

Purchasing’s quest to achieve 95% supplier on-time delivery. “We recognized we had several internal and external issues to resolve,” Daniel and Leer acknowledged at the Congress for Progress XXIII (sponsored by the Mid-Atlantic Chapters of APICS). First among the internal solutions was to improve system data accuracy.

This information is used by the MRP system to indicate what, when, and how much to purchase. “We discovered that any inaccuracies in this information could affect supplier on-time delivery by requiring suppliers to perform to unrealistic demands, due dates, and lot quantities,” according to Leer.

One focus area was the planning data fields. “In our system, these were only reviewed in emergency situations,” Leer offered. “We identified the critical planning data fields in our MRP system that control how our MRP system determines demand and suggests supply of material.” A new procedure was written to review these critical planning fields annually.

Purchase lead times were another area rarely reviewed in the system. It was updated only when suppliers called, advising that lead time was increasing. However, it was never adjusted back when lead times decreased.

“We identified lead time in our system as purchase lead time and safety lead time,” the presenters explain. Purchase lead time was defined as the number of days needed to issue, build, and ship an order to our dock. Safety lead time is the number of days needed to receive, inspect, and release the order.

Supplier input required to develop lead-time data. “We contacted all suppliers to determine the number of business days they required to build and ship all items,” they explain. “We told suppliers they were required to inform us of any change in lead time immediately and that we were going to measure their conformance to this lead time,” according to Daniel. The time required to issue a PO was set to five days for all components.

Safety lead time was determined by joint meetings with purchasing and incoming quality control. It included the time needed to receive the part, inspect the part, perform laboratory analysis, and release the part.

“We set safety lead time by part family since inspection time was similar by family,” he explains. These part families were commodity package items, printed package items, primary containers, and raw materials.

Review of open purchase orders finds many past due. “We also analyzed our open purchase orders and found at least 25% had due dates that were more than five days past due,” Daniel notes.

They developed a report to track the number of purchase orders with due dates greater than five days past due. This is generated weekly. “We also made a requirement to update purchase order due dates in the system immediately upon notice of any delivery date change,” Leer said.

Another weak link: inaccurate bills of material. “BOM accuracy was excellent for established and stable manufactured items,” they note. However, new bills and changes to bills were not created nor updates until about two weeks before the product was scheduled to run in production.

It was decided that the new bills and changes to bills had to get into the system ASAP. “This was accomplished by educating the plant on the need for accurate and timely BOM updates and by transferring the ownership of the BOM to individuals closer to the changes,” he describes.

Working on supplier relationships meant major changes. After the plant began maintaining a stable schedule and consistently meeting it, and after purchasing also had corrected all their data and processes, it was time to begin working with the suppliers. The approach included improved supplier communication. Key suppliers were brought into the Lilly plant for a presentation on the goals and a review of the recent internal process changes. The discussion focused on how the changes could benefit the supplier and on the supplier’s role in helping Lilly to achieve its goals.

A letter was sent to all suppliers outlining the 95% on-time delivery goal. In it, the effort to reach MRP Class A, and the key measures that would be implemented was discussed. Further, the suppliers were notified they would be provided with an 18 month planning forecast, more stable schedules, and fewer orders placed within the lead time.

- *Moving toward strategic sourcing.* Strategic sourcing, at Lilly, is a corporate initiative. The intent is to provide two suppliers for all primary containers. According to Daniel, primary containers include items that “touch” the

product. “Contracts were established with our strategic suppliers specifying lead times, delivery requirements and quality requirements,” Daniel detailed. Penalties were noted for poor quality and/or poor delivery performance. To further develop relationships, quarterly review meetings with all strategic suppliers are scheduled.

- *Creating a supplier planning report.* “Our suppliers had little knowledge of upcoming firm orders and forecasts,” he explains. “It was, therefore, very difficult for them to maintain stated lead times and delivery requirements.” A report was developed listing all suggested and firm purchase orders. This report is sent to all suppliers quarterly. Strategic suppliers also are given approval to buy raw materials for firm and suggested orders three months out. “This ensures that lead times are met,” maintains Daniel.

- *Changing supplier behavior.* Historically, the suppliers seldom called regarding late orders. “Our goal was to change this behavior, by meeting with suppliers and communicating our expectations,” he explained. “We reinforce our expectations by calling suppliers on every order that was due the following week,” he declared. “Our intent was to continue calling on every order until suppliers had demonstrated a change in behavior.”

“After improving data in our system and developing good supplier relations, on-time delivery was improved,” Daniel concluded. “When both parallel improvement paths were completed, the 95% on-time supplier delivery became a reality.”

SIKORSKY’S KAIZEN PROCESS PROMOTES SUPPLIER DEVELOPMENT

Raising suppliers’ performance level can ultimately have a huge effect on your customers. But getting their performance up can sometimes mean taking the drastic step of extending your management techniques into their operations.

Introducing supplier kaizen. Supplier kaizen is a method of bringing suppliers to the same level of operations as the parent company, through training and improvement projects, to ensure superior performance and nurture the trust required for strong partnerships.

Sikorsky Aircraft (Stratford, Conn.) developed a new supply base

management system that “created internal and external ratings and targeted an ambitious improvement in the supply base,” according to Catherine R. Forman, CPIM, and David H. Vargas, CPIM, both project leaders, agile manufacturing department.

Two years later, the company realized the supply base would not progress at the rate desired and it established a group to conduct supplier kaizen. Over 40 suppliers in eight different commodities have gone through the program.

S2000 supplier certification program. The program was created to develop a world-class, continuously improving supplier base, to bring the supplier base to the “right size” and to improve suppliers’ quality, delivery, lead time, and cost metrics. A manual was written describing the attributes of a world-class supplier.

“Suppliers submitted a self-assessment of their internal capabilities, or were audited by a Sikorsky team, which were scored against others in their commodity group,” Forman and Vargas explained at a recent APICS Annual International Conference. Suppliers also were rated on their quality, delivery, and responsiveness performance to Sikorsky. Every year suppliers are given an overall assessment and rated as “basic,” “advanced,” or “world-class.”

Supplier kaizen at work. “We define kaizen as ‘making people’s jobs easier by taking them apart, studying them, and making improvements,’” explains Forman. A “kaizen event” is a focused activity that uses a dedicated team to improve a process in a short period.

To date, 40 events have been conducted. They have resulted in millions of dollars of savings on multiyear contracts and substantial lead-time reductions (see sidebar).

“The kaizen events have either jump-started a new continuous improvement program, or served to energize programs already in place,” Vargas shares. Another important aspect has been to improve relationships with the suppliers, establishing contacts for further communication and problem solving.

There is no set form for a supplier kaizen. They have ranged from a two-day business process event, to a week-and-a-half manufacturing event that built cells, and a series of events that addressed both technical and lean manufacturing issues. However, every event follows the same four steps:

Examples of Sikorsky's Kaizen Events

- Sikorsky's Overhaul and Repair Center needed a 30-day turnaround to support its customers. The repair work at an electronic supplier was six months. The team, made up of the agile team representative, the buyer, and the planner, spent three days with their counterparts at the supplier. They did an analysis of the interface between Sikorsky and the supplier in the ordering process and found that details were not ordered until after the teardown evaluation was complete, pricing agreed to by Sikorsky, and a purchase order placed. The team developed a long-term agreement with standard pricing, and the supplier committed to stock the detail components. The team also streamlined the evaluation and quoting process at the supplier. Lead time was cut to 40 days.
- Quotes from a sheet metal supplier were 60% over target. They claimed to be losing money at the previous price. The kaizen was conducted in two weeks, one to improve the forming of the details and the other to improve assembly. The first reduced setups, eliminated unnecessary inspections, and improved workplace organization. The second created shop aids for assembly, eliminated defects passed to assembly from time, and decreased the testing required for spot welding. The price was brought down to 10% over target.
- A servo had been on the short-to-load list for over a year. The Kaizen team did a two-day investigation visit, where they analyzed the whole process and identified multiple problems with the casting. Several meetings with the casting supplier resolved the defects. A week-long kaizen at the servo supplier focused on improving and standardizing the machining setups to make a good part every time. Scrap dropped to zero from 35% and the supplier is no longer delinquent.

1. Selecting the supplier
2. Planning the content
3. Conducting the workshop
4. Following up on the benefits to Sikorsky

At the start of the program, elaborate flow charts are created establishing the steps required to approve and review a kaizen event.

Supplier selection. “The purchasing managers, through the buyers and commodity team leaders, own the relationship with the supplier,” Forman

stresses. “The agile team works with the buyers, commodity team leaders, and managers at every step in the process.”

Suppliers are selected for a kaizen event by purchasing managers along with the commodity team leaders. “Only those the commodity team has decided to develop are candidates for kaizen, except when the part cannot be re-sourced and there is a critical problem with that supplier,” according to Vargas.

Event planning. There are two essential elements to ensure a successful kaizen event:

- Identifying an opportunity area which, if improved, will affect the objective
- Gaining the support and enthusiasm of the supplier’s management for an event

At the site visit, the agile team introduces kaizen and lean manufacturing principles, explains the objectives set by purchasing, reviews the supplier’s continuous improvement activities, and takes a plant tour, “walking the process” for a typical Sikorsky part.

Sikorsky and the supplier select project areas that could be resolved in a kaizen event. “Frequently, to get supplier support and to develop trust, an event will cover both the areas of opportunity identified by the supplier as problems with their interface with Sikorsky, and the areas of opportunity the agile team identifies in the supplier’s internal processes,” Forman describes.

If the supplier agrees to engage in kaizen with Sikorsky, a project plan is written that formalizes

- Opportunities to be addressed by the kaizen
- Scope of the project
- Targets for improvement
- Date of the event

At the same time, the buyer prepares a memorandum of agreement that commits the supplier to

- Share the savings that result from the kaizen
- Develop a continuous improvement plan for the company

- Designate a continuous improvement leader
- Conduct follow-up on kaizen events

The supplier also identifies a team roster sent to Sikorsky for review. It is recommended to the supplier that the leader of the supplier team be the person who will be responsible for the supplier's continuous improvement program. Also, the team should represent a cross-section of the company, process owners, and "outside eyes."

- Supplier kaizen should not be limited only to improving manufacturing processes. Substantial savings in lead time are usually found in business processes and in the interface between the companies.
- In all events, the principles of lean manufacturing and waste elimination must be taught. The most important benefit of supplier kaizen is the long-term commitment to continuous improvement and to partnering with Sikorsky in future growth.

HOW PURCHASING RESCUED LIFETIME'S MATERIALS FLOW PROCESS

Have you ever dreamed of how efficient it would be if purchasing was in charge of inventory and quality control, coordinating all aspects of materials management? Here's how one materials manager turned this dream into reality.

Lifetime Products, Inc., Basketball Division (Clearfield, Utah), experienced exceptional growth. Not an unusual situation, but it created a fast-paced, "get it built, get it shipped" environment. Unfortunately, with this success also came a multitude of problems, according to John W. White, former materials manager.

The materials department was no exception. The materials department had been organized in a fairly traditional manner: Purchasing and stores were separate and distinct departments, with both managers reporting to the general manager. Inventory stores was led by a manager who had two inventory supervisors reporting to her. And quality assurance was completely independent of purchasing and inventory control and reported to the general manager.

The purchasing manager was responsible for a team of four buyer/

planners, who each purchased a specific commodity. The metals buyer purchased steel tubing, stampings, steel sheet, and steel round bar. The packaging buyer was responsible for everything in packaging the products, including corrugated material, polystyrene foam, printed labels, stretch wrap, and pallets.

The plastics buyer brought in small injected molded parts, large blow-molded parts, and fiberglass and acrylic basketball backboards. The hardware/miscellaneous buyer brought in everything else, including inks, hardware, basketball nets and basketballs. White, now materials manager, Alpha Technologies (Bellingham, Wash.) shared details at a recent APICS Annual International Conference. Together, they spent approximately \$45 million supporting the production line.

Initial attempts at improving the situation were not sustainable over the long haul. The materials department seemed to have only one mandate: “Whatever you do, don’t run out of material,” The warehouses were bulging at the seams, and material was brought in by the truckload. “Unfortunately, much of the material was not needed and material shortages were completely out of control,” according to White.

In keeping with its philosophy of delivering product on time and at any cost, Lifetime’s management began allocating the needed resources to the materials department. “People were hired and fundamental materials management disciplines were put in place,” White described. Significant improvement was made in a relatively short time. However, the department was finding it more difficult to get to the next level.

Determining what the interrelationships are all about. The materials group decided to take a step back and look at the relationships between purchasing, inventory control, and quality control. “We found their ability to individually succeed was directly related to their ability to work together, to keep their departments’ long-term visions in harmony, and to maintain sound disciplines in each of their areas,” White described. Following are some of the interrelationships that were uncovered:

- Purchasing relies heavily on inventory accuracy to manage buying and planning properly.
- Purchasing needs to catch poor quality material at the receiving dock, not the production floor.

- Purchasing must have quick feedback and accurate documentation whenever out-of-spec material is found on the receiving dock.
- Purchasing wants assurance that correct receiving specifications are in place and receiving is using them correctly.
- Purchasing needs inventory control to do inventory transactions on a real-time basis, all the time.
- Inventory control relies heavily on purchasing to provide accurate inventory forecasts to plan space and resource requirements.
- Inventory control relies on purchasing to enforce suppliers to bring in material fit-for-use, including standardized containers, correct quantities, and correct paperwork.
- Both inventory control and quality control want assurances that quality issues with suppliers get the appropriate attention.

Placing purchasing at the head of the new materials organization. “Our conclusion was that we needed synergistic management,” explains White. To synergize the materials organization, they took the former four basic commodities and created four procurement teams.

Each team would be responsible for the entire materials function for their specific commodity: sourcing, engineering design assistance and consultation, planning, buying, receiving, storing, issuing to production, and raw material quality.

Purchasing agents were in a natural position to coordinate materials functions and were designated commodity material managers. Most buyers had actually managed storerooms at one time and were most familiar with the entire process.

“By accepting all the responsibility for raw materials from the time it left R&D until it hit the production floor, purchasing could, at least in theory, control its own destiny,” White explained. “We convinced Lifetime’s steering committee the strategy would work, and they gave us the approval to reorganize both the purchasing and inventory control departments.”

The quality department was dismantled and completely restructured. The new raw material quality coordinator reports to the materials director and supports commodity teams. The inventory control manager position was eliminated.

New materials department eliminates “us against them” mindset. Having buyers now acting as materials managers allowed for several things to happen.

“Changes in how we did anything within the department could be made immediately,” allows White. “Communication was quicker and more useful.”

Also, direction was consistent among the disciplines. “It created the ‘we’ environment, and more importantly, it allowed buyers to make changes in other areas that significantly impeded on their ability to succeed and ensured that stores and quality were getting the attention from purchasing that was due,” he detailed.

Another significant advantage to implementing the commodity procurement teams is how they align with Lifetime’s core technology improvement teams. These teams consist of representatives from engineering, production, materials, and quality that meet regularly to work together for improvement within a commodity.

“Both production and engineering have felt the positive effects of having a more focused and specialized materials department,” White explains. “All material questions and concerns now are addressed by one person, which allows for a quicker and more informed response. It also allows materials to fairly represent themselves in decisions that affected stores and purchasing.

The new management philosophy is working—and how! Since implementing this new strategy, Lifetime has been able to capitalize on many significant improvements. “We have reduced the number of materials managers from four to three by merging commodities together,” offers White. Also, they have reduced the number of warehouse personnel by 18. “Meanwhile, our level of support to both production and engineering increased significantly, and we maintained or improved all existing materials measurements including increasing inventory accuracy to 99%,” he details.

Most positive effect is in how materials people have increased their understanding of the materials flow process. “They now see the big picture,” he declares. For example, materials managers now understand that by buying parts as a standard they can have them delivered in containers of 100, which not only will make it easier for receiving to inspect and inventory to cycle count, but also will allow for easier handling and storage. In addition, it just happens to be the exact quantity that production requested to most efficiently support their line.

“Everyone within the commodity procurement teams now has a better understanding as to how the team affects the bottom line,” maintains White.

“The materials manager now can easily explain why decisions are made and more importantly, can easily access input on decisions from those closest to the problem.”

PORTER-CABLE TRANSFERS SCHEDULE RESPONSIBILITY TO ITS SUPPLIERS

Porter-Cable Corporation, a division of Pentair, Inc., like many other manufacturing organizations, is sharing planning information with its suppliers. However, there is a difference in their approach. They have also transferred the scheduling responsibility to suppliers, requiring them to meet an actual need date, rather than the traditional PO due date. The process seldom requires calling the supplier to expedite an order. Also, it reduces the buyers' involvement in day-to-day scheduling activities. Company officials believe that as this new program matures, they will realize substantial savings in expediting and schedule follow-up and buyers will be able to focus more time on value-added sourcing.

Creation of the supplier advanced scheduling report. “We present the MRP detail normally seen and used by the production planners directly to the supplier,” explains Dan G. Salley, CFPIM, production control manager. “The responsibility of meeting the detailed schedule date is now the suppliers’.”

To assist this movement of responsibility, they developed a new scheduling tool. The supplier advanced scheduling report (see Table III-3.4) is the direct output of the final assembly/master schedule, netted against on-hand inventory and time-phased to indicate the exact date the material is needed in assembly. In essence, it provides a summary of all parts required from the supplier.

“The report is printed at the beginning of each week after the MRP regeneration and on demand,” Salley told a recent APICS Annual International Conference. It contains the supplier's number, name, and the main contact at the supplier with their fax number.

The buyer/planner reviews the report before faxing it to the supplier. This first report is simply a summary listing of all parts purchased from that supplier, with a requirement in the next 12 shop days. A table is set up at the item/supplier master level to load pieces per box, box size, how many boxes fit on a skid, and how many pallet positions a skid takes up in a trailer.

Table III-3.4 Supplier Advanced Scheduling Report Format and Trailer Loading Report Format

Date: 5/05/98		Porter-Cable Corporation		Page 1		Prog. SFRO																	
Time: 13:19:16		Supplier/Advance Scheduling		Case Supplier		Contact: Ann Friday		Fax: 800-555-1808															
Supplier: 12345		Box Size		Skid Qty		Pal Posn		Last Friday															
Item#	Part#	Description	Case	Qty	Size	Box	Skid Qty	Pal	Posn	Date	5/7	5/8	5/11	5/12	5/13	5/14	5/15	5/18	5/19	5/20			
1	888801	Case	1	1		1	144	1	1	5/5/98	432	119	216	216	225	225	225	225	225	225			
											Lot Sized	144	288	144	288	144	288	288	144	288			
											# of Skids	1	2	1	2	1	2	2	2	1			
2	888803	Case	1	1		1	144	1	1	5/5/98	1872	905	970	970	970	970	970	970	970	970			
											Lot Sized	1006	1006	864	1006	1006	864	1006	1006	1006			
											# of Skids	7	7	6	7	7	6	7	7	7			
3	888804	Case	1	1		1	270	1	1	4/9/98	270												
											Lot Sized												
											# of Skids												
4	888805	Case	1	1		1	40	1	1	5/5/98	840	491	650	650	650	650	650	650	650	650			
											Lot Sized	570	640	640	640	640	640	640	640	640			
											# of Skids	13	16	16	16	16	16	16	16	16			
5	888807	Case	1	1		1	98	1	1	5/5/98	392	258	400										
											Lot Sized	294	392										
											# of Skids	3	4										
										Total Skids Required		16.0		28.0		25.0		24.0		25.0			
										Pallet Positions		16.0		28.0		25.0		24.0		24.0		25.0	

This item master information is referenced next to the part number and description of each line item. The last receipt date for this part and its quantity is pulled from the purchase order history to give all parties a common reference point when discussing or reviewing the report.

The planned receipt line from the traditional MRP planning grid is printed to the right of the appropriate part number. This represents the final assembly requirements in the specific quantity and date due in the final assembly area.

Trailer loading report evolves from the advanced scheduling report. A second report has been developed, the supplier advanced scheduling trailer loading report (see Table III-3.4). This worksheet contains the same information as the summary sheet with the addition of the calculations for trailer loading. The planner does the math. “This report can be used either by the production control group for lot sizing, or by a warehouse/shipping group for order picking and filling,” Salley describes the process.

Some of Porter-Cable’s suppliers build-to-stock. They use the blanket ordering information to schedule their shop or suppliers, and “merely use [their] final loading report to complete the order process,” he notes.

Using the item master information, the bare requirement is sized to match either the box quantity or the skid quantity as a lot size, he explains. The logic in the system is arranged to look at whether there is a box or skid quantity loaded at the item master level. If there are both, the skid quantity is the minimum lot size. If there is only the box quantity, then it becomes the minimum lot size.

STRATEGIC SOURCING COMES TO STEELCASE— WITH IMPRESSIVE RESULTS

The goal of many purchasing professionals is to develop a significant strategic sourcing capability by using the strength and diversity of cross-functional teams. Unfortunately, most initiatives never realize their full potential, with quite a few collapsing in absolute failure.

One exception to the “rule,” however, is the initiative and practice developed by Steelcase Inc. (Grand Rapids, Mich.). Joseph Erba Jr., vice president, sourcing and logistics management, observes, “We have become a much more efficient sourcing organization, and now have more people trusting our ability to get things done.” For years, he admits, “Sourcing/

purchasing was kind of like the lost cousin in Steelcase. Today we have more people coming to us and asking for our services.”

Steelcase Leadership System, the genesis of the turnaround. Steelcase had returned to a process focus after three unsuccessful years of being a business unit organization. “We again have functional groups (sales and marketing, manufacturing, sourcing and distribution) but we focus on the process, which is cross-functional,” Erba relates.

“We basically manage our organization using three key process areas, with each process involving all of the different functions in the organization,” he told a Supply Chain Forum presented by Institute for Industrial Research (New York).

Adaptive management process key to success. “We have a policy team that sits on top of the organization and that group of eight individuals establish the strategy for the corporation, both short term and long term,” explains Erba. “Where our process becomes unique is once the policy team sets those strategies, it moves to the process management teams, which are based in the horizontal process orientation groups.” These teams then take over and direct all the initiatives we create during the course of the year.

“I am the leader of a number of different process teams, most of which do not just include people from my group,” he notes. “Most often there’ll be participation from manufacturing, the area I interface with quite a bit, but also sales and marketing and product development.”

How the system works to create a supplier certification process. To provide an insight into the workings of the process, Erba described how he applied its principles to initiate a supplier certification program.

When Steelcase “did not have a certification process for our supplier base,” he began, “figuratively, we had 8,000 purchasing agents. Basically everyone in the factory could make a decision to buy whatever they wanted to buy. There wasn’t an awful lot of control,” he admitted.

Project gets off with a kaizen start. The goal was to establish a supplier certification process to reduce disruption costs, improve on-time delivery, and eliminate receiving inspection.

The process was initiated by the operations management team, which included representatives from quality, sourcing, engineering, production

and inventory control, manufacturing and distribution. A kaizen group initiative was then launched.

“This is a high-intensity, dedicated group that came together for a week to review the problem,” Erba describes. One of their outputs was to map out a “should-be” and “as-is” situation. Due to the nature of the project, they gave a midterm report to representatives of other functional groups that would be affected by their recommendations.

At the end of the week the group called in management and made their presentation. The team’s plan received buy-in from the executives, however, they ran into some problems using the tool.

What was learned when trying to put the supplier certification process into place. “The team process was a success,” Erba declared. However, “the implementation struggled because we did not have accountability of the functions strictly defined and assigned. We didn’t have the folks made accountable that were to do the implementation. We didn’t put it into their individual ROIs [responsibilities, objectives, indicators],” he detailed. ROIs are the annual goals and responsibilities that are established once a year for every employee within the organization.

Also, there was a conflict among functions, those who would carry out the certification process with the suppliers. “We came up with the suggestions and gave them to the purchasing group to start with suppliers,” he explains.

However, since the purchasing group also had a number of projects in which they were involved, the supplier certification process kept being delayed.

“We initiated a corrective action project in which we completed a gap analysis to decide where the problems were and undertook some corrective actions,” Erba explained. “These steps took about six months to set up, but we do have a successful supplier certification now in place.

Introducing sourcing into new product development initiatives—another example. Three years ago the sourcing group was given a significant cost reduction mandate: reduce material costs by \$100 million over three years.

“One of the critical areas, yet it was difficult to resource product development,” he admits. “Nevertheless it was important for us to be connected to new product development.”

Unfortunately, while sourcing had this major cost reduction mandate,

Steelcase was in the throes of developing a major new product that required a lot of sourcing support.

Getting the suppliers involved on the team. “We put a small team of people from marketing, industrial design, product engineering, manufacturing engineering, quality, and sourcing/materials management together and co-located them with the product development team,” he details. “They were to coordinate all sourcing activities.”

Additionally, several key suppliers were asked to join the team and become involved. They were asked to do things that the supply base was not asked to do before: provide finished goods to customers directly from their location.

Deliverables generally met, but a new sourcing role had to be created. “The sourcing team did a good job of supplying their internal customers, and most of the deliverables were met,” he offers. While the sourcing team became integrated into the product team, it had become disconnected from the procurement team. The result was that supplier selection and supplier management activities became disjointed.

This experience led to the creation of a new role within the sourcing organization, advanced sourcing. “It’s part of the supplier development team. We now have four individuals assigned to advanced sourcing. Their job is to stay linked with product development and bring back appropriate information to the procurement group,” according to Erba.

What about the \$100 million cost reduction mandate? By the end of Steelcase’s three-year time frame, Erba reports his group not only met, but it exceeded the \$100 million cost reduction target—by \$3 million. Again, this was the result of another cross-functional team effort, one which also relied on the supplier community. The team had a mandate to create a structured cost reduction process, which it did.

Continually Advance Supplier Excellence (CASE) was the outcome. The program was designed to aid Steelcase suppliers in identifying cost reduction activities. “This was a very cross-functional team, from sourcing, manufacturing, and suppliers,” Erba reports. “It’s also an ongoing process and we involve the suppliers right up front and set performance objectives.”

Most of the projects to achieve the \$103 million in cost reduction have come out of the CASE initiative. “It wasn’t from deeper price discounts or cheaper products,” he asserts, “it was working through product teardowns

and having suppliers, even competing suppliers, tear a part or product apart and tell us how we can build it more competitively. Also, initiating process improvements and single sourcing on a lot of our products.”

Steelcase’s total manufacturing purchasing budget is \$500 million. In three years they saved over 20% of that, by developing strategic sourcing techniques through cross-functional teams.

D & B’S NO-NONSENSE APPROACH REGENERATES PURCHASING OPERATION

Today, the Dun & Bradstreet purchasing organization is a lean operation that also is a major contributor to the corporation’s bottom line. The department now manages fewer than 3,000 suppliers, down from 8,600 only four years ago. More important, they have developed preferred relationships with about 100 key suppliers. As a result, the purchasing staff now consists of just 14 individuals versus 70 a few years ago, of which 80% were clerical.

“We also generated savings of \$8.3 million, which added three cents in earnings per share to the corporation’s bottom line,” asserts Douglas F. Greene, global purchasing director, The Dun & Bradstreet Corporation (Purchase, NY; 914-933-3195).

Additionally, at 18 focused suppliers, paper invoices are down from 86,000 three years earlier to zero today. Also, they have automated 506,000 transactions. And, while the P-card now is used for 16,000 transactions, POs have been taken down from 55,000 four years ago to less than 2,000 within three years.

Key to change: having the courage to look at purchasing critically and honestly. “To unlock the value of our purchasing function we had to have the ‘courage to critique,’” he offered. “And we did.”

Describing the former situation at an NAPM-NY Annual Purchasing Executives’ Symposium, Greene put it rather bluntly: “The whole thing was an uncoordinated mess—and a model of inefficiency.”

The startling transformation becomes a textbook case of reorganization and refocus. “In our own house we found the tools for identifying problems, extracting opportunities, and yielding actionable information by putting data into context,” Greene relates. “I ordered our own medicine. We took the data tools

and analytics for which D&B is known, along with the vendor information resident in our database, and we turned it all inward on ourselves.”

The change juggernaut gathers momentum. “Once we decided to change, we resolved to go all the way,” Greene insists. “We centralized the purchasing function and created a single mindset with shared values and objectives.”

“We did some aggressive and unconventional things, like looking where we could add value by getting into areas that we had never before been in,” he offers. “We went to marketing and suggested they consolidate ad agencies. We talked about consolidating all travel.”

They listened. Today, the 265 travel agencies have been reduced to one.

Introducing cross-functional teams. “We formed, for the first time, cross-functional teams that merged business and functional experts,” he explains. “We brought the sides together, and we rationalized the requirements and supply.”

This enabled purchasing to manage total costs, and to negotiate higher levels of quality and service, based on the “real” needs of the team members. “We also worked with the business units to learn where outsourcing might be appropriate.”

The quest to become a center of value creation. They established that a three-prong approach converted purchasing into a value creator. The individual elements include the following:

1. *Taking costs out of the procurement process.* Underpinning this effort is the ongoing effort to dissect and understand the components of cost. “Not just acquisition price, but organizational costs like headcount, operating budgets, the financial demands of management focus, efficiency and information,” Greene itemizes. “We also investigated process costs, like acquisition and payment processes, research time, the cost of noncompliance, and the ability to gather information.” They looked to capture hidden costs, too, focusing on quality and service levels, cycle times, supply and maintenance costs, insurance—effectively all the costs associated with owning and managing assets.

“We discovered that innovations in purchasing can reduce cost,” Greene declared. For example, new acquisition and payment processes can reduce bureaucracy and transactions, contract terms and conditions can reduce exposures, and better relationships with suppliers foster trust, innovation and investment.”

2. *Establishing innovative supplier relationships.* “We sought agreements with best-in-class suppliers so they would invest in us in unconventional ways,” Greene offered. This played out as automated billing practices, quality and service initiatives, and in continuous, measurable improvement.

Further, purchasing staffers set out to improve quality and service levels and brought suppliers on site to help them.

“We also negotiate contracts that protect us from hidden risks,” he explains. “Our temp agreement comes with insurance provisions. Our relocation contracts come with environmental indemnification. We have service level guarantees.”

Additionally, they have incorporated electronic feeds into D&B’s budget software so department managers get “better information, more quickly, so they can manage their budgets,” he allows.

3. *Communicating results, expectations, and requirements.* “We also moved to master the art of the relationship, to strengthen the way we form, improve, and measure them,” he maintains. “And I don’t mean just relationships with suppliers, but also with employees and the business units.”

As an example, he advises, “Senior management understands earnings per share. So if you can put your achievements in that context, or relate it to the bottom line in any way, you’ll find a universal language that communicates well.”

Greene also boasts of his current staff: “We’re a stronger department because they’re the right fourteen. They’re aggressive, creative, well trained, and not satisfied with the status quo.”

HARLEY-DAVIDSON’S PILOT BUILDS TRUST WITH TIER 2 AND 3 SUPPLIERS

Purchasing professionals do a commendable job of measuring Tier 1 supplier performance. However, the system tends to break down with the sub-tier suppliers. Recognizing this situation, Harley-Davidson Motor Company (Wauwatosa, Wis.) initiated a new process that called for participation of Tier 2 and Tier 3 suppliers.

“The reality today is we deal closely with Tier 1 suppliers in our businesses. We measure their performance, we work with them, and we see them,” explains Leroy Zimdars, CPM, director of development purchasing (414-616-1757). “However, we don’t talk to the Tier 2 and 3; neither do the

Tier 1 suppliers, in a lot of cases.” And as Zimdars has experienced, “The problems we have in launching a new product are not from Tier 1 suppliers, but somebody downstream.”

A disappointing beginning, but a valuable lesson learned. Years ago, Zimdars developed a presentation to train Harley-Davidson’s suppliers in how to develop an effective value chain. They hosted a conference for their primary suppliers.

“We also had each Tier 1 supplier invite its major Tier 2 supplier to the same conference. At the meeting, we challenged each one, in each value chain, to come back with one area of improvement that they were going to work on over the next year,” he told an NAPM Supply Chain Management Conference. The result was: “We gave them the tools, and we trained them,” he explained. “But they didn’t work together because they didn’t have alignment and there wasn’t anyone driving them to become value-added as a chain.”

Piloting a new concept that creates trust in a value chain. Harley-Davidson is leading the pilot for the trust-building and cooperation module of the National Initiative of Supply Chain Integration (NISCI; Chicago; www.NISCI.org) supply chain integration process (see Figure III-3.2). NISCI helps member businesses research and develop ways to optimize the performance of supply chains between three or more trading partners.

Two modules (measuring chain economic performance and architecture for consensus decisions), also in the pilot stage, are led by other charter

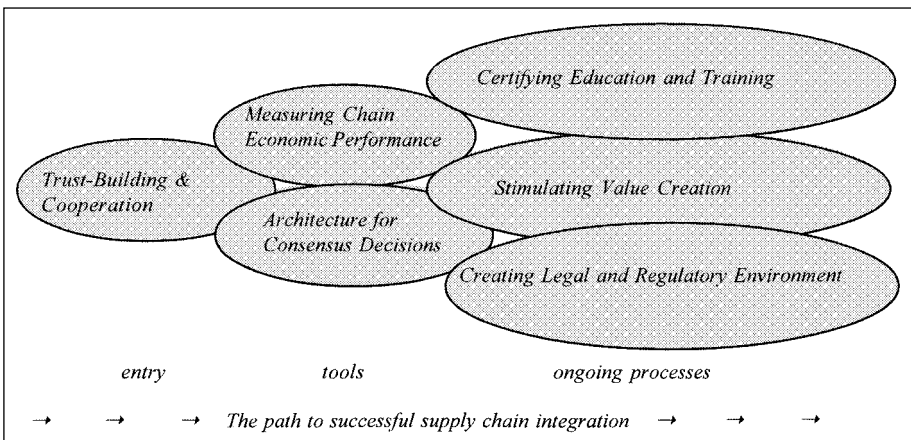


Figure III-3.2 NISCI’s Supply Chain Integration Process

member companies of NISCI. Pilots for the remaining three are planned for the future.

“I’m assigned to the trust-building and cooperation module, and we believe that’s the entry into the entire supply chain process,” Zimdars explains. “Companies that don’t know who their value chain members are often don’t trust them. That’s the issue we’re dealing with and how we believe you come into the process.”

In this particular chain are Harley-Davidson and its Tier 1 supplier of die castings (Aallied Die Casting Co. of Illinois; Franklin Park, Ill.), along with the Tier 2 suppliers who do the plating and polishing (Southwest Metal Finishing Co.) and provide the die and tooling (Ram Tool, Inc.) for the casting. “This value chain produces every chrome-plated casting for our engines,” according to Zimdars. “We don’t want parts, we want jewelry,” he said in describing the demand the suppliers must meet.

Cooperation Day, and the detailed work begins. A good deal of preparation is necessary before Cooperation Day. For instance, the champion for the chain is selected. Zimdars chose Scott Torphy, manager of administration at Aallied Die Casting (847-455-1950).

Also, the “mandate” team members are identified. For this particular chain, Harley-Davidson representatives come from purchasing, design, production, finance and sales. The supplier mandate team also has representation from matching areas. Overall, the team has 21 team members.

Included in the prework activity is the determination of areas and activities the chain should work toward to achieve consensus decisions. Among the topics to be flushed out are program plans and timing, technology acquisition and development, and integrated, concurrent design and manufacturing. Also included are opportunity scanning, competence sharing, knowledge acquisition and development, resource utilization, and measurement methods.

Meet once, then all follow up done via Internet. Cooperation Day is the one time that all members of the chain gather together. For many, it’s the first time they have met. During the day and a half they meet, smaller “links” gather together to identify and discuss the concerns they have and the issues they share. “About 90% of the issues get identified,” according to Zimdars, and “it’s done in a very nonconfrontational manner.” The chain members look at these issues to find a common thread for which they can offer improvement and from which each can benefit.

Getting to the specifics. “Each link then has an assignment, on which the members must work when they get back to their individual work sites,” Torphy explains. The “links” identified operating goals such as

- Reduce rejected parts by 50% at all inspection areas
- Shorten cycle time by 30%
- Reduce amount of waste by 20% of the total cost
- Ensure that the commitment for the business is long enough to pay back the costs of investment

Building Internet competence is critical. “Once Cooperation Day is over, all of the work, communication between and among the teams, and status reports are done via the Internet,” Torphy explains. Therefore, they spent about three hours having the team members “surf the net” to become familiar with the chain’s Web site structure, features and operation. It’s just the beginning, but Harley-Davidson believes it’s on the right track in aligning their supply chains and moving them in a positive direction.

SEQUENT SEPARATES STRATEGIC AND TACTICAL SUPPLIER MANAGEMENT

Sequent Computer Systems, Inc. (Beaverton, Ore.), has separated its sourcing organization into a strategic side and a tactical side. The strategic sourcing process focuses on long-term supplier relationships and corporate supply chain goals. The tactical side of the house handles day-to-day execution of supply chain deliverables. The strength and uniqueness of the reorganization, however, are in its application.

Separating strategic logistics from tactical logistics. “On the strategic side, worldwide strategic sourcing manages the logistics supplier strategies, provides leadership to the logistics team, and develops service and repair supplier strategies,” explains Martha (Marti) H. McMahan, worldwide logistics manager (503-578-7580).

On the tactical side, some activities (see Figure III-3.3) report through worldwide manufacturing while the balance go through customer service or international subsidiaries. The organizational structure is similar for procurement.

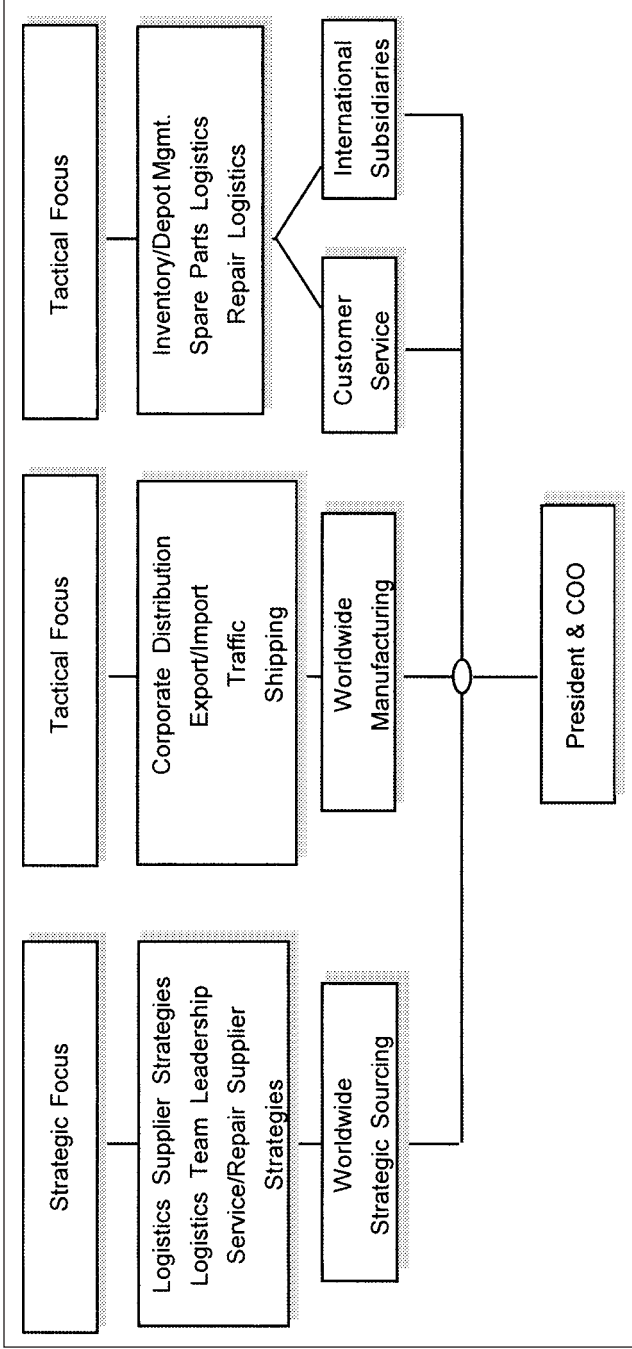


Figure III-3.3 Sequent's Logistics Organizational Structure

The strategic management of all suppliers comes under worldwide strategic sourcing, McMahon's organization. Meanwhile, the tactical activities (order placement, JIT delivery management) are within the worldwide manufacturing organization. "The reorganization now enables us to focus on the strategic relationships and, in our case, the logistics road maps much more effectively," she explains.

Logistics strategy developed through a commodity team. "We run our logistics strategy through a logistics commodity team," McMahon explains. The team has a manager who reports to her. Among the members of the team are the corporate distribution manager, customer service logistics manager, import staff, export staff, traffic staff and McMahon, as worldwide logistics manager.

"We frequently bring in consultant members from other organizations, such as accounts payable, computer applications, warehouse staff, packaging commodity manager, and international subsidiary logistics staff," she offers.

Formal selection process, but few suppliers to choose from. From a material management point of view, Sequent's shipping profile is primarily by air, without ocean or rail transport. There is a little LTL. "We have a very narrow supplier base with our logistics providers," she noted at a Proven Performance Metrics in Logistics Conference (Institute for International Research; New York). "Our focus is to try to increase business with existing providers to keep the number of providers limited."

The formal supplier selection process begins with the request for quote activity. "We try to keep this down to a very small selection base, often less than five potential suppliers quoting," McMahon describes. The commodity team conducts the evaluation. In some cases the team is extended to include members from Sequent's international subsidiaries. "In these cases we've done the supplier selection process through video conferencing," she explains. Suppliers can make their presentations to an international audience, and international team meetings can also be conducted in this manner.

The evaluation process includes supplier presentations, and site visits: "all pretty typical," she notes. "We also use a weighted average point system in making the assessment."

One provider per type of service. Sequent prefers this arrangement. Therefore, it has one provider for each service, such as courier, international air freight forwarder, heavyweight air carrier, and LTL provider. Also, small package air

domestic and international, third party logistic provider for warehousing support service, and van lines.

“One benefit of a limited supplier base is that it really minimizes supplier management cost,” McMahon insists. “We focus our energy with the supplier who has a major impact, instead of spreading ourselves over a large supplier base.”

Logistics costs slashed by a third, and other benefits. A small supplier base also improves the quality of supplier management, she attests. “When we initiated this program, we brought our logistics costs down by over a third. We also entered into multi-year agreements which have protected us from annual price increases,” she details. Some of the agreements have extended out four years.

“We also have the benefit of receiving special consideration from our suppliers, which fall into a variety of categories,” she confides. As an example, she mentioned the UPS strike. “There was no impact to our pickup and delivery time.”

Further, with some of the suppliers Sequent serves as a beta site to prove out a new technology. For instance, she tells of utilizing a new tracking system that “wasn’t quite on board yet” for a supplier’s other customers.

Benchmarking long-term contracts. “Our formal written, multiyear contracts are typically for a period of three years,” McMahon describes. “We also benchmark in the second year of the contract so we know that our rates are still competitive within the marketplace. We try to be in the first quartile of the competitive pricing that we benchmark.”

Additionally, she admits “our contracts are lengthy in nature, as we try to fully define the actual business relationship. This includes the metrics we’ll be using, the types and frequency of meetings we’ll hold, and any cost recovery elements. We try to put everything we can into the agreement, so that if I’m not there, someone else can understand what’s happening in this business relationship,” she explains.

Meetings scheduled with all suppliers. “In our formal logistics supplier management process, we have regularly scheduled meetings with our providers,” McMahon notes. “We produce an annual calendar each year that specifies when all meetings will be conducted.” This includes all quarterly reviews, and the semi-annual executive performance reviews.

“Here, our executives, often the vice president of strategic sourcing, will meet with the appropriate supplier executives to discuss the state of our

mutual business relationship,” she explains. Further, a report card is prepared before the meeting.

Performance metrics are developed in conjunction with the suppliers. “We have quarterly goals that are established for each metric. They are in writing and agreed to by the suppliers and ourselves,” she explains. “We note the results of each performance measure each quarter and rate each as ‘exceeded,’ ‘met,’ or ‘did not meet expectations.’” Typically the report will have between 15 and 25 monitored expectations.

The logistics commodity team tracks the trends and documents all aspects of the relationship. In addition, the suppliers are asked to complete a section of the report card on Sequent’s performance.

Getting feedback from the supplier community always an interesting exercise. How are we doing as a customer for them? “We ask our suppliers to assess our performance,” McMahan mentions. “However, this is a challenge for them. Typically, they’re conservative and nervous expressing what they really think.”

McMahan and her team try to be supportive of the feedback process. “We encourage them, and we frame the approach as, ‘What are we doing that makes sense? What drives you crazy? How can we fix it together?’” After a slow start, she acknowledges that “we’re now starting to get meaningful feedback from the suppliers.”

As a final note, she offers, “I cannot emphasize how important it is to overcommunicate with suppliers. You’re dealing with a different culture. They’re outside the firm. The more you communicate, the better you’re going to get your message across and be successful together.”

WHAT ONE COMPANY IS DOING TO BOOST ITS SUPPLIERS’ QUALITY

Most purchasing managers make an effort to assess supplier quality, but few have gone as far as Roberts Sinto Corporation (Lansing, Mich.). They are establishing a quality system that is QS 9000 compliant and looking for their supplier base to join them on the journey. A significant part of this initiative requires suppliers to complete a survey profiling their quality documentation and methodology practices. has a copy of the survey (an excerpt of which appears in the sidebar), and commends Roberts Sinto for taking this action.

We consider it a thorough, well-conceived document. In fact, we would recommend it as a model for other readers who are interested in helping evaluate/improve their suppliers' quality environment.

100% supplier response expected. In an exclusive interview, Karl Dorr, quality manager (800-748-0384, ext. 1528), shared, "We will use this information to classify the supplier's quality level compared to a minimum standard under QS 9000 requirements. Further, we also are prepared to help our suppliers establish any improvement or corrective action processes that they require to achieve these new quality levels."

He anticipates full cooperation from the supplier community. "Those who don't mail back the survey by the deadline will get phone call reminders from us," he explains. "We are looking for 100% cooperation."

If they still do not respond, Dorr reveals, "we'll alert the appropriate people within Roberts Sinto of their lack of response, and advise them not to place any additional business with that supplier. When the supplier is eventually alerted to this reality, they fill out that survey pretty quickly and get it in to us," he explained.

A fair self-evaluation. From previous experience with these type surveys, Dorr anticipates receiving a "realistic" set of ratings that will enable him to draw accurate profiles. "If anything, I have found the individual suppliers in their self-evaluations to be harder on themselves than we would be if we were auditing them," he offers.

The questions are self-explanatory, with plenty of examples. The survey contains nine sections, and each question is rated on a scale of zero to 5. As part of the package, a scoring matrix is enclosed to help the supplier understand how the survey will be scored and what expectations will be applied for the partnering effort.

Supplier Quality Documentation/Procedures Survey

Quality Planning and Defect Prevention Rating Scale

1. Does the organization have a documented quality system?
 - short term (one year)
 - long term (three–five years) a plus
 - documented in writing
 - does it have the required elements (see appendix)
2. Does the quality system include benchmarking a total organization commitment to continually improve processes and systems?
 - is there total management involvement
 - is a team approach used to establish goals
 - is there statement of purpose
 - is it signed by senior management
 - is there a quarterly review and update
 - are there assignments of responsibilities
 - are there job descriptions of people responsible
 - is benchmarking done to help goal setting
3. Does supplier have a comprehensive manual describing their complete quality control system?
 - does manual describe elements necessary to assure product integrity
 - is manual review and update frequency established
 - is manual signed by responsible individuals
 - are manual procedures practiced on–floor
 - are on–floor practices described in manual
 - are revisions and updates sent to copyholders
 - does manual contain table of contents
 - does manual contain illustration of tags, forms
4. Is advanced quality planning consistent with a philosophy of continuous improvement?
 - does management exhibit a quality attitude
 - do documented strategies reflect never–ending improvement
 - are quality plan objectives aimed at quality improvement
 - is a quality attitude displayed to employees
 - is there a quality awareness program implemented
 - are quality training programs used for all
 - is quality objective defined

5. Is employee participation used to aid in quality improvement and problem solving?
 - is there a program for employee involvement
 - does program involve training in problem solving skills
 - is it a team concept
 - are regularly scheduled meetings held
 - are they documented
 - are recognized problem-solving skills used
 - is there a measurement of progress
 - is there a reward for efforts
6. Are joint planning meetings held with customers on new parts or materials?
 - is there a documented procedure addressing joint planning meetings
 - is it part of normal business routine
 - are responsible parties represented
 - is there a checklist format
 - are meeting notes documented
 - is it part of quality planning strategies
7. Is there a system to prevent the use of obsolete drawings and specifications?
 - is there a documented drawing and change control procedure in quality manual
 - is responsibility clearly defined
 - is there an audit against this procedure
 - are obsolete prints and specifications properly disposed of
 - is there a signature acknowledgement of new blueprints and specifications in the system
 - is there an internal sign-out control for blueprints

Procedures for Receiving Materials Rating Scale

1. Are adequate written instructions available for incoming inspection?
 - has supplier established specifications for all received materials
 - are specifications clearly documented in receiving inspection
 - are receiving inspections performed for each lot received
 - are sample sizes and frequencies clearly established
 - what is reaction plan for defective material
2. Does the quality control function have a system for quality evaluations of suppliers?
 - how does supplier evaluate subsuppliers' performance
 - does supplier clearly define quality requirements
 - does supplier provide a quality guideline for subsuppliers
 - is performance measured by quality, price, delivery
 - are performance guidelines clearly defined and documented

(continued)

3. Does supplier conduct audits for incoming inspection on all purchased material?
 - are all purchased materials inspected against established standards
 - are materials tagged as to disposition, accept/reject
 - are rejected materials properly contained
 - does system provide for corrective action
4. Are raw materials identified and traceable to test or certify reports?
 - are certifications required for all materials
 - is SPC a requirement of subsuppliers
 - is statistical evidence required from subsuppliers
 - are control plans required

In-Process Quality Controls Rating Scale

1. Is there an effective traceability system for in-process materials?
 - are in-process/travel tags used to identify stage of operation
 - are castings date coded for traceability
 - does flow of process provide for checks and containment if defective
2. Is there an effective system for material identification, inspection status and handling of in-process material, including segregation of nonconforming material?
 - are in-process tags used
 - do tags provide for identification and inspection signature
 - do tags identify operators
 - do tags identify disposition of material
 - is defective material properly identified
 - is defective material in proper area of confinement

Final Inspection Rating Scale

1. Do the instructions include characteristics to be checked, method of check, and sample size?
 - are control plan items clearly identified
 - are gages clearly defined, identified by number
 - are frequencies clearly established
 - are gage operation instructions included
2. Is there an identification system at final inspection so all containers are identified with a shipping label that shows part number, quantity, date inspected, disposition, and supplier identification?
 - are bar code labels used
 - are shipping tags used
 - do labels contain appropriate information
 - is disposition, date, signature of responsible person marked
 - are Brinnel samples part of tag system

Shipping and Packaging Rating Scale

1. Does packaging, labeling and storage for safety and critical parts appear adequate for preserving lot control number and/or traceability as required by customer?
 - do instructions clearly define safety or critical characteristics
 - do container labels clearly identify part as safety/critical
 - are labels securely attached
 - is lot control preserved in storage
2. Are there adequate safeguards in effect to prevent product from being packed without quality control concurrences?
 - is inspector/operator signature required prior to material movement
 - do lift truck operators' instructions include proof of approval prior to material movement
 - can material be shipped without signed approval, proper tags, etc.

Procedures for Nonconforming Materials Rating Scale

1. When nonconforming material is encountered, does supplier utilize formal documented corrective action?
 - is there a formal documented corrective action program
 - are corrective actions logged and traceable for follow-up
 - does this program address irreversible corrective action
 - do forms provide for signature of responsible persons
 - are customer complaints documented and action taken
 - are internal problems addressed same as external
 - is there a written procedure for customer notification of suspected shipment of nonconforming material
2. Is root cause analysis utilized?
3. Are corrective actions implemented to prevent recurrence?
 - are applicable statistics applied to corrective actions
4. Is the corrective action taken evaluated?
 - are applicable statistics applied to corrective actions

Inspection and Equipment Controls Rating Scale

1. Is the total production equipment adequately maintained?
 - is there a maintenance program for production equipment
 - is this program documented in quality manual
 - is responsibility assigned
 - are check sheets utilized

(continued)

2. Is it by a systematic preventive maintenance system?
 - is maintenance program documented
 - are machine logs maintained
 - is the maintenance program manual or computer driven
 - is any form of statistics utilized for monitoring performance levels
 - are wear trends monitored and limits established
 - are capability studies performed at excessive wear levels
3. Are process/performance characteristics of products validated by an accredited materials test facility? Do future plans include accreditation?
 - are internal lab facilities customer accredited
 - does supplier utilize outside test facilities that are accredited, certified
 - is supplier pursuing lab certification

Communications and Documentation Rating Scale

1. Is there a written procedure for customer notification of a significant change in process?
 - does quality manual contain written procedure
 - is significant change defined
 - are control plan characteristics included
 - is the customer to be notified before change
2. Are quality reports issued on a routine basis?
 - does quality manual contain a scrap reporting procedure
 - is scrap reporting a quality function
 - is reporting structure clearly defined
 - are reports issued frequently
3. Are internal audits conducted on a regular basis to assure continued compliance to supplier procedures
 - does quality manual contain documented internal audit procedure
 - is responsibility defined
 - is frequency adequate (quarterly for internal operations, and annually for total system)
 - does audit procedure provide for immediate corrective action if deficiencies are found

*Statistical Process Control Rating Scale**Management Commitment*

1. Is there a formal documented plan for the implementation of SPC with goals, objectives, and implementation dates established?
 - is there a short- and long-term plan for SPC
 - does it establish usage of SPC to control processes
 - does it specify objectives
 - does it target implementation dates and timing
 - does it target specific elements of process to be implemented
 - are different phases of training program described
 - is timing established for each phase
 - is there a measurement of progress against plan
 - is there a review and update established

Training

2. Is there an ongoing training program for employees in the use of SPC?
 - does formal plan indicate timing of difference phases of training for employees
 - does each phase increase knowledge of SPC and techniques
 - does program provide new employees basic training
 - are classroom methods used with on-the-floor examples

Application

3. Are process potential and process capability studies performed?
 - prior to production, are capability studies performed to establish process output
 - are capability studies performed after process changes
 - are studies targeted at control plan characteristics
 - are capability acceptance standards clearly defined (6-8-10-12 sigma etc.) for short- and long-term studies
4. Does management react to provide and support necessary action to obtain improvement?
 - does management support use of statistics
 - are resources made available, time, people, gauges, training, etc.
 - are the critical areas of process targeted for improvement
 - what successes have been achieved through the use of SPC
 - is supplier using SPC because it is required or because it has been recognized as a valuable process improvement tool

Source: Roberts Sinto Corporation.

Chapter III-4

Partnering Techniques and Negotiating

EXCLUSIVE SURVEY: TAP INTO THE FLOW OF IMPROVEMENT IDEAS WITH SUPPLIER ALLIANCES

All of the efforts that purchasing professionals have put into forming supplier partnerships and alliances over the past few years are finally paying off. This is most evident in the many continuous improvement initiatives and the suppliers' role in them.

A top best practice—right from the beginning. Ever since *Supplier Selection and Management Report* began tracking the “creating new supplier partnerships” best practice in 1995, it has been one of the most used, always mentioned by about 40% of respondents. So it is no surprise that in the latest survey purchasing professionals say that their supplier partners are very involved with continuous improvement projects. Here's what your colleagues report:

- “Through supplier partnerships we leverage our suppliers' expertise to help us improve our business,” states the procurement vice president at a large manufacturer of medical products. “We have done this in several areas, both in direct and indirect supplies, and have seen an improvement in our bottom line. The lesson is to require trust and build on the successes.”
- “Our supplier partners learn our business inside and out and because of this are able to provide us with value-added contributions for process im-

provements and cost reductions,” according to the purchasing director at a large financial services organization.

- “We use a supplier quality assurance process with our supplier partners in which all of the stakeholders get together to identify redundant costs and removal processes,” offers a director of strategic sources at a leading manufacturer of office supplies. “They meet quarterly to review cost improvement targets.”

- “Supplier partnerships have helped us develop new products which are not only lower in cost of procurement, but are also easier to use in manufacturing,” according to the director of procurement at a food/beverage manufacturer.

How supplier partners are helping in continuous improvement projects. Almost every respondent of the more than 150 survey replies received shared a “positive” story of how supplier partnerships/alliances are contributing to their continuous improvement initiatives. The following are excerpts from some of them.

Enroll suppliers into a focused supply chain value improvement program. The senior procurement director at a large producer of consumer goods explains, “Our procurement team has launched an initiative focused on the various elements of the supply chain that qualify for waste elimination. It’s a long-term business strategy for eliminating waste and growing value throughout the supply chain.”

This is an outgrowth of another program in which suppliers were encouraged to make suggestions to reduce costs and improve value. “A thorough understanding of cost drivers within our supply chain led our supplier partners to make many valuable suggestions to what was one of the most successful cost reduction initiatives we have had with our suppliers,” he reports.

“Our goal for the new initiative is to work with the suppliers to deliver a six percent year over year value improvement to the existing supply chain system by removing waste from the process,” the senior director explains. “The ideas and associated values developed by individual suppliers will be reviewed by the respective executive management teams during their periodic meetings. We will continue to share any and all supplier-initiated improvements with them on an equitable basis,” he continues.

Suppliers work hard at new technology to keep the existing business. The purchasing manager at a large builder of test equipment explains, “With all of the competition out there, our current suppliers are working harder to maintain our business through added value services.” One such activity she notes is the redesign of a Web site by one of the suppliers to enhance the ordering process.

“The site also provides us with new ideas and alternative methods in our product design, suggesting new solutions to internal and external processes,” she explains.

Work with suppliers to save the cost of processing orders. A purchasing agent at a midsize pharmaceutical manufacturer has been working with suppliers to reduce the cost of processing orders. “One way was to develop an order form for low-dollar items and place orders weekly, rather than daily, as some departments did,” he explains.

Another supplier started an on-site storeroom that is managed by the supplier. “This inventory belongs to the supplier until delivery to the end user,” the purchasing manager explains. “Both of these programs are still being fine-tuned, but have cut processing costs tremendously.”

Value engineering with the supplier community. “Suppliers have gained a better understanding of our true needs and we now understand what requirements are driving costs and can be eliminated or modified,” explains the director of materials at a small manufacturer of recreation equipment.

Quality improvements soar through closer supplier contact. “By working closely with our suppliers, we make them more familiar with what is acceptable material,” explains a senior buyer at a small producer of biological safety cabinets. “We have them come into our factory, and look at our manufacturing processes, which then allows them to work on their quality issues.” She also reports, “We have improved the quality of our product since the supplier has improved their product. Our rework has been cut significantly due to the changes that have been implemented by the supplier community.”

Sharing information helps to align supply chain to optimize plant efficiencies. “We now routinely share data such as usage needs and production schedules with the supply base,” maintains a procurement manager at a small provider of suppliers to the utility industry. “Similarly, the supplier also shares their

schedules with us. By now knowing a supplier's production schedule we can make a better selection of a supplier to satisfy our future needs."

Early supplier involvement means getting them involved in the design of new products. The manager of supplier quality at a midsize maker of floor care products shares, "We involve our suppliers in the early stages of product development. This allows them to offer suggestions that will reduce total scrap, improve yields, and ensure the highest quality product," she explains.

Greater visibility through supplier Web site a major improvement. The application-specific integrated circuits (ASIC) commodity manager at a large producer of industrial controls reports, "Being able to view open order status and inventory status real-time on one of our supplier's Web sites has been a very beneficial continuous improvement initiative."

Jointly focusing on the supplier's quality brings benefits to both companies. "Our partnership with a PCB [prototype circuit board] manufacturer enabled them to develop quality programs with our influence, and from there they have moved on to become qualified in most quality standards," maintains a senior planner/buyer at a large electronics manufacturer. One result has been a significant reduction in price as they have improved their yield many times over.

HOW TO TRANSFORM SUPPLIER PARTNERSHIPS INTO SUPPLY CHAINS

The link between forming supplier partnerships and creating supply chains is uncontested. However, although purchasing professionals are not the least bit hesitant to forge new partnerships, they tend to resist taking the next step: building them into supply chains.

Leading industry observers and top practitioners insist that it is a necessary move. "In a world of global organizations, supplier partnership building has become a critical skill," declares Nancy Wendorf, program manager, Information Security Systems and Products Division, Motorola (Scottsdale, Ariz.). "Corporations that build strong supplier partnerships enhance their competitive advantage by leveraging the capabilities of their supplier partners."

Mark K. Williams, CFPIM, consulting manager at the North Highland Company (Atlanta, Ga.; mwilliams@north-highland.com) expands the thought by stating, “To be truly efficient and cost-effective, companies need to form alliances with other companies so that all of their niches, when combined, could form the links of a solid supply chain.”

Dave Garwood, president of R. D. Garwood, Inc. (Marietta, Ga.; Garwoodofc@aol.com), dispels the myth that supply chain management is only materials management. “Strategic alliances with suppliers to develop true partnerships are a part of supply chain management,” he stated at Congress for Progress XXV (sponsored by the Mid-Atlantic Chapters of APICS). “While suppliers undergo tremendous changes from traditional business practices, customers probably experience even larger changes as their demands directly drive their suppliers’ schedules.”

Potential for losing control of the supply chain. Jack Symon, CFPIM, CIRM, CPM, Eisner Consulting (Somerville, N.J.), observes that many small and midsize organizations “consider themselves too small and prefer to pass on the supply chain management movement right now.” However, at Congress for Progress XXV, he explained, “With the prevalence of the Internet and the introduction of lower-cost, entry-level supply chain management solutions, businesses of all sizes can begin to join the supply chain management movement.” Failure to do so, he warns, may have consequences. “Most likely many of your suppliers or customers will choose to implement a supply chain management solution, and as a part of their supplier chain, you will be assimilated.”

Supplier alliance characteristics the same that make for supply chain management success. Wendorf explains, “True strategic alliances are characterized by synergy, collaborative strategy development, sharing of benefits and risks, joint processes, working toward common goals, trust, long-term commitment, increased information sharing, and effective and timely communication.” Specific discussion points, included in a checklist, can help to differentiate suppliers for this initiative (see sidebar).

Symon, taking this lead, provides his recipe for building a supply chain that “survives and thrives.” It includes the following:

- Aligning your objectives to be in sync with your customers and suppliers. “Look beyond just products to process improvement potentials to create a ‘value chain’ and not just a supply chain,” he describes.

Twelve Talking Points for Moving Supplier Partnerships into Your Supply Chain

1. Does the supplier understand the level of commitment required to achieve the targeted gains in quality and cycle time, and does it have the resources required to sustain that involvement?
2. Will the supplier be able to grow with us and to continue to offer improved value in the future?
3. Does the supplier really have the necessary technical competence, and will it be willing to contribute that expertise?
4. Does the supplier have a team approach to quality, purchasing, and production and a positive attitude toward cooperation and collaboration, including win-win negotiating?
5. Is the supplier's senior management committed to the processes of cooperation, collaboration, and conflict-resolution required for strategic partnering? What have they done to demonstrate that commitment?
6. How much future planning is the supplier willing to share with us? Is their management willing to share the necessary proprietary information with us and, at the same time, treat our proprietary information in a confidential manner? Is there a fundamental level of trust in the relationship?
7. How well does the supplier know our business? Has its management made the necessary investment of time and effort to become truly knowledgeable about our operation and our problems?
8. Has the supplier demonstrated commitment in the past by willingness to make necessary investments in plant, equipment, and other resources? What has been the level of that commitment?
9. What will the supplier demand of us in return? What assurances and guarantees will this supplier require as a condition of partnering?
10. Who are the supplier's key suppliers, and what can they contribute to the ESI process?
11. Does the supplier have the technical expertise available in a time frame appropriate to our requirements?
12. Who are the supplier's technical experts who will be available to support the design and manufacturing processes?

Source: Nancy Wendorf.

- Developing a shared vision and strategy upon which the supply chain will operate.
- Developing a collaborative planning effort and being synchronized in its execution.
- Sharing information instantaneously.

- Developing shared common systems and processes.
- Developing common, effective performance measures.
- Striving for continuous improvement to maintain value in the supply chain.

One important change: sharing of schedules. “Purchasing professionals need to change the way they do business and employ the tools of companies that have been successful, tools which are critical to supply chain success,” Williams declared at Congress for Progress XXV. One of these tools is schedule sharing.

“Sharing your schedule with the supplier provides the opportunity to work with real demand, instead of a forecast,” he explains. “This also allows the supplier to reduce the amount of finished goods safety stock on hand, thereby reducing costs.” Williams also provided some guides for sharing your schedule with suppliers.

“Meet with the supplier and impress on them that the information you will be sharing with them is highly confidential,” he advises. “You don’t want to have your schedule ending up in the possession of a competitor.” Have the supplier sign a confidentiality agreement to reinforce this goal.

With an MRP or an ERP system in place, purchasing professionals easily can generate requirements to the supplier. Williams notes the following:

- Segregate the requirements by supplier. This will form the basis of the information that will be transmitted to the supplier.
- Determine how solid or fluid the quantities and items are within the company’s time fences. For example, if quantities are frozen within the first four weeks but subject to 25% to 50% swings from weeks four to eight, document this information so that it can be discussed with the supplier.
- Meet with the supplier to review how the information is structured. “Keep in mind that MRP may be a foreign concept to some of the suppliers, so in-depth training may be needed for them to understand how to use the information to help schedule their business,” Williams explains.
- The most effective schedule sharing agreements include a guarantee from the customer that once an item is called for within the frozen time fence, the supplier will purchase it. Suppliers will not be nearly as reluctant to produce, and possibly customize, inventory for a customer that guarantees it will be purchased.

- Review seasonal trends and abnormal events such as vacation shut-downs or special promotions with the supplier and obtain an agreement as to how these special events will be handled.
- Determine how often and in what form the schedule will be transmitted. Should it be sent daily, weekly, or monthly? And, should it be sent via mail, fax, EDI, or e-mail?

In these times of change, supply chain management needs an integrated continuous improvement process. Karen L. Alber, CFPIM, director of business solutions at Quaker Oats Company (Chicago), strongly emphasizes, “Companies must continually evaluate the balance between their supply chain and customer demand.” As an example, she cites the many changes that have taken place in the consumer products industry. “Consumer demand has changed significantly over the past decade,” she notes. In addition to the demand-creation opportunities the company generates through marketing activities, there are simply more varieties requested by consumers.

Define the continuous assessment process. “Based on the notion that most supply chains were not originally designed to meet the demands being placed upon them today, a company must identify where they must improve to remain competitive,” Alber discussed at Congress for Progress XXV. “A performance analysis needs to be conducted to see company performance against current and future customer requirements.” A gap analysis will portray where gaps are, and these can then be assessed against industry benchmarks to understand the greatest areas of opportunity. Specifically, performance measurements should be modified.

“Performance metrics should measure each area of the supply chain not only on its own performance, but the impact of the other nodes in the supply chain to guarantee supply chain synchronization versus silo management,” she details. Garwood also mentions that “old yardsticks such as purchase price variance, direct labor efficiency, equivalent utilization, and product development budget performance are no longer adequate.” Instead, he suggests a new set of metrics to motivate and reward the right behavior, such as quality of the demand plans, which would replace forecast accuracy, and flexibility instead of lowest purchase price. Alber also stresses the requirement of information availability. “There are customers that are demanding the use of improved information technology in order to do business with them,” she explains. “Companies must assess how to improve their internal information systems as well as their ability to interact with their external partners to survive.”

Supply chain management promises to revolutionize the way business is done. Therefore, as Williams concludes, “Purchasing managers must continue to lead the transformation of their companies into becoming solid links in a strong supply chain.”

JOINT SERVICE AGREEMENT: THE NEW TOOL FOR BUILDING A CLOSER SUPPLIER RELATIONSHIP

Many purchasing professionals have obtained impressive benefits from closer supplier relationships, while others have been frustrated in their efforts. Some have found an effective way of collaborating with one specific supplier, which is a disaster when attempted with another. However, a tool has passed the test of consistently building working arrangements with external partners. It's the Joint Service Agreement (JSA). The purpose of a JSA is to describe in detail the “responsibilities, expectations, and entitlements of each party to a client-supplier agreement,” says Kate Fickle, director of Pittiglio Rabin Todd & McGrath (PRTM; Mountain View, Calif.; kfickle@prtm.com).

JSAs do not typically serve as the legal contract between customer and supplier. Although a JSA may resemble a business contract in length and format, Fickle explains, “it's drafted with flexibility of action rather than rigid enforcement of terms in mind.”

With a JSA, the signatories are not bound to actions or practices that may suddenly become impractical or counterproductive due to changed business circumstances. It grants each party the freedom of action to respond to change for the benefit of both parties.

JSAs are effective tools for cementing supplier-customer relationships. Like any good tool, JSAs should be used selectively where supplier-customer relationships are of high importance to both parties. Not every supplier contract calls for a JSA, she notes. Since an agreement can take months to draft and implement, it is generally impractical for a company to develop a JSA with more than 15% to 20% of its suppliers.

Although the purchasing professional usually initiates the JSA with the supplier, it is important that it does more than enumerate the customer's requirements. “The operative word in JSA is ‘joint,’” Fickle emphasizes. “The more effective JSAs represent a real meshing of both the customer's and the supplier's expectations.”

How the purchasing professional benefits from a JSA. Buyers can derive significant internal benefits from JSAs:

- *The development of a clear statement of the supplier relationship's objectives.* In defining how the supply chain will operate under the proposed JSA, it often becomes apparent that the different members of the customer team (purchasing, planning, engineering, and management) have different, and sometimes conflicting, ideas about the basic purpose of the supplier relationship. Across-the-board internal agreement on the supplier relationship's overriding purpose is a vital precondition to drafting a viable JSA.
- *The realization that certain business processes are not working properly.* In the course of the operational scrutiny during the JSA drafting stage, it is often revealed that some business processes are not working as they should. The work of fixing these broken processes may take many months before JSA discussions with the supplier can begin. But that work has to be done for the company's sake, she advises.
- *It forms the foundation for training in supplier management.* The third internal benefit to the customer is that the core components of the JSA, those that do not change significantly from supplier to supplier, form the foundation for cross-functional training in the area of supplier management.

JSAs provide a foundation for an ongoing periodic review process. One focus of the typical JSA is to measure customer-supplier relationships continually. These performance metrics can be the foundation for supplier scorecards. "We must emphasize again that it's a mistake to focus on supplier performance to the exclusion of customer performance," she declares. "When both are examined from a qualitative and a quantitative standpoint, both the customer and the supplier obtain more benefit from the JSA."

How does a JSA get done? The supplier and customer, after agreeing in principle that a JSA is in their mutual interest, proceed to outline the contents of the agreement.

This is followed by a series of meetings to discuss the proposed content of the JSA and define mutual performance objectives. "It often takes two or three months before the JSA is signed, depending on the two parties' level of preparation and their prior familiarity with each other," she offers.

"Most executives who have participated in JSA negotiations assert that the face-to-face process of working out the agreement is ultimately more

important to solidifying the relationship than the resulting JSA document,” Fickle observes. As the representatives of the two companies work together to define and resolve the obstacles to the JSA, they reach common understandings that form the real basis for the companies’ partnership.

“We’ve found that it is important to maintain the JSA through regular management reviews,” she advises. Semiannual meetings have proved to be the most effective forums for reviewing expectations, updating processes, and discussing performance issues. However, more frequent opportunities for informal communication must be maintained as the need arises.

EXPERT ADVICE ON HOW BEST TO END A SUPPLIER RELATIONSHIP

Purchasing professionals establish relationships/alliances with particular suppliers to reduce their supplier base, improve quality, and reduce the variations received from multiple sources. According to recent *Supplier Selection and Management Report* reader surveys, creating new supplier partnerships is an active and healthy activity, with two in five participating.

Yet the reality is that 50% of supplier partnerships fail. “Although we’d like to believe that strategic supplier alliances will last forever, we must realize that they have a natural life cycle and will inevitably come to an end,” maintains Lorrie K. Mitchell, supplier alignment leader at BellSouth Telecommunications, Inc. (Atlanta, Ga.; Lorraine.Mitchell@bridge.bellsouth.com).

Why alliances end. The end of a strategic alliance may sound disastrous, implying a failure on someone’s part, or a breakdown in the process, according to Mitchell, a member of the *Supplier Selection and Management Report* Editorial Advisory Board. At a recent National Association of Purchasing Management (NAPM) Annual International Purchasing Conference, she outlined reasons why many alliances end:

- *Changing focus of organizations.* “If either the purchasing organization or the supplier organization has shifted their strategic direction, an existing alliance relationship might no longer be of value,” she mentions.
- *Overall focus of organization is the same, but needs for certain products/services change.* This is a situation that might occur if a supplier’s product or service is becoming obsolete within the purchasing department’s needs.

- *Supplier cannot accommodate needs.* Although this situation might occur with a negative tone if the original intent of the alliance was to meet certain objectives that now cannot be met, it also may come about as change occurs that no one could predict.
- *Relationship just not “working.”* This situation is the scenario that most alliance partners fear, according to Mitchell. It could result from different corporate cultures that do not blend well, individual and unresolvable personnel issues, continuing conflicts that require great effort to repair, or the results of the relationship are just not meeting expectations.

In addition, Susan I. Scott, CPM, CIRMA, senior consultant at Harris Consulting, Inc. (Lexington, Mass.; Susiscott@aol.com), suggests that the most prevalent reason for dissolving a supplier partnership is broken trust. “Once you can no longer rely on a partner to back up their word with action, to tell the truth about downtime or quality issues, or to share true and accurate cost information, the relationship deteriorates quickly,” she explained at the NAPM annual conference.

How to prepare for a divorce. “Always have a backup plan,” Mitchell asserts. “Have a mental, if not written notes of what action you will need to take, whom you would interface with in every aspect of the supply stream.” There are some specific steps you may want to consider. “Naturally, you will already have documented the main issues that have brought you to this point,” she declares. You may be questioning whether a significant price increase or pricing structure initiated by the supplier is warranted.

Perhaps service level agreements are consistently not being met, or perhaps quality is the issue. “You may be receiving daily calls from your clients questioning the quality and technical capabilities of your supplier,” Mitchell explains. These concerns need to be listed and evaluated with a similar listing of positive forces in the current relationship.

Consult with groups and departments that could be affected by a change in suppliers. “Meet with those in charge and find out what a change would do to their part of the process,” Mitchell advises. “Once you have checked all processes, personnel, cost, and other repercussions a change of suppliers would cause, communicate this to your end users’ upper management.”

Construct a pros and cons statement of remaining or changing the alliance relationship. A key element here is to determine the dollar cost of the change. “If the costs are astronomical, you may want to rethink switching

suppliers,” she offers. Evaluate what time and resources you are using to keep the alliance relationship afloat and compare it with the time and resources to ramp up for a new supplier.

If the list of pros to stay with the current alliance is greater than the list of cons, Mitchell recommends creating a joint (purchaser/supplier) action plan that identifies the concerns and also the steps on both sides that will be taken to improve the situation. “Of course, complete dates with appropriate checks in between should occur,” she emphasizes. “Mutually agreed-upon measurements should also be included.” However, if the reasons to change outweigh the reasons to stay with the current supplier, then it is probably the time to issue a solicitation, probably a request for proposal (RFP).

Involve the end user in decision making. Scott maintains that the “change be invisible to the user. At best the user will notice improved service and quality, but suffer no downside from the change.” Mitchell, meanwhile, maintains, “As in any alliance relationship, the decision to terminate cannot be made in a vacuum nor can one side make it without input of the other.”

These determinations need to be made not only by the partners but also by end users of the product/service. “It is hard to imagine that you would have a problem with the supplier without them being affected by the impact too,” she explains. Chances are that your discussions with the suppliers are based on or were initiated by conversations of incidents described by your end users. “If you are considering significantly changing or eliminating the alliance relationship,” Mitchell says, “it is imperative that you have the buy-in of your customer or end users. They will be very interested in the alternatives you will be describing to them,” she encourages.

When you decide to move on. The time will always come in any alliance relationship when you will issue that solicitation to determine who will now provide that particular product/service. “The main thing is that you don’t terminate one alliance relationship until you have selected a new partner,” she cautions. “A partner who is willing and anxious to work with you will understand that there will be a period of transition.”

So, no matter how anxious and apprehensive your current supplier has made you regarding the possibility of switching suppliers, there is always another supplier ready and willing to start an alliance relationship with you, Mitchell assures.

See the sidebar for more tips.

Other Factors That Must Be Considered

There are several issues you may want to take into consideration:

1. *Legal.* It is always helpful if you can synchronize the timing of the expiration of the current supplier's agreement with the time you would like to terminate the alliance relationship. Giving too much advance warning to your current supplier can be risky business. You may be letting yourself open to either a decrease in service level or a major play for the business. If you have a dollar commitment agreement, you will need to evaluate what this switch will do to you financially. Perhaps you can negotiate a settlement of sorts, but you will have to determine some reasons why the supplier would be interested in exiting the alliance relationship.

2. *Confidentiality Agreements.* You already have agreed to purchaser and supplier's proprietary rights language in your executed agreement. If you have executed a nondisclosure or information exchange agreement covering a particular body of knowledge, that information will be protected as agreed upon and for the period of time agreed upon.

3. *Intellectual Property Issues.* If there are any open intellectual property issues, it may be difficult to bring them to fruition. It is likely that these issues were discussed and agreed upon prior to the execution of the agreement. Typically any issues of this sort are deal breakers and would be protected by the terms and conditions of the agreement even if it has expired.

Source: Lorrie K. Mitchell.

EIGHT BEST PRACTICE TIPS ON BUILDING SUPPLIER PARTNERSHIPS

Logistics managers that excel in supply chain management do so by maintaining strong supplier partnerships (see sidebar). Working closely with suppliers can help you to leverage the supplier's competencies and achieve even higher economic, productivity, and operational efficiencies.

Companies that have defined and altered their partner relationships are now among those considered world class. *Best Practices in Supply Chain Partnership and Certification*, published by Best Practices, LLC (Chapel Hill, N.C.; 919-403-0251), offers eight tips for managing supplier relationships and explains how some of today's leading companies are putting them to use.

1. Require suppliers to develop and implement internal quality programs. Florida Power & Light asks vendors to focus internally on quality

Seven Supplier Relationships

To get started, you first have to define the type of supplier relationship you want. James A. Eckert, assistant professor of marketing and supply chain management at Northeastern University (Boston; 617-373-5307), defines seven types of relationships between suppliers and customers by level of trust, frequency of interaction, and commitment to the relationship (see Figure III-4.1). They are

1. *Nonstrategic transactions.* These can be one-time or multiple transactions. The predominant characteristics include limited trust of the other party, limited communication, limited dependence on the other party, limited capability of the other organization, limited volume conducted between the organizations, and very little investment in the other party.

2. *Administered relationship.* Like nonstrategic transactions, these include one-time or multiple transactions, but with a stronger emphasis on managing the relationship through less formalized strategies. Trust is generally low, but communication high. These relationships have a high percentage of transactions over multiple products and services, which increases the level of dependence.

3. *Contractual relationship.* Contractual terms are popular in supplier-customer relationships and reduce the need for direct communication between boundaries. Interactive skills are critical, and managers must be aware of the contractual obligations to appropriately address key issues.

4. *Specialty contract relationship.* These exist for narrowly designed products or services that are exchanged between suppliers and customers. Success here requires strong personal relationships and a significant amount of trust. Such a relationship might exist between a manufacturer and a logistics services provider.

5. *Partnership.* An example here might be a supplier of critical components to a manufactured product delivered on a weekly basis. Trust and commitment must be high, but interaction is low. Partnerships require both parties to invest heavily in the relationship to prove their commitment.

6. *Joint venture.* This is generally associated with some form of investment by the parties in the relationship to accommodate mutual benefits. For instance, two manufacturers with complementary technologies might form a joint venture to produce a completely new product. Since the parties are tied by financial obligations, managers should be aware of their respective internal responsibilities.

7. *Strategic alliance.* Significant trust is required to achieve levels of communication and increased investment. An example might be a supplier who provides a dedicated engineer to work with a customer's new product development team.

Eckert says that managers must develop negotiation and relationship management strategies for each type of relationship and adapt their approaches to the unique characteristics of each relationship. This is done by analyzing where the relationship currently stands and where they would like it to go, where the other party considers the relationship to stand and where they would like it to go, and what action they can take to increase trust, interaction, and communication.

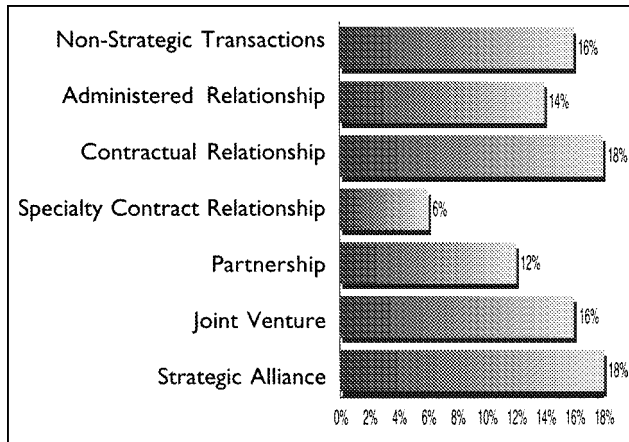


Figure III-4.1 Percentage of Use of Supplier Partnerships

Source: Northeastern University

improvement, detailing plans for deployment problem solving and proactive strategies.

2. Require suppliers to meet cost requirements. AlliedSignal asked its supplier base to reduce their prices by 10% to 15%, reduce lead times by 30, and continue to meet quality standards. Suppliers who did so were awarded long-term contracts.

3. Measure internal customer satisfaction with suppliers to ensure end-user quality. GTE uses its Supplier Quality Program to determine whether the supplier offers the best product or service that its expertise can provide,

whether the supplier is reliable and consistent, whether documentation is accurate, and whether the supplier is responsive and timely in addressing problems.

4. Conduct performance reviews to monitor supplier performance. GTE develops criteria for each supplier's product or service, based on value, delivery, documentation, and customer service. Each score is measured on a scale of 1 to 10 (10 being excellent). A minimum score of eight is required to become a supplier. If a supplier receives a score below eight, GTE will outline measures for improvement. Within 30 days, the supplier must submit a detailed action plan that reflects the improvements. If the supplier does not attempt to reach the minimum levels, it is dropped from GTE's supply chain.

5. Define key measures to manage the supplier performance process. AT&T UCS measures its suppliers according to mutually agreed-upon service standards. Regular meetings are held with key suppliers to discuss plans, review results, and address issues important to the success of the partnerships.

6. Employ classification designations to regulate the frequency of performance reviews. Xerox reviews its largest suppliers (\$20 million and more) quarterly, midsize suppliers (\$1 to \$5 million) every six months, and small suppliers (under \$1 million) annually. Standards for quality and lead times are reviewed at these times.

7. Employ a self-renewing supplier evaluation process to foster continuous improvement. General Motors has suppliers rate themselves in terms of quality, cost, delivery, technology, and management.

8. Develop a structured process to manage relationships with top suppliers. Corning Telecommunications Products Division has a tight structure for developing relationships with Level I suppliers. Suppliers are rated on their strengths and weaknesses in performance, quality, technology, and price. The process has reduced the level of defective product received from Level I suppliers by a factor of five.

Another leading organization, Hoffman-La Roche Inc., has put together a four-phased vendor certification program for establishing partnerships with suppliers of raw materials and components to attain quality improvement.

In phase I, vendors are chosen for certification and are evaluated on their commitment to quality. During phase II, the vendor is assessed and quality

improvement programs are implemented. Phase III requires the vendor to fulfill all certification criteria, and if the vendor meets all the requirements of phases I to III, certification is achieved.

PRACTICAL ADVICE ON HOW TO IMPROVE YOUR SUPPLIER PARTNERSHIPS

The average life cycle of a supplier partnership is about three years. For perfectly logical reasons, however, purchasing professionals continue to seek and create new supplier partnerships. Two in five *Supplier Selection and Management Report* subscribers indicate that this is one of their preferred best practices.

For many, entering into new supplier relationships is an opportunity to improve a lagging performance objective; for others, it is a means of leveraging a scarce resource. Most of the responding purchasing professionals shared with us their reasons for, and the benefits achieved from, these new partnerships. The following are excerpts from their replies.

Achieve better supplier quality. “Creating new supplier partnerships has been the way we addressed our top priority, improving supplier quality,” maintains a purchasing manager at a small manufacturer of exhaust systems. “The quality improvements go beyond material supplied. They also include service, processing, and other parameters.”

An essential element of the partnership agreement was to have frequent joint meetings. “This way, we gain a better understanding of each other’s processes and work to accommodate each other’s needs,” he shares. “Key suppliers and/or quality-poor suppliers were targeted first.”

Improve inventory performance. “We have increased our inventory turns by 20%, which has resulted in a savings of \$84,000,” according to a purchasing manager at a small maker of employee service awards. “Since creating new supplier partnerships and sharing production plans and forecasts with our supplier partners, they have been better able to serve us by decreasing lead times,” he relates. “Our savings are a result of being able to keep less products on our shelves.”

Provide a better fit with business model. The commodity manager at a major producer of silicon explains, “We are now implementing new ASIC parts

and have created a new supplier partnership that is a better match for our business model and design direction.” He also reports that through this new relationship, “We expect to save upwards of \$1 million per year.”

Move to a just-in-time (JIT) purchasing system. “We switched to suppliers with more efficient delivery methods, which reduced backordered items and allowed us to confidently implement our JIT purchasing system,” maintains a purchasing manager at a midsize manufacturer of laundry equipment. One immediate benefit has been a reduction in storage needs.

“Sourcing new suppliers also gives us multiple backups to further our ability to not order until we actually need that item,” he shares. However, this purchasing manager does acknowledge, “It is very difficult to change from a supplier who just can’t do what you require in terms of price and fulfillment when you have been with them for years.”

Expand a total buying program. “We formed a partnership arrangement across our global business unit with a supplier, which has reduced our initial costs, gained a rebate based on overall purchases, and enabled us to reduce our supplier base,” details a purchasing manager at a midsize facility of a large nonferrous metal producer.

The latter achievement is critical, she mentions, as one of her biggest challenges is the “neverending buy-outs or takeovers of our suppliers, which requires the need to recertify them.”

Gain access to better technology. “The area in which we’ve been focusing our efforts for the past few years has been in forming new supplier relationships,” acknowledges a buyer at a small maker of heating elements. “To build up these new relationships we spend a lot of time and attention on these suppliers, so everyone on both sides knows and understands the goal.” The new suppliers, she adds, “have better technology and manufacturing processes than previous suppliers.”

Enhance material flow. “Our new supplier partner made a suggestion and offered us an incentive to try a new approach,” describes a procurement manager at a small builder of specialty machinery. “They suggested that we allow them to purchase the components that up until then were supplied by us for their assembly.” The new approach, she mentions was “very effective both in substantial cost savings and efficient material flow.”

Reduce supplier base. “Since focusing on creating new supplier partnerships, we have been able to combine three suppliers/distributors into one,” says a purchasing director at a small healthcare provider. “When we made the commitment to have them take 80% of the business in specific product lines, we realized a cost savings of about 12%, plus an additional 30% in time and labor savings.”

The purchasing manager at a midsize maker of advertising specialties also tells of using supplier partnerships in an effort to reduce the supply base. “We have been able to decrease the cost of product in exchange for volume buys or blanket orders.”

Achieve cost reductions. A materials manager at a large manufacturer of medical devices tried to utilize the existing supplier base as all new products must be reviewed by purchasing. “As a medical device manufacturer, our goal is to keep minimal inventory, velocity high, and experience no quality snags.”

However, the time had come to source a new supply of PVC resin. “We conducted a supplier audit and validated material after negotiating a favorable cost,” he reports. “We entered into a new supplier partnership for this raw material. Overall, it will mean an annual savings of \$750,000.”

Guarantee critical materials availability. “Our work is based on having essential supplies available to do experiments in our research departments,” maintains an administrator for materials management at a major medical institution. “To achieve our delivery objective, we have signed key partnership agreements. Additionally, we have also signed on with a group purchasing organization and are using their contract to achieve significant savings in supplies and capital equipment purchases.”

HOW TO CREATE SYNERGY BETWEEN PROCUREMENT AND LOGISTICS DEPARTMENTS

Turf battles and functional silos have built up walls between procurement and logistics organizations (see sidebar). As the two groups begin to realize that they impact each other and cannot operate as separate entities for the good of their companies, however, those walls are starting to crumble.

“The line is definitely blurry,” says Les Artman, vice president of Mercer Management and leader of Mercer’s Strategic Sourcing Practice. “More

Internet-Based Procurement Support Systems

The onslaught of Internet-based procurement sites is helping supply chain organizations increase their level of sophistication when it comes to procuring raw materials (see “Five Levels of Procurement”). “E-business procurement will streamline internal processes such as requisition approval and purchase order creation,” states Christoph Hesterbrink in a recent report from PricewaterhouseCoopers, *E-Business and ERP: Bringing Two Paradigms Together*. “Suppliers will be able to monitor inventory levels and improve their own ability to forecast, truly integrating themselves into the value chain.”

While several e-procurement Internet sites have popped up in just the last few months, we recommend checking out the following solutions for their range of offerings:

- Sourcing Net from Dun & Bradstreet (973-408-6656) is an Internet-based site that allows customers access to 11 million U.S. suppliers. You can source based on demographics, geographic, and socioeconomic indicators such as minority, women-owned, and small business preferences. Another reference is by quality standards, such as ISO 9000 certification. The annual fee schedule reflects three levels of service—\$10,000, \$25,000, and \$50,000.
- PurchasingCenter.com is an online portal Web site focused on the needs of MRO buyers in small and midsize companies. It provides a supplier directory and a searchable database of 6,000 distributor locations. Unique is the “Your Purchasing Page,” which lets members build their own purchasing home page and publish information for use by their suppliers and customers.
- SupplierMarket.com enables buyers to broaden their supply base. The SmartMatch feature nominates a number of suppliers based on the online RFQ submission requirements. When the deal is complete, the supplier pays a small commission fee to SupplierMarket.com; there is no charge to the buyer.
- Virtual Source Network (vsource.net) allows buyers to create an Internet-based purchasing system. It provides support for consortium buying groups for leveraged procurement. A low initial access fee and ongoing transaction fees are based on usage.
- ShareMax.com just released the Agile Sourcing model featuring a proprietary supplier database. It includes extensive RFI data and enables users to find more suppliers for specific categories.
- E-SupplierLink from RockySoft Corp. (www.rockysoft.com) links planning data from multiple tiers of a global supply chain across the Net. Users need a Web browser and a connection to their planning data to run e-SupplierLink. “RockySoft’s approach has the potential to go well beyond

today's collaborative planning and information-sharing concepts toward connected execution," says Bob Ferrari, senior analyst of Supply Chain Management for AMR Research.

- Nistevo.com is a subscription-based service, requiring a browser to access. Its collaborative planning features have attracted firms like General Mills Operations, which will use the solution to collaborate with its various logistics service providers to manage annual service agreements. Nistevo.com will also allow General Mills Operations to adjust supply chain plans to meet changing customer demands. "We are constantly looking for innovative ways to improve the efficiency of our supply chain," says Dick Hanson, vice president of distribution and logistics for General Mills. "We're excited about the logistics enhancements we're looking to implement with the Nistevo.com network."

- NEXstep Inc. (Plano, Texas; 214-495-5641) offers a fulfillment solution for online retailers. This transaction-based fee model focuses on all supply chain areas that go into order fulfillment, including procurement.

Five Levels of Procurement

Les Artman, vice president of Mercer Management and leader of Mercer's Strategic Sourcing Practice, says that logistics organizations are working with procurement departments to enhance their level of purchasing sophistication. While he believes most companies are at level 1 in terms of their sophistication, "there is lot of opportunity for improvement and moving up the sophistication ladder."

The five levels are:

- 0 Individual user groups buy their own supplies; not centralized.
- 1 Centralized procurement organization utilizes corporate leverage; can save 20% to 25% of procurement costs.
- 2 Procurement organization develops an integrated plan with suppliers, getting them involved with product design; can result in another 5% to 15% improvement.
- 3 Procurement performs benchmarking activities of suppliers on price and service.
- 4 Procurement figures out ways to procure product more quickly so that finished goods orders can be fulfilled more rapidly. The goal here is to reduce costs and increase revenue.

and more companies are moving procurement into their supply chain organizations, along with logistics, to create a synergy between the two groups.” Some of the ways that these firms are creating synergies include the following:

- *Sharing information.* “Procurement can represent up to 70% of the cost of goods,” says Artman. “If you add that to other supply chain costs, that is a high percentage of the cost of doing business.”

When information is shared, the supply chain organization will get a total picture of supply chain flows and costs. In addition, there will be a better understanding of the tradeoffs between buying more product at a lower cost or buying less product at a higher cost and what this all does to inventory levels.

- *Making procurement part of the supply chain organization.* The supply chain manager will take responsibility for procurement as it relates to the tradeoffs, explains Artman.

- *Putting together performance measures.* Measuring working capital (inventory + receivables/payables) gives the supply chain organization a better grip on deciding when to purchase supplies and how they impact inventory. Artman says, “Measures can incent the organization to optimize the link between the supply chain organization and the procurement group.”

- *Changing ways of thinking.* Rather than categorizing costs by functional areas, think about the net landed cost of delivering a product to the customer, beginning with procurement to warehousing and transportation.

SUPPLIER FEEDBACK ENCOURAGED AS BUYERS EXPAND REPORT CARD USE

Not only are supplier report cards a staple of sound supplier management, but purchasing professionals are increasingly asking suppliers to prepare a report card on their performance as well. Lorrie K. Mitchell, supplier alignment leader at BellSouth (Atlanta; Lorraine.Mitchell@bridge.bellsouth.com) tells *Supplier Selection and Management Report*, “We have a formal report card/scorecard in place designed to promote a cooperative relationship between both parties. Both the buyer and supplier come to realize early on that it is beneficial to assist the other party in any issue or weakness they may have,” she maintains.

H. Ervin Lewis, CPM, director of purchasing at Wellman, Inc. (Johnsonville, S.C.; erv.lewis@wellmaninc.com), who does not have a formal feedback process, nonetheless routinely asks suppliers to rate Wellman's performance as a buying organization. "Our objective is to be a 'world-class' buyer in the supplier's eyes and in our minds that means helping the supplier become successful," he told us.

Overcoming the reluctance of suppliers to provide "real" feedback. Of the professionals we spoke with on this question, virtually all acknowledge that in the beginning it is difficult to get the supplier's cooperation. "Don't tell us what you think we want to hear," stresses Randy L. Gard, vice president of global planning at Vermeer Manufacturing Company (Pella, Iowa; rgard@vermeermfg.com), to his supply base. "It doesn't work that way."

Gard's experience is not unique. In fact, Lewis argues rather forcibly, "We need to hear from the supplier if we are doing something that makes their business life more difficult or raises their costs." That is not to say that every supplier suggestion will be implemented, Lewis notes. "But it provides a starting point from which we can work together to find solutions that satisfy both parties."

The quest to be a better customer. "We need to be significant to our suppliers to obtain the best possible service," argues Terry Sueltnan, vice president of supply management at Industrial Automation & Control, Honeywell Inc. (Phoenix; terry.sueltnan@iac.honeywell.com). "We always ask them what we're doing to make life easier or more difficult for them," he declares.

In Vermeer's case, Gard wants the organization to be a better customer to help drive down total acquisition costs. "If we're hard to do business with, if we give the suppliers an inaccurate forecast, if they can't get in touch with us, we want to know about it," Gard insists. Vermeer's report card is rather simple (see Figure III-4.2), he explains. "Did we ignore the lead time? How many times?" Or, was the delivery date or quantity changed? And how often did this occur during the time period?

Another example of a report card format is that of the Galesburg Refrigeration Products Division of Maytag Corporation. This report card is in the form of an opinion survey (see Table III-4.1). Scott W. Giles, director of procurement (sgiles@maytag.com), explains that the suppliers review each statement and mark off to what degree they agree or disagree with it. A unique feature is having the supplier identify which customer they consider best-in-class in each category.

Vermeer Report Card												
	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99	Jan-00	Feb-00
Ignore lead time												
Changed order quantity												
Changed delivery date												
Not paid on time												
Changed specifications												
Each category above is determined by the number of times Vermeer did the described activities.												
Suggestions for improvement:												

Figure III-4.2 Supplier Feedback Critical to Improving Primary Alliances and Partnership Relationships

Wisconsin Tissue also has a supplier’s evaluation form (see Table III-4.2). It classifies the evaluated criteria as either day-to-day or long-term. Brian Higgins, CPM, purchasing area manager at Wisconsin Tissue, a division of Chesapeake Corporation (Menasha, Wisc.; 920-727-8820), told a recent NAPM Supply Chain Management Conference that if a supplier rates one of the criteria a 3 or less (degree of dissatisfaction), they request an explanation.

NAPM CONFERENCE PROBES SUPPLIER DEVELOPMENT STRATEGIES

Supplier development was the hot button at a recent Annual International Purchasing Conference, sponsored by the National Association of Purchasing Management. Purchasing professionals crowded into meeting rooms during the four-day event to hear top practitioners and consultants describe their experiences in using a variety of supplier management tactics and practices. The following are excerpts from four particularly impressive presentations.

Table III-4.1 Galesburg Refrigeration Products Division

<i>Supply Partner Opinion Survey</i>	<i>Strongly Disagree</i>			<i>Strongly Agree</i>		<i>Best in Class Customer</i>
1 Galesburg Procurement provides effective communication & follow-up on my issues	1	2	3	4	5	_____
2 Galesburg Procurement is knowledgeable about the goods and services purchased	1	2	3	4	5	_____
3 Galesburg Refrigeration utilizes early supplier involvement in design process	1	2	3	4	5	_____
4 Galesburg Refrigeration two-week firm production schedule is maintained	1	2	3	4	5	_____
5 Galesburg Procurement monthly Supplier Value Assessment (report card) is fair	1	2	3	4	5	_____
6 Galesburg Procurement fosters philosophy of openness to drive improvements	1	2	3	4	5	_____
7 Payment terms are adhered by Galesburg Refrigeration as negotiated	1	2	3	4	5	_____
8 Manufacturability of our parts design ensures "Zero Defect" quality assurance	1	2	3	4	5	_____
9 The Galesburg Refrigeration material requisitioning system meets my scheduling needs	1	2	3	4	5	_____
10 Galesburg Procurement is total cost driven vs. piece price focused	1	2	3	4	5	_____
11 Galesburg Procurement conducts their activities in accordance with the highest standards of ethical and professional conduct	1	2	3	4	5	_____
12 Galesburg Procurement has improved compared with prior year	1	2	3	4	5	_____
13 Galesburg Procurement Rates as Follows (1 = Lowest, 5= Highest)	1	2	3	4	5	_____

Develop a supplier technical/capabilities questionnaire. "Buyers are always seeking to maximize value in purchases," maintains Lorrie K. Mitchell, relationship manager, supply chain department, BellSouth Telecommunications, Inc. (Atlanta). "They want to select the most appropriate supplier to provide the requested product/service and meet all of their needs, but somehow price tends to get in the way."

Table III-4.2 Performance Evaluating Suppliers

1 = Extremely Dissatisfied, 5 = Extremely Satisfied
(if 3 or less, please explain in comments sections below)

<i>Day-to-Day Criteria</i>	1	2	3	4	5	NA
Friendly, east to work with	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unloading product in a timely manner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reasonable lead times	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Efficient and effective communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timely payments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take proper discounts on invoices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand purchase orders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete information on purchase orders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accurate feedback is provided	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Long-Term Criteria</i>	1	2	3	4	5	NA
Warehousing is appropriate for item	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturing equipment is appropriate for items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Material handling equipment is appropriate for items	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visitation program is acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality complaint forms provide necessary info	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supplier certification program is fair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Committed to long-term relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Committed to trustful relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Purchasing department is fair and ethical	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supportive QA department	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What helps the relationship? _____						
What hurts the relationship? _____						
Other comments _____						

Source: Wisconsin Tissue.

One tool she recommends to avoid this situation is a supplier technical/capabilities document: “It’s the most important document in the supplier selection process as it ensures the selection is based on capabilities and requested outcomes and not solely on price.”

Open-ended questions work best at getting the answers. The supplier technical/capabilities questionnaire asks the supplier candidates two types of open-ended questions.

“The reason these questions are so important is that without their answers, you and your client have no way of knowing if a supplier understands what you are looking for and if they indeed have the capability to provide it,” Mitchell emphasizes.

First, have the client (at BellSouth it is the technical selection team) identify general questions to determine supplier capabilities, size, past business experience, and so forth. Second, there should be specific questions addressing the product/service outcome needed. "Once the questions are identified, the team needs to determine the importance or weight associated with each question," Mitchell says. "This approach not only ensures the client the best supplier is selected, but it also can provide a documented summary of the reasons why they were selected," she explains.

Ensuring the longer-term prospects for the supplier you select. L. Wayne Riley, manager of global materials services at Intel Corp. (Chandler, Ariz.), agrees that many buyers and companies have "expertly documented formulas for analyzing their respective suppliers for acceptable performance and materials/service fit." However, he questions whether they also are able to "perform a proficient analysis of their suppliers to project long-term success."

According to Riley, "Buyers place little attention and effort on the alignment of the suppliers' manufacturing operations to their own specific manufacturing operation." This, he claims, has the most important impact on current and future cost and performance.

What the buyer should study about potential suppliers. According to Riley, before a buyer "engages with a supplier to provide materials or services," she must

- Know how the manufacturing, technology, and service directions of the suppliers' materials/products coincide with the manufacturing direction of their own products
- Understand the suppliers' commitments and business needs
- Provide the appropriate level of analysis

Alignment of product/process structures is critical for success. Buyers can analyze their suppliers for capability, stability, resourcefulness, and competitiveness (the four components that cover the suppliers' ability to manufacture and deliver quality materials/service). However, before doing so, "they must ensure their suppliers' product and process structures are aligned with their own company's product and process structures."

"Buyers have the responsibility to analyze their own company's situation, then to determine that of their respective suppliers," Riley continues.

A match also eliminates the need to conduct extensive supplier evaluations for future supply due to the inability of the supplier to fulfill orders.

Putting management back into supplier management. “Even though supplier relationships may have existed for many years, neither partner may have taken the initiative to manage the relationship,” maintains William S. Wehr, CPM, director of quality systems at Lewis-Goetz Company, Inc. (Pittsburgh).

Lewis-Goetz has developed a supplier partnership management process (SPMP) that provides a defined structure for managing and continually improving partnerships with key suppliers. It consists of seven process features that are integrated to provide performance accountability, defect identification, cost improvement commitment, problem solving, and two-way communication. “These process features establish a baseline for measuring the success of the partnership while allowing areas of improvement to be clearly identified,” explains Wehr.

Setting goals that are meaningful for all the parties. One area Wehr stresses is that of establishing performance goals to define acceptable and unacceptable performance. “Goal setting is always a sensitive issue because any evaluative assessment of the supplier’s performance will ultimately be communicated to the supplier’s top management through the periodic review meetings,” he explains. Goal setting should take into account only those performance areas important to the buyer and meaningful to the supplier, Wehr advises.

Consideration also should be given to those performance areas that can be quantitatively measured (on-time delivery, material defects), and the extent data is readily available. “A key principle that always must be considered is that partnership goal setting is a dynamic process, as buyer and supplier performance expectations change over time to meet increasing customer demands,” Wehr maintains. “Therefore, performance goals must be continually reassessed and changed to meet these new expectations.”

Effective management of supply chain requires streamlined, partnership-based relationships with suppliers. That is the common thread, or message, that the presenters are communicating. Similarly, George L. Harris, CPM, president of Harris Consulting, Inc. (Lexington, Mass.), emphasizes that these types of relationships require a substantial amount of resources and attention from both buyers and suppliers. He also advises, “Partners should be few in number, yet involve many people from both supplier and buyer organizations.”

According to Harris, the supplier partnership development process in-

volves a four-step approach. The assessment phase entails the review of data on purchasing volume, part families, current suppliers, extent of competition, state of technology, and supplier volatility and performance. Once these data are developed, a plan can be constructed for execution.

In the optimization phase, the purchasing professional moves to the best suppliers by using evaluation strategies such as stair-step, pass/fail, or continuous reduction tactics. Results are collected and measures are mutually agreed upon, with the supplier receiving feedback on performance. Action plans are then developed.

“There is always some trepidation about optimizing the supply base, as it could be viewed as increasing the risks taken by an organization,” Harris notes. These risks include higher pricing due to single sourcing, lack of contingencies due to natural disaster, or sheer supplier nonperformance and the lack of leverage.

Put it in writing. “That’s why measures of progress must be put in place to allow for periodic evaluation of performance,” he says. “We also recommend the terms of the partnership agreement be put in writing, given the mobility of procurement and supplier management personnel.” The terms must survive the personnel turnover and relocation of staff originally involved in the establishment of the agreement.

AVOID PRICE CHANGE SURPRISES BY SPELLING IT OUT IN THE CONTRACT

In today’s dynamic environment, purchasing professionals must be on the alert for sudden price change requests from the supplier community. According to *Supplier Selection and Management Report* readers, this often means an unexpected price increase.

However, almost half the respondents to a recent reader survey say that they take exception to the so-called automatic upward price adjustment and are instead taking a tougher stand on price increases. Patrick S. Woods, CPM, CPIM, APP, commodity manager at Emerson Electric/Fisher Controls (Sherman, Texas; 903-868-8160), believes that more companies should include in their purchase orders or contracts “specific and concise language to address price change.”

Not only increases should be considered when it comes to price changes. He also advises, “Price changes include both increases as well as decreases due to a

softening in the marketplace, and cost savings through the practice of techniques such as value analysis.”

At an Annual International Purchasing Conference of the National Association of Purchasing Management, Woods recommends “at least negotiating within the agreement that with exception to material costs, the supplier is to fix or hold firm the other cost drivers (labor, outside services, and overhead) throughout the term of the agreement.” These then can be re-negotiated at the agreement’s expiration.

Material costs are a different matter, however. He believes that material costs are least within the control of the supplier.

How to deal with fluctuations in material costs. Determine whether there is an applicable index on which to base the changes. In the event that more than one base material makes up the total part material, try to negotiate for the leading material. For instance, in brass, the leading material is copper; in plastic, it is petroleum.

Woods recommends “talking with your direct supplier, their supplier, and even the raw material producer. They can possibly even recommend an index that both you and they can agree as an indicator of price change.”

If that strategy does not work, consider the Producer Price Index (PPI), which is published monthly by the U.S. Department of Labor’s Bureau of Labor Statistics. Additionally, he reminds, the price change should reflect only the portion that the material represents in the overall total part price.

When to consider making a price change. There are two schools of thought for handling the timing of price changes, according to Woods: “You may wish to negotiate with the supplier that prices will be reviewed and changed in set intervals, quarterly, semiannually, or annually.”

The alternative is to set a fluctuation window with a +% or -% fluctuation prior to price changes. The key here is to set a base material cost with a fluctuation window above or below.

“If the price increases, but not outside the fluctuation range, the customer benefits by not having to pay the higher price,” he analyzes. Similarly, the supplier benefits when the base price decreases, but not when it remains within the agreed-to range.

Putting it all into the appropriate language. This rationale must be incorporated into specific language through price change clauses incorporated into the agreement (see sidebar).

Sample Price Change Clauses For Your Contracts

A. Price change clause based on time interval (6 month) adjustment

Pricing Adjustments Based on Raw Material Only. The price for each customer product may be adjusted in the event of a change in _____ material price. At the end of each six (6) month period after the establishment of this agreement, based on a six month average, defined as a “semi-annual period,” the parties to this agreement shall determine the average price for the specific “semi-annual period” which will equal the average price per unit of _____ material as published in the _____ index or PPI during such “semi-annual period.” The supplier will subsequently decrease or increase the price of each customer product containing _____ material by an amount of the average price change multiplied by the percentage of that customer product that is comprised of _____ material. Such price change will be effective for the next six month period.

B. Price change clause based on adjustment window (+ or -20%) read as follows:

Pricing Adjustments Based on Raw Material Only. The price for each customer product may be adjusted in the event of a change in _____ material price. If any price of _____ material as published in the _____ index or PPI is 20% greater or less than the preestablished base price then the supplier will subsequently decrease or increase the price of each customer product containing _____ material by the amount of the price change multiplied by the percentage of that customer product that is comprised of _____ material. Such price change will be effective for the next invoice.

C. Price change clause based on both time interval (6 month) and window (+ or -20%) adjustment

Pricing Adjustments Based on Raw Material Only. The price for each customer product may be adjusted in the event of a change in _____ material price. At the end of each six (6) month period after the establishment of this agreement, based on a six month average, defined as a “semi-annual period,” the parties to this agreement shall determine the average price for the specific “semi-annual period” which will equal the average price per unit of _____ material as published in the _____ index or PPI during such “semi-annual period.” If any average price is 20% greater or less than the average price for the immediately preceding “semi-annual period,” the supplier will subsequently decrease or increase the price of each customer product containing _____ material by an amount of the average price change multiplied by the percentage of that customer product that is comprised of _____ material. Such price change will be effective for the next six month period.

(continued)

D. Price change clause based on cost reduction through value analysis

Pricing Adjustments Related to Cost Reduction Efforts. Both customer and supplier agree to work together on cost reduction projects through value analysis. When such efforts lead to tangible and measurable cost reduction over a 12 month period, the dollar savings will be shared 50/50 between both parties (or depending on your negotiability you may stipulate a minimum amount to you with any percentage over to be shared equally). Supplier's capital investment and all other related expense attendant to the realization of the actual cost reduction will be recouped at 100% through the cost reduction before customer is entitled to receive financial benefit from the effort. Customer will receive its share of the reduction in the form of price reduction on the products directly affected by the cost reduction effort.

Source: Patrick S. Woods, CPM, CPIM, APP.

What about supplied services, and fluctuations other than materials? If you purchase services or if the supplier of the manufactured item insists on allowing fluctuations for other factors, primarily labor, take the following approach.

Normally, labor rate changes, along with overhead increases (such as utilities and rent), generally follow inflation rate changes. The best overall indicator to capture such changes, according to Woods, is the Consumer Price Index (CPI).

The sample clauses A, B, and C could again be used, but by substituting labor costs for material and the CPI in place of the PPI or other index. "As was the case previously, you can negotiate the price change based on a time interval, fluctuation window, or combination of both," Woods maintains.

Language when the price change results from a cost reduction initiative. "A proactive way to encourage the supplier to hold pricing, even the material cost factor, or to even lower the pricing, is through cost reduction based on value analysis," he shares.

"However, you as the customer have the responsibility to provide your supplier with the channel and resources to achieve the value analysis programs," he declares. "All too often, suppliers simply give up because they feel this program is one-sided."

In addition to the value analysis clause in the agreement (see sidebar, clause D), some purchasers go a step further to propose a 50/50 sharing of the benefit from these ideas, Woods notes.

HOW PURCHASING PROS ARE EXPANDING THE SCOPE OF SUPPLIER PARTNERSHIPS

The quest for supplier partnerships remains unabated. Purchasing managements continue their pursuit of suppliers that will enable them to achieve their long-term objectives while simultaneously enabling them to begin serious progress toward building an effective supply chain management practice.

Respondents to the recent *Supplier Selection and Management Report* reader survey confirm that creating new supplier partnerships remains a critical priority, as almost two in five (37.2%) claim to be fostering this type of relationship. Coupled with those who are initiating supply chain management initiatives (almost one in five), it is no wonder why supplier partnerships are critical.

What impresses us is the focus and determination that purchasing professionals bring to this process. The following excerpts from reader responses suggest what you can do in establishing or expanding existing new supplier partnerships.

Establishing a long-term agreement with a key supplier. “One of our buyers, after reviewing the various performance measurements that we maintain on our suppliers, strongly recommended that we enter a long-term relationship with a supplier of a critical material,” shares a manufacturing engineer at a midsize facility producing fuel systems for the aerospace industry.

“The supplier has brought its performance to an even higher level since it now has direct access to demand data,” he offers. “The supplier gets the minimum amount to us at the right time in the right location, significantly reducing the aggravation factor.”

Looking for suppliers that are only industry leaders. “We’re actively creating partnerships with world-class global suppliers that can show the ability to lead their industry technically and economically,” offers a group manager of materials and logistics at a large producer of precision stampings and mechanical springs.

“We’ve already accomplished this with two suppliers of raw materials and one office supplies vendor,” he declares. “Our facilities in multiple countries will realize significant cost savings.”

Looking to the partnership as an inventory reduction tool. “We created teams of representatives from purchasing, engineering, manufacturing, and sales to

work with suppliers on their quality,” declares a materials manager at a mid-size manufacturer of refrigeration equipment.

“We then created supplier partnerships with some suppliers and assured them a certain volume of our business will be placed with them,” she responds. “In return, they agreed to maintain our inventory, which lowered our carrying costs, and we also achieved a reduction in material cost of between 5% and 7%.”

Sourcing locally paying dividends. “We’ve entered new supplier partnerships with U.S. companies that have offered more competitive pricing and more responsive service,” maintains a purchasing manager at a small manufacturer of electronic products. “Traditionally, we have sourced materials from our parent company in Japan, or transplant companies that are not competitive.”

According to the manager, “It took a major effort to get the parent company to understand U.S. manufacturing capabilities before they relented and allowed us to pursue other sources.”

Supplier partnerships initiate other best practices. “We establish supplier alliances and partnerships because they allow us to enjoy other benefits,” explains the purchasing manager at a major electric utility. “Since we’ve entered several partnerships, we have involved the suppliers in engineering issues, improved our quality, introduced JIT concepts, and determined total cost of ownership on purchases.”

Sharing with the supplier—what a partnership is all about. “We’re into supplier partnerships,” agrees the director of corporate purchasing at a midsize supplier of HVAC systems. “We’re into constant communications with the suppliers to explain our position and how we need them as our partners. They get more business, and we’ve seen our costs tumble. Last year alone we lowered cost by more than 5.2% of the total dollars spent,” he declares.

EXPERT GUIDANCE ON HOW TO SOLIDIFY SUPPLIER PARTNERSHIPS

The reality is this: Supplier partnerships are, at best, short-lived. Most end within three years. According to *Supplier Selection and Management Report* reader surveys, however, many (almost half) respondents continue to seek

out and form new partnerships. Essentially, they seek from the partnership what they cannot achieve alone.

For example, William S. Wehr, CPM, director of quality systems at Lewis-Goetz and Company, Inc. (Pittsburgh; 412-341-7100), places a major emphasis on maintaining partnerships with several key suppliers. The objective, he explained at a recent NAPM Annual International Purchasing Conference, is to “increase customer service, reduce inventories, and minimize total operating costs.”

Meanwhile, supplier relationship authority Tim Underhill, president of Underhill & Associates (Tulsa; 918-494-8085), gets to the basics, observing, “If a partnership is not beneficial to your suppliers, and it’s not beneficial to you, it’s going to end.” The idea is to form a relationship that is mutually beneficial.

Potential is great for significant savings. According to Underhill, “picking the ‘low-hanging fruit’ of a relationship, meaning consignment inventory or reduction in the number of transactions, typically represents about 30% of the savings you can get from your suppliers.”

The real decision that purchasing professionals must make is whether it is worth their time and effort to go after the other 70% of the total savings. “Those that have learned how to bring benefit to the supplier and themselves have had tremendous impact on their company’s bottom line,” he declared at NAPM’s Supply Chain Management Conference.

“Alliances are based on your ability to be more profitable,” he told the assembled purchasing professionals. “You’re not going to do an alliance because you want to have this great relationship with a supplier; you want to do it for bottom line impact,” he emphasizes.

What about partnerships with service providers? Opportunities for service alliances should not be overlooked in this era of partnering. “Much of what is true about alliances for materials may also be said about alliances for services,” maintains R. G. Roberts III, CPM, alliance manager at SONAT (Birmingham, Ala.; Robby.Roberts@sonat.com). However, he acknowledged at the NAPM purchasing conference that “selecting potential service providers may be much more of an art than materials partners.”

Similarly, service alliances differ in that fewer potential supply partners may be available. This means that more suppliers must be developed. “Supplier development has been successful with materials suppliers, so it also should be considered with services,” he declares.

How to develop the service alliance. Roberts and copresenter Larry R. Smeltzer of Arizona state University recommend the following:

1. *Identify suppliers that can benefit from an alliance.* “The unfortunate reality is that many buyers look at potential alliance from only their own perspectives,” they agree. Similar to Underhill’s message, they insist that both the buyer and supplier must benefit from a service alliance.

In many instances, the greatest benefit to a supplier is that labor may be better utilized because the buyer can assist with forecasting demand. Another advantage to service alliances is that the supplier may train employees for procedures specific to the purchaser.

“But the main point is that it is essential to find suppliers who will benefit from the alliance so they will be motivated to ensure its success,” maintains Roberts. “It also may be necessary for the buyer to specifically point out the advantages to the supplier.”

2. *Develop total cost model.* The purpose of an alliance is to increase overall efficiencies, not simply to reduce prices, as purchasing pros continually hear. However, service providers are often small organizations, so it may be necessary for the purchasing organization to assist the provider to develop a cost model. A cost model used for materials may be adapted for services.

3. *Clearly define the roles of both parties.* “Both parties must be clear on which company and precisely who within the company is responsible for the various alliance activities,” explains Smeltzer. For service alliances especially, the major responsibility may include the approval of variances. Therefore, it is important to know who may approve last minute variations.

4. *Develop evaluation measures.* Simply said, however, in service alliances the evaluation may be subjective. Because it is subjective, it is important that the supplier understand the evaluators’ biases and how best to work with them. Also, it is helpful to develop a checklist to assist the process.

“Evaluation measures should ideally be developed by the alliance partners,” Roberts notes. “Each party likely has differing expertise and perspectives.” Therefore, joint collaboration on the development of the measures will ensure that the parties take advantage of the expertise and consider both perspectives.

Wehr adds, “Mutually acceptable measurement methods must be defined to include both data collection and data analysis. This is particularly critical since the buyer and the supplier may use different criteria for assessing the same performance area.”

5. *Establish formal communication systems between both parties.* It must be formal, Roberts insists. Again, it is important that the communication procedures be agreed upon early in the alliance discussions. “Formal communication is especially important with services because service conditions and standards may vary from day to day,” according to Smeltzer. “It is important these variances are understood by both parties.”

6. *Continually evaluate service performance.* As opposed to materials, services cannot be put on the shelf. Services are generally independent of each other and may require independent evaluations.

While related to measurements and formal communications, the recommendation is to communicate the measurements among the parties. Also, the more frequent the evaluation is, the better. It must be balanced on number and complexity, however. Here again, a primary difference between services and materials is that the service provider is often being directly evaluated. Evaluating people is far different from evaluating a product.

7. *Develop problem-solving and dispute resolution procedures.* No alliance is without some problems. If both parties know they have a vehicle by which their concerns may be heard, they will probably be more willing to express their viewpoints and suggestions.

BRING SUPPLIERS BACK TO THE TABLE AFTER THE CONTRACT IS SIGNED

Purchasing professionals are becoming increasingly aggressive when renegotiating contracts with their suppliers. In their quest to achieve the best cost profile, improve supplier performance, and garner additional services, buyers are not hesitant to bring the supplier “back to the table.”

Contract renegotiation, driven by small and midsize companies (less than 500 employees), is quickly becoming the hottest supplier management technique in use. Among the purchasing professionals in these facilities, the rate has soared by more than 20%. Overall, *Supplier Selection and Management Report* reader surveys show an almost 17% increase in contract renegotiations over the past three years alone.

Readers are achieving wide-ranging success in their renegotiation initiatives. Many have shared their experiences with us. Next we present some of the tactics, challenges, and benefits of their efforts.

Cost reduction a primary consideration. A purchasing engineering manager at a midsize maker of ink finds that renegotiating existing supplier contracts saves “substantial amounts of money.” In fact, for the last two quarters, savings amounted to more than \$400,000.

Additionally, “engineering and plant operations people have their own preferences, and the suppliers know it,” he mentions. In the past this relationship had created a noncompetitive situation. However, the purchasing engineering manager resolved it by discussing alternative options with the engineers before the purchase, and requested at least two bidders on certain types of purchases.

Take advantage of falling prices. “Don’t only look to renegotiate an existing contract when prices are increasing,” advises the purchasing vice president of a midsize manufacturer. “Our buyers continuously monitor the suppliers’ market, and with the downward trend in the cost of oil, energy, and other raw material components, they began to renegotiate our existing contracts to reflect these lower supplier costs,” he explains. “We also have worked with our domestic suppliers to counter the lower-priced Asian imports,” he adds.

Initiate supplier cost improvement programs. “We use ‘should cost’ analysis to renegotiate existing supplier contracts,” maintains the manager of coordinated purchases at a large producer of water sports equipment. “Going through this exercise has allowed us to call in our current suppliers and ask for price concessions and encourage them to begin their own cost reduction initiatives.”

To help them with their “should cost” models, the organization has created a “new data file on our suppliers which identifies cost drivers and details on their operations. Many of our suppliers are cooperating and sharing their confidential information with us,” he reveals.

Contract renegotiation helps to reduce inventory. “Our biggest challenge has been to take 30% out of the total raw material and purchased goods inventory,” a director of materials at a large customizer of trailers and coaches offers. “We’ve already taken it down by about one-third by renegotiating lot sizes with our suppliers and having them make smaller, more frequent deliveries to our site.” In addition, he tells of providing more information to key suppliers. “The results are very positive, even though our freight cost has increased slightly,” he mentions.

Move the suppliers to the level needed to support the buying organization. “We have established a supplier quality management process and a supplier development process to improve the performance of our primary suppliers,” says the materials director at a midsize producer of projection systems. “We then renegotiated the existing supplier contracts based on activity-based costing and supplier benchmarking.” Annual savings moved to \$14 million against the prior year’s purchase price paid.

Renegotiation leads to greater product improvements. “For the first time in our history, we’ve begun to renegotiate our existing supply agreements,” says the director of global sourcing at a large manufacturer of packaging products. “We implemented the new provisions by sharing more information with our suppliers and expanding the business we do with them.” In addition, the new contracts call for the suppliers to become more active in product improvement processes. All in all, the company has achieved more than \$2 million in cost reductions.

Revisit pricing issues on single-source items. “Several single-source items were introduced to other potential suppliers for cost reduction ideas and pricing,” describes a materials manager at a midsize manufacturer of luggage. “We advised our existing supply base what we were doing. They quickly renegotiated their contracts, coming back with substantial price reductions to ensure that they kept the business.”

New contract involves suppliers in inventory management. “Since renegotiating our existing supplier contracts, we have saved time for our buyers and money for the corporation,” says a buyer at a small producer of linear motion systems. “The suppliers are now responsible for the inventory, monitoring it and stocking it on a weekly basis, according to our needs.”

New business conditions create the “opportunity” to renegotiate. A director of purchasing at a large maker of consumer products is challenged by the number of mergers and acquisitions taking place in the commodity market. “Negotiating and keeping a contract is difficult and time-consuming under these circumstances,” he laments. “But we’re continually renegotiating existing supplier contracts because of the dramatic changes in supply that have occurred from these mergers, and the increasing demand we have due to business growth.”

Review value of goods with the suppliers. “We’re actively renegotiating our existing contracts,” maintains the materials group director at a small producer of lighting fixtures. However, as part of the renegotiation process, they call in their suppliers and discuss the market value of their goods. Additionally, the director researches alternative suppliers. “What we’re doing in renegotiation is putting the supplier in control of its own destiny,” he argues.

Advantageous negotiation position a benefit from being acquired. “We have been acquired by a larger organization with facilities that purchase similar materials from numerous suppliers,” explains a purchasing manager at a midsize company that makes body panels for trucks. “One of the first activities we undertook was to reduce our supply base and to concentrate on the volume purchase of these similar materials.” To date, they have successfully renegotiated supplier contracts for glass, resin film, and coatings, saving over \$1 million annually.

Falling currency exchange rates create an opportunity to renegotiate. The sourcing vice president at a large producer of recreational vehicles renegotiated “economies” on power train components with its foreign sources. “We leveraged competitive source alternatives with the weakening currency to yield a 12% improvement in component cost,” he explains. Annual savings total more than \$3 million.

Rework contract to maintain credibility with customer. For a unique reason, a senior buyer of materials at a small producer of hot forged parts renegotiated its steel contract with its present supplier. “We extended the contract to three years with a minimum volume,” he describes. “The reason it was done was to maintain credibility with our primary customer and assure that we had a reliable and steady raw material supply.” Nevertheless, the new terms in the renegotiation resulted in a six-figure savings.

NOW IS THE TIME TO REVIEW PURCHASE ORDER TERMS AND CONDITIONS

Purchase order (PO) terms and conditions (T&Cs) are legal documents. As such, they require periodic review and revision. Because individual com-

pany management determines what to include, T&Cs can range from a simple statement to a comprehensive document covering any and all possibilities.

To help establish what should be in a “good” set of PO terms and conditions, we present the following examples from *Purchaser’s Legal Adviser* (Business Laws; Chesterland, Ohio; 404-729-7996). We endorse them as a foundation from which to draft a version that fits your requirements. As usual, consult your corporate counsel before finalizing your own T&C language.

“*Acceptance.* Seller’s acceptance of any PO shall be expressly limited to the terms of the contract. The purchaser objects to contrary terms contained in any quotation, order, acknowledgement, invoice, or other document originating with the seller. Any terms and conditions printed on any purchase order, any release order, acknowledgement, invoice or other document issued by either seller or purchaser that conflict with these terms and conditions are superseded by these terms and conditions. By shipping goods or performing services after receipt of a purchase order, seller shall conclusively be deemed to be bound by these terms and conditions and all other provisions of the contract.

“*Price.* The price shall be that stated in the purchase order. That is, unless that price exceeds the lowest price at which the seller is selling items or similar items to its other customers as of the date of delivery to purchaser. In this case, the lower price shall control.

“If there is no price stated in the purchase order, the price shall not be higher than that last charged or quoted purchaser for such items by the seller. If there has been no charge or quotation by the seller to purchaser for items previously, and if no price is set forth in the purchase order, purchaser shall have the right to return items with seller paying the cost of transportation. That is, if the seller charges a price which is in excess of the lowest price at which the seller is selling items to its other customers as of the date of delivery to the purchaser.

“If prior to delivery of the items, purchaser is able to purchase a portion of all of the items, or similar items of like quality, and at a price which is less, purchaser shall notify seller. Should seller fail to meet the lower price, purchaser may, at its option, purchase from the other source at the lower price. In this event, purchaser and seller shall be relieved of their obligations under the contract in respect to the items or similar items purchased from the other

source. The price shall include any freight charges or sales, use or other similar taxes. No such charges or taxes shall be paid by the purchaser.

“Drawings and specifications. Specifications, drawings, notes, instructions, engineering information, or technical data furnished by either purchaser or seller to the other, or referred to in the contract shall be incorporated into the contract by the reference. Seller shall be fully and solely responsible for obtaining product data adequate to design, manufacture, fabricate, construct, and deliver the items in compliance with all requirements of the contract.

“Purchaser shall retain title to all such documents which it provides or causes to be given to seller. Seller shall not use any of such documents or the information contained therein for any purpose other than in performance of the contract.

“Seller shall not disclose such documents or information to any party other than the purchaser or party duly authorized by the purchaser. Upon purchaser’s request, seller shall promptly return to purchaser all such documents and copies.

“Changes. Purchaser shall have the right to make changes (including additions and/or omissions) from time to time in the items, any specifications and/or drawings which are part of the contract, method of shipment or packing and/or time and/or place of delivery. Purchaser shall give seller written notice of any such change.

“The notice may include any increase or decrease in the cost of, or the time required for performance of the contract determined by the purchaser to be appropriate. If seller does not agree with such adjustments, or if the notice does not contain any such adjustments, seller shall still be obligated to proceed immediately with all of the changes directed by the purchaser without waiting to reach an agreement on any adjustments.

“Any claims by the seller for adjustments after its receipt of purchaser’s change order must be asserted in writing to purchaser not more than ten days after such receipt by seller or such claim shall be null and void.

“Delivery. The seller shall deliver the items to purchaser on the date(s) indicated in the purchase order. If seller fails to make delivery of any part of the items on the date(s) indicated, the purchaser may terminate the contract and pursue other remedies.

“All shipments shall be delivered FOB to the destination designated by the purchaser in the purchase order. Risk of loss of shall remain with the seller until the items in a completed state are received by the purchaser, its agent or consignee, regardless of whether or not purchaser has made full payment for the items.

“A packing slip must accompany each such shipment. If a shipment is to a consignee or an agent of the purchaser, a copy of the packing slip shall be forwarded concurrently to the purchaser. If no such packing slip is sent, the count or weight by purchaser or its agent or consignee is agreed to be final and binding.

“The seller, or the carrier it uses to transport items, whichever is applicable, shall maintain a satisfactory safety rating from the U.S. Department of Transportation. The seller or carrier shall provide purchaser with written proof of such rating on request if the carrier is a motor carrier.

“It shall maintain comprehensive general liability body injury and property damage insurance in the amount specified in the T&C relating to insurance. That is, unless a larger amount is required by any federal, state, or local regulatory agency. In that event, such larger amount shall be maintained.

“*Warranty.* Seller warrants that for a period of four years after the delivery of or performance of the items to or for the purchaser, the items will be of merchantable quality. Also, fit for the purchaser’s particular purpose, be of high quality, and free from defects in material and workmanship. In addition, they shall comply with the most stringent of purchaser’s or seller’s specifications, performance guarantees, and requirements; and, comply with all nationally recognized codes and established industry standards.

“All items shall be sold by the seller to the purchaser free and clear of any encumbrances. Seller’s warranties and guarantees shall survive inspection, delivery and acceptance of the items and/or payment by purchaser. If items do not conform to any of these warranties, then, at the purchaser’s option, seller shall repair or replace the defective items, FOB purchaser’s designated site at seller’s expense. Or, in the case of services, re-perform the services at seller’s expense.

“Seller shall be responsible for all expenses and damages which purchaser incurs, including, but not limited to incidental and consequential damages. The foregoing warranties and obligations also shall apply to the items supplied by the seller in such repair, replacement, or re-performance. Seller shall pass on to purchaser the benefit of any manufacturer warranties.

“*Payments and invoices.* The specific terms of payment for all items are stated in the purchase order. Unless otherwise specified, there or in a separate written instrument signed by the purchaser, no invoice shall be issued before shipment or performance of the items covered thereby. No payment shall be made before receipt of items and of a proper invoice for such items.

“Purchaser may withhold any payment otherwise due under the contract to such extent as necessary to protect purchaser from loss. That loss may

be because of: (a) evidence of financial difficulty of seller which might prevent complete performance of the contract by the seller; or (b) a breach by the seller of any contract provision.”

SUPPLIER BRIEFS OFFER CONTROL AND SPEED DURING NEGOTIATION

By James M. Hasik, senior consultant; Jonathan B. Good, senior manager; and Todd M. Zielinski, manager; Accenture (formerly Andersen Consulting LLP) Strategic Services (Atlanta; 404-880-9100).

Supplier negotiations can (and sometimes should) be contentious. But even less pleasant, and far less useful, is a negotiation that is not grounded in fact. The way to avoid such a situation is to present a supplier brief. A supplier brief is your company's formal statement of its preferred arrangement with the supplier. An essential component of any complex, fact-based negotiation, a supplier brief can transform the process and accelerate it toward its logical conclusion.

Even a simple brief, comparing price indexes against individual suppliers, can provide the supplier with a powerful weapon.

Why a supplier brief? Briefing your suppliers on your preferred positions prior to negotiation serves several important purposes:

Control. By starting the discussion with an explanation of your needs, you can take control of the process. Further, negotiations have a tendency to wander off track, especially if multiple contentious issues are on the table. The brief, written for all to see and available to everyone in the meeting, provides a starting point to return to whenever the process starts to slip away.

Documentation. As a complex negotiation continues, promises may be made on both sides regarding seemingly small points. Laying these points out in advance provides a visual checklist of the progress of the negotiation. An annotated copy of the brief serves as a record of agreements and outstanding issues after the meeting has concluded.

Developing the brief. Synthesize the facts about the supplier and its relationship with your company into a compelling argument. This can be as

simple as a few ratios and trends insights or as sophisticated as a detailed supplier cost model.

If you identify a target cost for the supplier's products, and a reasonable schedule for meeting the terms, the supplier will be forced to raise specific objections to your points. Throwing up his hands and objecting to the process will not help his cause at this point.

Present the information in a logical structure. This will convey to the supplier the importance of the company's requirements. The organization might include:

- *The current situation as you understand it.* Here, explain your request. A presentation of the situation should include a summary of your opinion of your relationship with this supplier. Include both its history and your vision for the future. Also, restate their case to demonstrate your understanding and highlight the areas you want to address.

- *Define the problem you want resolved.* This section should be well supported by relevant data (see sidebar, below). The points made here can include purchasing trends in volume and market share, estimates of the supplier's cost structure in input prices, labor rates, and expected margins. The sustainability of the business, the history of the supplier's delivery performance, and the quantitative impact that all of this is having on your company also comprise useful information.

The message should be straightforward and easily understood, but generally not a laundry list of complaints.

Recommend how to restore or extend the relationship. This section of the brief should state your business requirements in both financial and quantitative terms. It also should propose ways to resolve the issue together. If need be, it may simply state what the supplier must do to retain your business.

Consistent application of this briefing format with the same suppliers will enable them to grasp the information more quickly, understand your company's reasons for presenting it, and even refute those of your arguments that may not quite hit the mark.

Anticipate the response. You also must anticipate the supplier response and develop a strategy for conducting the negotiation. For your most important accounts, you may even consider holding a "mock trial" in which members

How Relevant Data Can Be Presented in Supplier Brief

Consider a brief suggesting improvements in the supplier's cost structure, and the impact that the pie chart (see Figure III-4.3) of the supplier's cost structure could have on a supplier's arguments. Suppose that the producer price index for the supplier's industry has been trending upward. In this case, though, the particular supplier uses an alternative input—Raw material #2—whose cost has actually been dropping. Thus, while costs for the rest of the industry may have been up significantly, total costs in this relationship have been nearly flat. Without a deconstruction of the supplier's inputs, this understanding of the specific cost structure would have been lost. Information like this enables the negotiating team to assess the impact of those changes on the supplier's overall cost. If the company has leverage, it can negotiate with the supplier to share in those savings.

Without question, it is often difficult to determine a supplier's exact cost structure. However, estimating the cost structure based on industry information and discussing the findings with the supplier may cause the supplier to yield useful data about its specific cost structure. The information revealed can be very important in understanding the reality behind the numbers.

Supplier Cost Component	Average Annual Change in Prices	Annual Impact on Supplier's Cost
Direct material #1	1.75%	0.42%
Direct material #2	-3.80	-0.76
Other materials	1.92	0.19
Direct materials	1.53	0.40
GSA	2.70	0.54
Total impact		0.79

Source: Andersen Consulting, LLP.

of your procurement organization play the roles of the supplier's negotiators. Among the objections the suppliers might put forth are the following:

- *“Indexes and cost structures are averages, and don't apply to us.”* A truly prepared supplier will often bring his own brief intended to refute what he anticipates your arguments will be.
- *“We have a better quality product that requires us to charge more.”* A quantitative analysis of which product attributes are important to you and which are not can resolve this dispute.

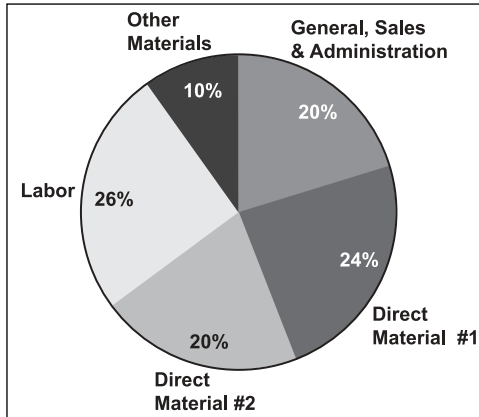


Figure III-4.3 Estimate of the Supplier's Cost Structure

Source: Andersen Consulting, LLP.

- “Your buyers accepted those price increases when they were first imposed.” Putting supplier briefs into your negotiating program can startle your long-time suppliers. This does not, however, change the economics of your business or the relationship.

What will you agree to? Outlining your fallback plan in the brief can focus the supplier's attention by showing him how serious you are. Take care, however, not to reveal just how much of his preferred position you will accept before opting out. You will want to preserve maneuvering room within the negotiation.

Are you going through this process with everyone else? Though its exact meaning is elusive, suppliers often seem more satisfied with fairness. Supplier briefs should be developed for any significant negotiation simply out of the economic benefits they bring.

Present, discuss, negotiate. The final steps in the process are to present the brief, listen to the supplier's position, and negotiate an agreement that meets the defined goals. The brief should support this ultimate goal by properly framing the discussion.

In general, the outcome of the negotiation will most strongly depend on the underlying economics—that is, who in the relationship holds the balance of power. But properly phrasing the question does not hurt. That is, be-

cause you are unlikely to get that for which you do not ask, your stated solution should stretch the supplier's abilities. The negotiations themselves will uncover what is reasonable in the long term.

Finally, the conclusion of the negotiations should include a discussion of the effectiveness of the brief. Reactions of individuals should be noted and maintained in a file so that the information is available for the next round or the next time you entertain bids.

Constructing a supplier brief is not a small feat. But because it can be so effective as a supplier management tool, you should capitalize on every useful lesson gleaned from its application.

Chapter III-5

E-Purchasing / E-Supply Chain

EMBRACE THE INTERNET, BUT DO NOT LET IT DEPERSONALIZE SUPPLIER RELATIONSHIPS

“While the Web can alleviate clerical functions, it is not going to replace human intelligence for strategic sourcing and supplier relations,” maintains Thomas T. Stallkamp, vice chairman and CEO of MSC International, Inc. (Southfield, Mich.; www.msxi.com). “You may be able to auction off mops and brooms online, but no one should auction off a company’s relationships with its suppliers,” he emphasized in his keynote address at a recent National Association of Purchasing Management (NAPM) Annual Internal Purchasing Conference.

Purchasing at a true crossroad in its direction? “After the decade of the ‘nineties, where we sort of came into our own as a respected and even sought-after discipline, the current business discourse is about how purchasing might be eliminated by the Internet and the wonder of industry supply exchanges,” said Stallkamp, the former vice chairman of DaimlerChrysler and member of the management board of DaimlerChrysler AG.

“Well, I for one don’t think so,” encouraged Stallkamp, who is credited with revolutionizing procurement practices and supplier management relations in the automotive sector—if not industry in general—by fostering supplier involvement through partnerships and alliances, while serving in various purchasing and operational positions at Chrysler before being named president in 1998.

What does the Web mean to me and my job? “We need to recognize that the Web is really here and offers a great opportunity to free us from clerical drudgery,” Stallkamp emphasized. It also

- *Permits more strategic buying.* “It allows purchasing professionals to plan commodity/supplier strategies,” he notes.

- *Provides opportunity to be the in-house expert.* “It’s more than a finance tool or a cost reduction mechanism. But as supply professionals, you need to quickly seize the opportunity to inform and guide your management on how to use the exchanges,” maintains Stallkamp.

- *Opens the door for supply chain management.* “Now is the time to embrace the changes and broaden the role of purchasing to include the larger, more centralized aspect of total supply chain management,” he continues. “Some of these initiatives won’t make you the most popular person with your peers, but if you approach it constructively, you can make your current assignment more interesting and valuable to you personally and to your company.”

He urges, “We should all become champions of supply chain management and educate and inform senior management of its advantages.”

Web procurement’s role and the purchasing professional. “By itself, the Internet will not automate you away,” Stallkamp assures. “It is a tool to be mastered, not feared. What it can do is free you up to spend more time thinking and planning, rather than reacting or performing clerical functions,” he shares.

“The Web-based exchanges offer the best, cheapest, and fastest way to communicate to customers, suppliers, and manufacturers,” he explains. He has distilled the common elements of a successful Internet buying exchange into the following:

- *Establish true neutrality.* “The exchange must operate independent of a company’s control to make suppliers believe they aren’t being ‘used,’” he declares.

- *Define who owns the data.* It cannot be left to “happen.”
- *Guarantee the proprietary nature of data.* He recalls how one automotive OEM got into “enormous” trouble by sending supplier drawings to others in the chain without permission.

- *Share savings from higher volume.* The savings must be shared with the

chain instead of retained by the owner of the exchange, he explains, advancing a practice he instituted at Chrysler with the individual suppliers.

- *Provide broad access to industry competitors.* “Let everyone in, rather than form company-specific portals,” he urged.

“Web procurement portals offer to free companies from the cost, time, and errors of clerical transactions,” Stallkamp repeats for emphasis. The transactions that can be reduced or eliminated by the Web include things such as vendor identification and selection, review and approval, order processing, and payment. Most of these items are related to the issuance of quotes and orders.

Meanwhile, Goldman Sachs goes beyond these clerical areas to “pick up the inventory and cycle time reductions that the Web can eventually provide.” They estimate that current procurement costs can be reduced by a third through the Web. “The savings in the chain equals over \$4.5 billion per year,” he reports. “No wonder CEOs and CFOs have awakened to the intrigue of Web procurement,” he comments.

The “new” opportunity for supply chain management. “But I believe the future offers even more,” Stallkamp declares. “For more than half of my professional life I’ve been trying to move companies beyond purchasing into supply chain management,” he shares. Purchasing is only one component of supply chain management.

True supply chain management deals with strategic buying, production control and scheduling, inventory management, demand forecasting, and warranty or customer follow-up. “All of the functions in your company can, should, and will continue as Web communication accelerates the speed of information flow,” he believes.

However, his view of the supply chain has changed over the years. “Most people, to explain a chain, usually show a horizontal connection of the links supporting a manufactured product or services as it moves toward customers.”

Instead of a horizontal chain, it is really a vertical X, with the pinch point, or control mechanism, at the point of intersection. “All chains have a control, whether expressed or not,” he explains.

“We can use the Internet to communicate with the various links in the chain,” he offers. As a tool, the Internet offers many advantages. He cites instantaneous connections of information, sharing plans and information throughout the chain, consolidating volume for lower costs of standard

components, and significantly improving the engineering “learning” so that they do not have to reinvent for each new project or product.

Stallkamp’s point of differentiation. “There is much more out there than on-line auctions for the lowest bid or whipping commodities lower,” he observes. “Web procurement has a true role as a tool to allow companies to get out of the cost of clerical functions. But we must rise above that issue and realize that managing supply and supply relationships is more challenging,” he insists.

To rise to this challenge, supply professionals must combine financial skills with negotiation and strategic planning. They must master oral and written communication and have the ability to see a broader picture than the cost per unit of an item.

“No matter what new tools or systems we use, the fact remains that companies can have strong relationships, just like individuals,” he explains. “The Internet should not be allowed to depersonalize those relationships. The development and management of a company’s supplier relationships is the responsibility of the purchasing and supply functions of a firm,” Stallkamp firmly declared.

THREE EXPERTS’ ADVICE ON HOW TO START AN E-PROCUREMENT INITIATIVE

If there were ever any doubts about the viability of e-procurement, the recent NAPM Annual International Purchasing Conference (www.napm.org) dispelled them. The following should help get you to the next step in e-commerce.

Build your e-procurement roadmap. Richard G. Weissman, CPM, director of purchasing at PurchasingCenter.com (Burlington, Mass.; weissman@purchasingcenter.com), points out that e-commerce tools “must match both your organizational and personal needs.” A member of the *Supplier Selection and Management Report* editorial advisory board, Weissman recommends that purchasers “build an e-commerce roadmap.” This roadmap must

- *Align business goals.* “Make sure the goals of your supply management organization match the goals of your business and customers,” he emphasizes. Only then can you translate these requirements to the supplier com-

munity. It is important that this alignment reflect the entire business function, not just e-commerce-related processes, he warns. “The rewards come from automating good practices.”

- *Assemble a cross-functional team.* “Do not do it alone,” he stresses. There are levels of expertise throughout your organization, so seek team members who have passion, subject matter knowledge, and commitment.

- *Develop a technology plan.* “E-commerce need not be expensive, nor a proprietary software program,” Weissman assures. Review basic technologies and business needs. The prevailing advice is to start small and grow the process. Speak with your suppliers and customers. “Design an e-commerce process that is applicable and scalable to your business and organization,” he advises. “Benchmark, research, and investigate. Be open, but cautious,” he encourages.

- *Motivate and train employees and suppliers.* Buyers may have to sell the merits internally and with suppliers. Make e-commerce education and training part of supplier and employee reviews. Set reasonable and obtainable expectations and track performance, he itemizes.

- *Review, revise, and revisit.* “E-commerce is exploding and changing on a daily basis,” Weissman notes. “Be prepared to react to those changes.”

Sort out your options. Kevin J. Williams, purchasing specialist at ESPN, Inc. (Bristol, Conn.; kevin.j.williams@espn.com), readily acknowledges that “getting your e-commerce efforts off the ground is usually the hardest part.” His approach begins by “sorting out what your options are, determining which are viable, and identifying what resources are needed to make these options happen.” Once done, group them into three categories, which will help you develop an e-commerce plan:

- *Easy options.* “These require little, if any, changes to the systems you already have in place,” he notes. They will typically include generic external options and may include some internal systems. An “easy” option is e-mail, which is “ideal for any task that requires tracking, is extremely well-suited to expediting and follow-up, and is invaluable for bidding work,” Williams says. Another tool is e-fax, which can be sent directly to your desktop, viewed online, and attached to electronic purchase orders (POs) for backup.

- *Moderate options.* These require a little effort but can be implemented in a relatively short period of time (6 to 12 months). He lists scanners as one moderate option. “With good-quality models costing as low as \$135,

scanners allow you to convert hardcopy bids, sales literature, and even policy and procedure documents into files that can be attached into your other systems,” he explains.

Web-based price comparison sites are another. Even if you do not intend to purchase directly from the merchants that are linked to these services, you can develop a strong feel for what you should be paying for a given product.

- *Challenging options.* “These require additional time, often more than a year, and money that you may not have at your disposal immediately,” he explains. The key here is to make the most effective use of the time it will take. For example, shop around to get a feel for what your favorite e-commerce solutions cost. Work on the justification and budget requests well before your budget figures are due,” he suggests. “This will allow for proper planning and a higher likelihood of success.”

Estimate the “true” costs for e-procurement systems. Russ Boyd, supply contracts manager at Perot Systems Corporation (Plano, Texas; russ.boyd@ps.net) warns, “Oftentimes cost will be erroneously equated to the price of the software while many of the other true costs are ignored or forgotten.” He identifies some of the relevant costs as the following:

- *Software cost.* This is the most obvious and sometimes the biggest cost involved with an e-commerce procurement solution. “It is important to do as much research as possible to benchmark the right solution cost for your company size and application goals,” he explains.

- *Implementation cost.* This cost can rival software cost, and it is critical to capture both external (supplier-provided) and internal costs. Some of the key internal resources required may include a project manager, systems analysts, business analysts, programmers, procurement personnel, and others.

- *Hardware cost.* Most of the e-commerce procurement solution providers have recommended hardware to run the solution effectively. Make sure you analyze this cost early in the decision process so that there are no surprises in the end.

- *Additional software cost.* Most of the providers can help identify what additional software is required to run their solution on a given hardware and operating system platform, but identify the required additional software early in the process.

- *Software/hardware maintenance costs.* There will be ongoing maintenance and support costs, which are typically in the range of 12% to 20% of the purchase price of the hardware/software. “Make sure the software maintenance costs include all updates and enhancements, as well as error corrections,” Boyd details. “Make sure that priority definitions, response times, and resolution time service levels are included along with an escalation procedure, and remedies for failure to meet agreed-upon service levels.”

- *Ongoing support costs.* These costs are for any required consulting, catalog maintenance, internal system maintenance (backups, help desk), ongoing training and updates, and transaction fees associated with the chosen solution. Identify these costs in the purchase decision process, he emphasizes.

- *Miscellaneous costs.* These are the most overlooked and include training, customization, facilities, and utility allocations related to the required hardware and software, telecommunication costs, among others.

Capture the anticipated savings. “E-commerce procurement solutions offer a huge and varied savings potential,” Boyd explains. To determine the potential savings, “determine what the cost of doing business is under the current system.” The potential areas of savings include the following:

- *Productivity improvement savings.* “Savings related to productivity improvements are sometimes difficult to sell to management and finance since there is no reduction of head count,” Boyd acknowledges. But if expressed as a future cost avoidance, the ability to increase workload without the addition of head count, a best-in-class company will recognize these improvements as actual cost savings, he notes. Examples include time saved in creating requisitions, tracking submitted requisitions, and approving requisitions.

- *Procurement resource reallocation savings.* E-commerce procurement solutions automate the procurement process and eliminate non-value-added redundant work. Therefore, buyers may be retrained as supply managers, sourcing specialists, and contract managers focusing on the strategic management of the supplier. This will lead to a reduction in head count in the procurement department and reallocation of those resources to other areas of the company. The savings from this should include not only annual salary but also benefits and overhead allocations.

- *Material cost reduction savings.* E-commerce procurement solutions help to eliminate maverick purchasing and consolidate procured goods and

services to preferred suppliers. Typical savings from this consolidation is 1% to 3% of the total annual spend of goods and services.

- *Increased P-card utilization savings.* A key feature of a “good” e-commerce procurement solution is the ability to process transactions directly and electronically with a supplier using a P-card for payment. Savings accrue from increased rebates (for buying specified volume levels) and a decrease in the number of invoices required to be processed by accounts payable.

- *Electronic expense report savings.* This feature or option (depending on the solution) increases productivity since the time required to create an expense report is reduced. It includes automatic population of the expense report, automated routing and approval using the same work-flow routing and approval engine as the procurement solution, and reduced follow-up on approvals and payment of expense reports. Additional savings are achieved in accounts payable through the reduction of paper expense reports and electronic processing.

- *Cycle time reduction savings.* These are the most difficult savings to determine and validate. Depending on your type of business, the reduction in the cycle time from requisition creation to order placement, and extending to delivery from the supplier, may be able to be calculated as cost savings, Boyd offers. “If your business is time-dependent upon the delivery of goods and services, then this is probably the case. Your senior management and finance organization can help you with this determination,” he explains.

HOT E-PURCHASING TOOLS FROM NAPM MEETING

The Web-based procurement revolution is underway, as a walk through the exhibit area at the recent NAPM Annual International Purchasing Conference quickly showed. Additionally, an on-site Visa USA survey of conferees revealed that 67% currently engage in some form of e-purchasing, up 10 percentage points from last year. Of those who do not, 80% said they would in the future—up 26 percentage points from just two years ago. The interest is obviously there, as the attendees jammed the narrow aisles and often strained to take a look at the new e-purchasing solutions. Here is a summary of the top products for purchasing pros to consider (see sidebar for more solutions).

Four More Solutions of Interest to Buyers

American Software announces trading portal for e-intelligence. The Web-based ERP solution with complete front-to-back office integration includes a collaborative trading portal with RFQ and bid functionality. The trading portal allows a business to issue RFQs and solicit competitive vendor bids for needed materials. It is enhanced by the alert capability of e-intelligence, which proactively notifies users of bid activity via e-mail, telephone, HTML Web pages, or wireless device.

Contact: American Software, 470 East Paces Ferry Road, N.E., Atlanta, GA 30305; 404-261-4381; fax, 404-264-5206; www.amssoftware.com.

Dun & Bradstreet launches D&B SourcingNet. Purchasing managers can leverage the Internet to speed identifying and qualifying potential suppliers. D&B SourcingNet customers have ready access to D&B's updated universe of 11 million U.S. suppliers. Searches are easily initiated and refined using a full complement of decision criteria: keyword searching, SIC, geography, size, structure, demographics, minority- and women-owned firms, and ISO-registered companies. Buyers can immediately access quality potential suppliers by ordering a D&B Supplier Evaluation Report, D&B Supplier Performance Review, or Critical Supplier Analysis Service. A demonstration is available at www.dnb.com/sourcingnet.

Contact: Dun & Bradstreet, 325 Columbia Turnpike, Suite 201, Florham Park, NJ 07932; 973-408-6656; fax, 973-408-6618; www.dnb.com.

Perfect.com introduces automated RFQ ASP. Perfect.com provides business-to-business (B2B) net market makers with an online RFQ matching process. The market definition tool allows them to create categories and subcategories, design multi-attribute product RFQ forms, and choose auction rules. The buyer application enables buyers to describe their purchasing needs in an Internet-based multidimensional RFQ form where each dimension represents a relevant product feature or attribute. The seller application enables suppliers to respond to buyer RFQs online in three ways.

Contact: Perfect.com, 1860 Embarcadero Road, Suite 210, Palo Alto, CA 94303; 650-858-1900; fax, 650-858-1095; www.perfect.com.

ProcureNet to develop ProcureNet OneSource. In a strategic partnership with Mercator Software, Inc., ProcureNet will develop the ProcureNet OneSource Integration Broker. This is an integration toolkit for the OneSource Web-based procurement solution that will enable ProcureNet customers to create end-to-end e-procurement platforms throughout the entire supply chain.

Contact: ProcureNet Inc., 2 Madison Road, Fairfield, NJ 07004; 973-575-6620; fax, 973-575-5467; www.procurenet.com.

Agile Sourcing from ShareMax.com. The e-procurement model uses proprietary information and technology to identify and reduce the total costs of externally purchased goods and services while offering the flexibility of e-procurement strategies such as electronic strategic markets, spot buying, auction, and catalog buying. Its comprehensive Spend Analysis service provides information to increase purchasing leverage and negotiating positions. The database includes extensive RFI data and supplier information. The Agile Sourcing technology infrastructure also supports online RFIs and RFQs.

Contact: ShareMax.com, 600 Parsippany Road, Parsippany, NJ 07054; 973-884-6000; fax, 973-884-6007; www.shareMax.com.

Details online from Bank of Montreal/Harris Bank. A Web-based e-commerce purchasing solution combines corporate procurement, purchase management, information access, and control in one online environment. The multiuser, multiaccess drill-down applications include purchasing, fleet, and travel and entertainment line item viewing, standard and customized reporting, transaction splitting into multiple accounts, cardholder transaction viewing, and allocation and supplier list management. The next release, scheduled for mid-2000, will bring buyers and sellers closer together through a front-end purchase order management system. Enhancements will generate purchase orders automatically utilizing rules-based purchasing and approval, incorporate electronic catalog functionality and portal links, and enable suppliers to automatically retrieve, authorize, and settle orders in a hosted environment. It will also deliver PO detail including Level III and the new Level IV data (information needs specific to a company) without special supplier software.

Contact: Bank of Montreal/Harris Bank, Electronic Banking Services, 3300 Bloor Street West, Toronto, Ontario M8X 2X3, Canada; 888-838-4401; www.bmo.com.

PurchasingNet-SQL version 4.0 from PurchasingNet, Inc. The Web-based, enterprise-level e-procurement system includes new features such as XML support that improves supplier connectivity with added XML capabilities in the catalog update, order transmission, and e-mail functions. Further, version 4.0 includes a new feature that automatically separates stock requisitions from purchase requisitions, streamlining the entire inventory process. PurchasingNet, Inc. (formerly American Tech, Inc.), now offers the e-procurement solution via subscription services from an Application Ser-

vice Provider. It has signed with NaviSite, Inc., to provide hosting, connectivity, and customer support services for PurchasingNet-SQL.

Contact: PurchasingNet, Inc., 125 Half Mile Road, Lincroft, NJ 07738; 732-946-8844; fax, 732-946-3102; www.PurchasingNet.com.

SourceTrack e-purchasing service from SourceTrack. SourceTrack provides middle market businesses with content, community, and commerce. The commerce services provide buyers with a work-flow system to acquire operating resources such as office supplies, computer supplies, and MRO items, plus a variety of other services and products. The services allow shopping, decentralized requisitioning, automatic approval routings, and electronic orders and confirmation. Purchasing specialists help companies build order templates, establish work-flow rules, and deploy the solution. Buyers pay an initial set-up fee (about \$20,000) and monthly maintenance (\$1,000).

Contact: SourceTrack, 100 South Ashley Drive, Suite 1100, Tampa, FL 33602; 813-314-4003; fax, 813-223-4147; www.sourcetrack.com.

SupplierMarket.com version 4.5 from SupplierMarket.com. The functionality upgrades to the online marketplace for manufactured direct materials include new commodity templates placed in registration allowing the supplier to register and give more specific information. A new value-added service field enables suppliers to provide information about value-added services, such as inventory replenishment, vendor managed inventory (VMI), or engineering services. In addition, two online analytical processes are now available, Supplier Activity Tool and Supplier Comparison Tool.

Contact: Supplier Market.com, 10 Mall Road, Burlington, MA 01803; 781-273-6700; fax, 781-273-6800; www.suppliermarket.com.

SupplyWorks MAX from SupplyWorks, Inc. SupplyWorks MAX, a direct e-procurement solution streamlines and optimizes procurement activities in discrete manufacturing environments. Features include an electronic purchasing process with end-to-end status that provides centralized orders status, a simplified, intuitive user interface for buyers that minimizes ramp-up time and increases productivity, and user-definable fields that can be customized to accommodate unique requirements and preferences. It also provides extensive, flexible work flow-enabled approval process, and integrates directly into existing MRP/ERP systems. Also new, SupplyWorks Marketplace is the engine that powers Internet communication between buyers and suppliers using SupplyWorks' hosted e-procurement solutions.

Contact: SupplyWorks, Inc., 24 Crosby Drive, Bedford, MA 01730; 781-301-7000; fax, 781-301-7010; www.supplyworks.com 7010; www.supplyworks.com.

APICS INTRODUCES AUDIENCE TO HOT NEW E-PURCHASING SOLUTIONS

Are you ready for 85% of all purchase orders to be transmitted electronically (via the Internet, EDI, or through an electronic marketplace) by 2004? A recent survey of senior U.S. logistics and supply chain executives who are current members of the Council of Logistics Management (Oak Brook, Ill.; www.clm1.org) says that this is very likely to happen (see Figure III-5.1).

Spurring on these projections is the advanced technology listed in this section that comes from 13 companies and is making its way into the market. They were showcased at the recent APICS International Conference and Exhibition (www.apics.org).

Ariba Sourcing. Ariba, Inc. (www.ariba.com), displayed Ariba Sourcing for both corporations and marketplaces. It provides online collaborative sourcing technologies that allow buyers and suppliers of direct and indirect goods, specifications-based raw materials, capital assets, and business services to lo-

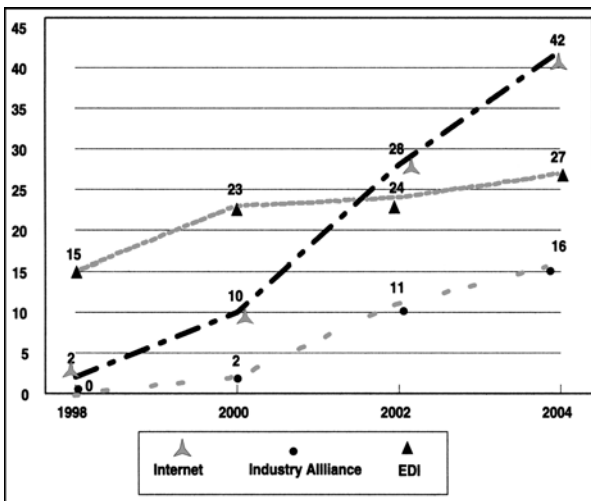


Figure III-5.1 New Study Projects 85% of Purchase Orders in 2004 Will Be Transmitted Electronically

Source: The Ohio State University 2000 Survey of Career Patterns in Logistics.

cate ideal trading partners, negotiate purchases, and strengthen supply chains on the Internet.

Developed to provide comprehensive sourcing solutions for RFQ-driven materials and services, Ariba Sourcing allows marketplaces and corporations to market and manage their own privately labeled procurement exchanges and utilize auction capabilities. Corporations can leverage Ariba's sourcing expertise across a wide range of commodity segments and consolidate supply bases through competitive bidding events.

Aspen Technologies introduces new net marketplace. Aspen Marketplace Solution (www.aspentech.com) enables process industry companies to create private and public marketplaces that integrate real-time information from their manufacturing operations to support collaborative business processes with their customers, suppliers, and trading partners.

The Aspen Marketplace Solution combines best-in-class technology for procurement, catalog aggregation, negotiated commerce, and content management with a collaboration platform focused on process industry work processes.

Castalink.com launches eCAS version 2.0. The Web-based eCAS (electronic collaborative application solution) is targeted to small and midsize companies. The eCAS application suite (www.castalink.com) offers an end-to-end solution from customer to enterprise to supplier and is comprised of seven modules. They include eOrder, eSalesForce, eConnect, eBizRule, eMessaging, eAnalysis, and eSupply. ESupply calculates purchase order and sourcing recommendations based on user-defined business rules, closing the loop between the enterprise and its suppliers.

DWL expands DWL Unifi Consumer Products portal. Featuring a unique Supplier Portal component, DWL Unifi Consumer Products (www.dwl.com) provides consumer products organizations with real-time, transactional capabilities to manage the transfer of mission-critical business information between enterprises.

The Supplier Portal allows employees to use a browser or wireless device to access and update forecasts, shipping, receiving, production, procurement, and replenishment information across the enterprise and to selected suppliers in real time.

ECOoutlook.com provides intelligent link between companies. ECOoutlook.com, an e-business service company (www.ecoutlook.com), announced the

Super-Map process and library to speed the time it takes to integrate B2B trading partner communities.

ECO Outlook is a hosted solution that makes it possible for companies to conduct business via the Internet with 100% of their supply chain partners. The solution enables companies to exchange information between their trading partner's EDI, ERP, legacy systems, and business applications and their own business system regardless of disparate communication standards or varying levels of technical sophistication.

Eventra debuts VendorSite 3.0. The latest release of VendorSite, Eventra's (www.eventra.com) Internet-based supplier relationship management solution extends the capabilities for managing the order-through-payment processes of the direct material supply chain. VendorSite 3.0 delivers enhancements for buyer/planners, such as the ability to track delivery and commit performance as part of the Shipment Performance Module.

The improved e-mail processing enhancement includes the ability to turn messages on or off according to a hierarchy, and the release includes the use of digital certificates for additional security. VendorSite 3.0 also offers a suite of add-on modules covering key areas of the inbound supply chain, giving greater flexibility for companies to create a configured solution that reflects their business needs.

Great Plains delivers eEnterprise 6.0. The seamlessly integrated global enterprise and e-business solution showcases significant customer-driven enhancements in the areas of e-business, sales and purchasing, major product series enhancements, and multinational and international.

Major enhancements in eEnterprise 6.0 (www.greatplains.com) to purchase order processing and inventory control, coupled with new sales order processing to purchasing order processing integration capabilities, help customers manage supply chains efficiently and effectively.

J. D. Edwards announces OneWorld Xe. The company's new extended enterprise product boasts some 300 Internet-ready applications that enable companies to choose the most appropriate collaborative solutions to meet their business needs.

OneWorld Xe (www.jdedwards.com) allows customers to use open, flexible, and interoperable technologies that foster communication and commerce among suppliers and customers across their extended supply chain. Among the Internet-ready applications and preintegrated applications delivered are e-Supplier portal, service/expenditure procurement process, stock-based and nonstock procurement, and supplier management.

Logility introduces latest addition of Supply Planning. The addition of Supply Planning to the Logility Voyager Solutions suite (www.logility.com) advances traditional distribution resource planning (DRP) and planning systems by applying advanced financial and optimization capabilities to sourcing decisions while simultaneously considering all supply chain constraints.

Supply Planning also offers an online exception management application that enables a company to determine deployment and sourcing problems anywhere in the supply chain while providing complete simulation capabilities for contingency planning, profitability analysis, sourcing and deployment issues, and many other supply chain planning decisions.

Moai Technologies releases LiveExchange 3.5 Enterprise edition. The product upgrades Moai's (www.moai.com) solutions that offer support for multiple, simultaneous dynamic commerce formats such as online auctions, reverse auctions, and online negotiations.

LiveExchange enterprise features include clustered server configurations for added scalability and high availability during peak activity and XML support for integration with other applications and trading networks. The LiveExchange structured negotiation features also have been enhanced in version 3.5. Structured negotiations enable complex online negotiations on multiple transactions parameters, such as payment terms or quality of goods, and multistage negotiations.

PeopleSoft delivers Supply Chain in a Box. The industry's first preassembled pure Internet supply chain solution can be rapidly deployed. PeopleSoft Supply Chain in a Box (www.peoplesoft.com) delivers seamlessly integrated applications for customer management, eCommerce, Order Fulfillment, Planning, and Supply Chain analytics.

Supply Chain in a Box delivers integrated Internet supplier management applications such as sourcing, supply planning, account settlement, and product life-cycle management through the Supplier Portal. Also integrated out of the box is eProcurement, allowing one-stop shopping for both suppliers and internal buyers through the central supply chain. All of the integrated customer and supplier functions come with full multicurrency and multilingual capabilities.

RightWorks debuts new RightWorks eBusiness Applications Suite. RightWorks eProcurement (www.rightworks.com) is a comprehensive solution that provides end-to-end purchasing life-cycle management. It provides tools that

cover vendor selection and management including RFP, RFQ, spot buying, multisite order consolidation, receipts and returns, and shipping tracking.

RightWorks eBusiness Application suite also provides a complete audit trail to enable the analytics required for global spend management, providing the ability to globally source and locally procure in a highly decentralized and distributed corporate environment.

SupplyWorks introduces SupplyWorks MAX Release 2.0. SupplyWorks MAX provides discrete manufacturers with a solution for streamlining and optimizing direct eProcurement. The latest release delivers further on the process improvements and financial advantages inherent in the company's Total Supply Management framework.

SupplyWorks MAX Release 2.0 (www.supplyworks.com) includes a new feature set, such as the integration between procurement plan collaboration and order execution, that enables buyers to streamline procurement and manage by exception. A new collaboration environment facilitates trading partner communication, and a comprehensive end-to-end system integrates Internet-based transactions over multiple formats. This release also includes an enhanced reporting and analysis capability that adds decision support tools such as lead-time measurement, supplier performance, and cross-plant operations.

E-PROCUREMENT SELECTION IN JUST A FRACTION OF THE TIME, THE MOBIL WAY

A successful online procurement implementation includes a strategy for e-procurement, a comprehensive software evaluation, and a sound business plan. One company that was able to derive a successful e-procurement solution by following this approach is the Mobil Corporation.

Mobil's nine-week e-procurement project. Typically, e-purchasing projects can go on for an indeterminate time. However, Mobil devised a nine-week selection process—and stuck to it.

Dan Quinn, former electronic commerce manager of procurement, Global Products Organization, Mobil Corporation, expresses, “When you look at the work that was done in a nine-week period, it's pretty amazing to go from really not knowing what you're going to do, to having a great idea about what you want to do.”

Quinn, now senior manager at Ernst & Young LLP (McLean, Va.; daniel.quinn@ey.com), outlined the Mobil e-procurement approach at ePurchasing 2000 (International Quality & Productivity Center; Little Falls, N.J.; www.iqpc.com). The fundamentals critical for a successful e-procurement effort include the following:

- *Determine scope/priorities, clarify objectives, and write charter.* “Take the process approach, ignore organization boundaries,” he advises. “It’s really important to get your business strategy right up front.” At Mobil, for example, one fundamental strategy for the procurement group was to put low spend on P-cards. However, when investigating the various e-procurement front-end solutions, they found that some do not support a P-card.

- *Pick team with appropriate skills.* “This has gotten a lot harder than it used to be because no one person knows all of the technology or business processes,” Quinn describes. “Get all of the right skills on the team covered, or the team’s not going to work and you’re not going to get the results you need.”

For one project, the team’s business side was represented by the team lead, ERP data coding specialist, commodity lead, field procurement specialist, and a staff procurement specialist. Technical side representatives included the IS team lead and specialists knowledgeable in electronic catalog and ERP, Internet, and IT internal plumbing and EDI. Other skills, as identified, were available to the team on an as-needed basis, usually for a day or two at a time.

- *Establish project plan with aggressive timetable.* It is difficult to gain resources and commitment for long-term projects. Quinn advises, “Available resources are too tight as it is, so the question becomes how can you boil this down and do it fast.”

- *Conduct a rigorous evaluation of the available e-procurement alternatives.* “Really think this through,” Quinn advises. “The devil’s in the details and you have to really understand these various packages because the answer for one company is not necessarily the answer for yours.”

For one project the team began with 24 potential e-procurement solution providers. “We first did two hour telephone interviews with each to see which would make it to our short list,” Quinn describes. They put together a one-page list of questions, conducted the phone interviews, and whittled the list to 10 potentials. Each of these then received a 30-page RFP, and a description of Mobil’s purchase-to-pay process.

“The half-day demos by the vendors had to follow our prescribed scenarios and not their dog-and-pony show,” Quinn explains. “We wanted

them to show us how their system was going to do our transactions.” Interestingly, when the vendors got to a certain step, they either did not do it or could not complete it.

“We would not have known about that if they just came in and did their own thing,” he allows. “But when they had to follow our script and do all of the steps, it showed us what their system could do and couldn’t do. It was very revealing.”

- *Develop a business case for an e-procurement solution.* “We did a business case, it pays out a lot of money, and it’s definitely worth doing,” notes Quinn. The benefits of e-procurement fall into three buckets: total system costs, transaction costs, and internal controls. According to Quinn the major cost saving contribution is found in the reduction of total system costs (see Table III-5.1). “A lot of people are spending time on the other two, but this is where the money is.”

- *Recommend a solution, develop an implementation plan.* “There are three choices: do nothing, do a pilot, or roll it out globally,” Quinn explains. There is no one right answer, as each method has its own set of risks and rewards (see Table III-5.2).

Table III-5.1 The Benefits of E-Procurement Solutions

Reduce “Total System Cost” for commodities

- Improve management information
- Strengthen control of purchases for consolidating spend
- Easier enforcement of procurement policies with automated process
- Eliminate hand-offs and delays by automatically linking the requisition to the supplier
- Improve supplier performance by improving accuracy of information
- Increase competitive pricing based on aggregation
- Eliminate non-value-added activities
- Improve access to prices

Reduce “Transaction Costs”

- Process cost reduction
 - Maximize use of P-card
 - Improve search capabilities
- Accuracy improvement
 - Clearer identification of products
- Simplicity and ease of use
 - Less wasted time searching and learning the ERP system

Improve internal controls

- Implement limits of authority approval
 - Audit trail optimized
-

Source: Dan Quinn.

Table III-5.2 Three E-Procurement Implementation Strategies

Postpone implementation

- **Benefits**
 - Wait for market maturity
 - Change in control
 - Suppliers would need time to support data
- **Concerns**
 - Savings opportunity lost
 - Continue high level of transactions and costs
 - No control on spending levels
 - Competition moving first and setting direction

Trial implementation

- **Benefits**
 - Enable better assessment of ERP integration difficulties and cost
 - Understand user interface and functionality
 - Gain experience with technology while minimizing financial risks
 - Better understand supplier interface issues
 - Validate benefits of business case
 - The eProcurement software market will mature
 - SAP will release new versions with improved functionality
 - Vendor consolidations
 - Integration experience
 - Suppliers may take a clearer direction on eCatalog preference
- **Concerns**
 - Change in control could complicate trial
 - Change in market conditions

Global implementation

- **Benefits**
 - Global benefits
 - Consistent process
 - Reduce transaction costs
 - Accumulate global spend and leverage agreements
 - Control spending levels
 - **Concerns**
 - Change management issues
 - Customer acceptance
 - Foreign EC legal issues
 - Global installations just emerging
 - Changing market direction
 - Change in control
-

Source: Dan Quinn.

At Mobil the choice was to do a pilot. “In doing a pilot we got a lot of valuable experience in three areas,” Quinn notes. They include the following:

- *How difficult is it to “really bring up my suppliers electronically?”* According to Quinn, “A pilot gives you a feel for how easy this is going to be to hook up suppliers. In our case, we’re not talking about one or two, but about hundreds, and in some cases, thousands of suppliers.”

- *How easy is it to integrate with my ERP?* “Vendors all tell you it’s easy, but how long does it take? How expensive is it? How integrated is it, really, at the end?” he inquires. “After running through a trial, you’re going to understand what it means to integrate this front end with your ERP,” he explains.

- *How easy is it for my buyers to purchase items with this solution?* “I may bring them into the room during selection to test it, but the real test is what do they think about it after using it for three months?” he asks. “Run the pilot for five months, no longer, and you’ll understand a lot more than you did beforehand.”

WHAT YOU NEED TO KNOW BEFORE MOVING TO E-PROCUREMENT

E-procurement will be in your future, if it is not already there. Recent *Supplier Selection and Management Report* surveys are finding that more than two in five practitioners (42.2%) currently use some form of e-procurement. Of the remainder, more than 80% are considering or planning it.

Get control over your supply chain. No matter what stage you are in, there are certain strategies or lessons that you may want to adopt when conducting your own e-procurement evaluations.

We caught up with leading authorities and some early practitioners who offer their well-earned observations and advice. For example, authority Larry Lapide, research director of supply chain planning at AMR Research, Inc. (Boston; llapide@amrresearch.com), observes, “Innovative companies have gained control of their supply chain by electronically connecting to trading partners using EDI and the Internet.”

He further believes that more companies will follow suit. However, in a special report (*The Innovators Will Control the E-Supply Chain*) he recom-

mends purchasing professionals adopt the following to achieve success and satisfaction:

- *Develop a formal e-supply chain strategy.* “Outline how you will use the Internet to improve your supply chain operations and support your e-commerce efforts,” he explains. Determine your core competencies and eventually push out the rest to trading partners through electronic connectivity in real time. This will enable you to coordinate a total process, distributed among trading partners without adding processing time.

- *Assess what starting or joining an online trading exchange means for your supply chain operations.* “If all it is doing is squeezing your suppliers on price or gouging your customers, it’s probably not worth it in the long run,” Lapide cautions. Trading exchanges are the most useful when they help connect trading partners to share information and coordinate distributed business processes. “If a trading exchange does not have a vision beyond buyers getting the best price and availability for a commodity or indirect manufacturing items, it will not improve your supply chain much,” he declares.

- *Do not connect just to your trading partners.* To improve supply chain operations, your internal enterprise systems need to be connected, enabling trading partner system-to-system and human-to-human communication.

Master the e-procurement conundrum. E-procurement expert Bruce D. Temkin, research director at Forrester Research, Inc. (Cambridge, Mass.; btemkin@forrester.com) declares, “The Net will change procurement. However, we don’t believe that the activities today are going to get you all the potential benefits,” he told NAPM’s Leveraging Supply Chain Management and e-Business conference

Temkin did offer some guides that purchasing professionals should review when “evolving your e-procurement strategy.” The major points are the following:

- *Proactive net sourcing.* Simply put, this is looking at new supplier qualification agreements. “As you buy more and more online, make sure that your supplier is able to handle this new online world,” he explains. “Create new online standards.” Additionally, insist on metric-driven agreements. “Start to measure suppliers responses, but also build that responsiveness into your agreements,” is Temkin’s advice. Insist on rigorous content standards. “Insist that all of your long descriptions are filled out,” he insists. “Insist that to buy

from them, they need to clean up their item master. You as a buyer have to make sure that happens.” Use multiple sourcing venues. “Learn how to use the many new environments that are available, whether they’re auctions, reverse auctions, aggregation, and exchanges,” he guides. “You, the buying organization, need to know how to use all of these different methods.”

- *Continuous supplier management.* “Actively consolidate SKUs,” he recommends. “Understand what people are buying that’s similar so you can cut down and get favorable pricing on it.” Create merchandise buying paths for end-user buyers to make it easier for them to find the right item, or preferred supplier. Also, flag the “specials” that may become available and that they might need. Temkin also notes, “Maintain ongoing performance analysis, because it’s not good enough to just set-up the supplier relationship, you also have to manage it on an ongoing basis.”

- *Hands-free procurement.* These are processes that are designed for the Internet, and not just procurement. They are managed by exception and optimized continuously. Essentially, with hands-free procurement the buyer is only handling exceptions.

Words to the wise from the practitioners. Alex Brown, director of corporate supply management at Advanced Micro Devices (Sunnyvale, Calif.), who led the transition to e-commerce in supply management, told the audience at the NAPM meeting about the following lessons learned:

- *Build consensus at senior management levels early.* “Within six months of the process we demonstrated the capability to the president of the company and had his buy-in,” Brown shared. “But we still had to deal with product line vice presidents and manufacturing executives, so we still had to get work done at this level.”

- *Implement change management with the strategy.* “During the early days we talked about the ‘leap strategy’ of moving the organization from purchasing to procurement, and eventually to supply management,” he explained. “We didn’t go through change management with some organizations, and we got resistance to buy-in. We even had difficulty within procurement, especially from some of the senior people who looked at it as a threat, so they resisted.”

- *Divide project into achievable deliverables.* “Anybody who has done a project and project management recognizes the benefit of having early suc-

cesses,” Brown explained. “Show progress and that you’re moving from one level to another, especially to your senior support as you continue to ask for funding and resources. Also, make sure to allocate your resources to the right subprojects at the right moments.”

- *Build consensus often.* The key here is to maintain interaction with all the organizations involved with the transition. Brown advises, “Communicate plusses and deltas continuously; don’t surprise internal stakeholders and customers.”

What American Honda Motor learned from implementing its e-procurement solution. Nicolas M. Nomicos, corporate purchasing manager at American Honda Motor Co., Inc. (Torrance, Calif.; nick_nomicos@ahm.honda.com), observed, “We have always focused on high-dollar items as part of our purchases. The issue we always had is that on the low dollar items we did not always utilize agreements, even though we had some, because we did not have an easy way to pass the word around,” he explained at the NAPM meeting. “That’s what e-procurement is giving us to a large measure.” American Honda Motor is also using e-procurement to move senior buyers to do strategic contracting. “Out of a staff of 15, I now have 10 already in strategic functions,” he reported. Additionally, he shared the lessons he learned from their e-procurement installation:

- *Control scope.* “Prioritize your wishes,” he expressed. “Otherwise, controlling the project scope is very difficult as there’s so much you want to put up front.”

- *Partner selection.* “We went through RFPs for partners, but what it came down to was, at that time, there were not too many people with Ariba/PeopleSoft implementation experience,” he explained. “So we just didn’t look at the company, but we also closely looked at the individuals that were to be on their team.” The process even involved scrutinizing the people’s resumes. “In our negotiations, we insisted that our partner assign specific individuals to the team who had the experience we needed. Otherwise, they will be learning the job, and it would be at our expense.”

- *Training.* “We started with a solution that needed no training on the procurement piece, but did require some for the expense reporting solution,” he noted. “If we had to do it over again, we would insist on mandatory training, all around,” Nomicos declared.

HOW THE INTERNET WILL ULTIMATELY TRANSFORM SUPPLIER MANAGEMENT

The goal of supply chain management has always been to deliver on time and defect-free, and the Internet holds the key to finally achieving it. That is the consensus of senior supply chain management executives in Fortune 500 companies. In fact, 82% of those surveyed believe that Internet technology will have a major impact on—if not totally transform—their supply chain performance within the next three years.

Is the supplier community up to the challenge? Research from the Economist Intelligence Unit (EIU) and Meritus Consulting Services reports that “although high-quality performance throughout the supply chain is critical, many companies are ill-prepared to integrate digital technology or reduce their cycle time.”

The level of supplier performance expected by senior executives is “extraordinarily high and uncompromising.” For example, 38% of respondents always expect shipments to be delivered on time; 40% always expect shipments as requested; and 44% always expect defect-free shipments. “Yet few suppliers meet these expectations,” concludes the research report (*Moving The Supply Chain Into The Digital Age: Integrating Demand and Supply*; www.eiu.com/latest/meritus.asp).

Buying organizations must also accept the challenge. The research also reveals some remarkable findings about the current inadequacy of supply chain performance and the lack of reliable management information:

- Only 4% of the executives surveyed believe their customers are completely satisfied with their fulfillment performance.
- As many as 30% of the respondents were unable even to estimate their supply chain performance.
- Over half of the executives (53%) expect their suppliers to deliver as requested 96% of the time, yet only 22% meet this standard with their own customers.

The supply chain's evolution into a demand and supply chain. The EIU/Meritus research finds “it all starts with demand,” with customers “calling the shots.” Therefore, it recommends that organizations develop more inte-

grated supply chain processes that are responsive to demand, with continuously shortened lead times.

To that extent, senior executives must “ensure that each link or node clearly understands and complies with the end-customers’ demand and delivery requirements.” Since no forecast is perfect, “accurate, near-real-time information about the plan should be shared throughout the extended enterprise, with employees and business partners, to rapidly facilitate any necessary remedial actions,” the researchers advise.

Integration of process and technology is the key to success. Great improvements in purchasing and fulfillment can be achieved through the seamless integration of supply chain processes, from customer through to supplier. It is essential that the chain act as a single entity to the customer. Senior executives identified supply and demand planning as the most important process they need to integrate into the supply chain. Within this category, well over two-thirds of respondents believe that supplier/partner relationships, procurement and sourcing, inventory management, delivery management, and cost reduction strategies are most critical integration issues. Yet, the report notes, none of the senior executives responsible for supply chain management were completely satisfied with the level of integration in their organization or with their suppliers or their customers.

Internet technology is the key to achieving integration. Firms must go beyond simply building Web sites and aim to create innovative solutions throughout the extended enterprise—from fulfillment and procurement to knowledge management and training. Survey respondents predict that Internet technology will become the second most important business process (right behind supply and demand planning). This is a major leap from its current status as one of the five least important processes. More than half of respondents also classify process design as a future priority, which further emphasizes need for Web-based utilities.

Collaboration, outsourcing, and the need for better communication. The tradition of vertical integration is eroding. Instead, there has been a shift to focusing on the most critical business processes and doing them exceedingly well. Therefore, companies and purchasing professionals are moving to develop a collaborative approach, ensuring that many organizations contribute to serving their customers better.

The research of EIU/Meritus indicates that many companies are

emulating this approach. Senior supply chain executives view manufacturing as the most important core competency, with sales and marketing a close second. The order is, however, expected to reverse in three years.

As companies focus on core competencies, they have a need to outsource peripheral business functions. Respondents anticipate increased outsourcing of almost all business processes and activities except for materials management, sales and marketing, and research and development—all of which will continue to be largely in-house activities. “Outsourcing, and indeed all supply chain management, increases the need for fast and flawless communication,” the report insists. Respondents expect that the supply chain would increasingly communicate electronically over the next three years.

Most significantly, supply chain type information is expected to see the greatest increase in digital communication. This includes inventory data, requests for quotations, fund transfer, planning data, delivery tracking and sales forecasting.

Almost all the companies in the survey recognize the potential for Internet technology to provide a competitive edge in this area. “The technology allows the customer’s initial demand to be automatically and seamlessly communicated throughout the process, from product selection through ordering, scheduling, pricing, delivery, payment, and confirmation,” they describe. “It can all be done as one transaction in near-real time, based on the customer’s input, with little or no support from the manufacturer.”

When asked what they consider the most effective means of real-time communication now and in three years, the respondents clearly predict a move away from EDI towards Internet communication, also including intranets/extranets.

EXPERT ADVICE ON BUILDING YOUR DEPARTMENT’S E-PURCHASING SYSTEM

Anyone who’s been ignoring the e-purchasing revolution will get a jolt from General Motors and Ford Motor Company, who simultaneously announced impending massive Web-based supplier exchanges. Ford, in alliance with Cisco Systems and Oracle is creating Auto-Xchange, an initiative to wire more than 40,000 of its suppliers and dealers to the Internet.

Meanwhile, GM, in concert with Commerce One, is establishing TradeXchange, an Internet site on which it will place its \$87 billion annual

purchasing budget and have its 30,000 suppliers trade with each other. Both projects are ambitious, and most suppliers continue to “evaluate” both sites, as they well should. There is also conjecture that the transition to an Internet-dependent supply chain could take time, more than the automakers are anticipating.

Not ready for prime time. We believe that e-purchasing is a definite “next” concept to impact procurement organizations. Right now, however, it is premature to adopt the position of most academics, consultants, and e-purchasing vendors that “if you haven’t incorporated the technology by now, you’re out of business.”

A recent *Supplier Selection and Management Report* reader survey found that almost three in five respondents (57.8%) do not have or use e-purchasing. A recent Deloitte Consulting survey (*Leveraging the e-Business Marketplace*) of more than 200 global corporations also found that 60% of their respondents are either planning, have under consideration, or do not plan to implement e-purchasing at this time.

Purchasing professionals with whom we have talked hesitate to leap into the electronic arena for various reasons. Prominent among them: overselling of technology and its benefits; caution about capabilities of providers; concern over security and risk involved; and confusion about the “real” financial and infrastructure investments that must be made.

Plan now to reduce risk when transitioning to e-purchasing. e-Purchasing is real, and while the majority of purchasing professionals may not be implementing this technology right now, they must begin planning for it immediately. There are key questions to answer before selecting and implementing an e-purchasing system. In fact, Russ Boyd, supply contracts manager at Perot Systems Corporation (Plano, Texas; russ.boyd@ps.net), recommends “defining the minimum system and functional requirements of the e-solution and incorporating those requirements into an RFP.”

At a recent NAPM Annual International Purchasing Conference, he provided some guidelines for types of requirements to consider (see sidebar). He also advised that purchasing should form a cross-functional team to gather required input from affected parties.

One plan of action to consider. Timothy Van Mieghem, partner of the Pro-Action Group (Chicago; 312-726-6111), acknowledges that “e-Commerce will not eliminate non-value-added purchasing tasks if it used as a

Minimum Requirements for E-Commerce Procurement System

Procurement Requirements

1. Centralized catalog of part numbers and prices that are accurate and easy to search
2. Web-based order form with quick response time
3. Automated approval routing with email notification
4. Ability to check approval status on line
5. Limited user training on application
6. Ability to check status of the order (ship date, tracking number)
7. Ability to click on catalog item and procurement request is populated automatically
8. Ability to “copy” a previously made request
9. Reporting ability for requestors
10. Ability to save the request form if requestor is not ready to submit the order
11. Ability for remote users to access the form with little “wait” time
12. Provides real time interface with ERP applications
13. Ability to print requisitions
14. Provides on-line help function

Security Requirements

15. Provides interface with current security
16. Provides application log-on security
17. Provides guard against data corruption
18. Provides guard against unauthorized disclosure of data
19. Provides audit trail

Generation of Contract Forms

20. Provides the ability to maintain standard contract forms

International Availability

21. Provides the ability to use the software at our sites around the world
22. Supports multiple languages and currencies
23. Software support is available internationally

Portability/Platform Requirement

24. What are the hardware and software platforms the product will run on?
25. Does data need to be converted between platforms?
26. Are all functions supported on all platforms?
27. Are there mainframe and PC components?
28. Is Client/Server technology exploited?
29. Is the product portable across platforms?
30. Is the product dependent on a particular release level of hardware or operating system?

Interoperability/Compatibility

31. Are there products (hardware or software) that will restrict the use of the product?
32. Will other products need to be modified in order to run with the product?
33. Are there compatibility problems with other products?

Resources Required

34. What will be required in terms of facilities?
35. What will be required in terms of a development environment?
36. How many employees, and what type, will we need to dedicate to the implementation and testing teams?
37. What skills will be required of the employees that will be used on the implementation and test teams?

Technical Requirements

38. Require a trial evaluation period
39. Works with Windows NT authentication
40. Does the Web software run as a background service?
41. Prefer HTML versus JAVA application
42. What is the application/transaction size?
43. What operating systems does your software run on?
44. Does it support WAN and dial-up users?
45. Thin client versus fat client
46. How are new versions/maintenance applied?
47. How does the cataloging process work? Real-time? Downloaded each time?
48. What are the minimum hardware and software requirements for the client?
49. Describe your installation process. GUI based? Script driven?
50. What levels of expertise are required by us to install and support your product?
51. Can we contact your current customers?

Source: Russ Boyd.

stand-alone tool or is not viewed as a strategic directive requiring full attention.” However, to take advantage of e-commerce, he advised purchasing professionals to

- *Understand the capabilities of e-commerce.* “E-commerce is the symbiotic integration of communications, data management and security capabilities that allows business applications within different organizations to automati-

cally exchange information related to the sale of goods and services,” he explains.

- *Understand what tasks the purchasing department completes.* A traditional purchasing organization will source the products they wish to buy, develop an agreement with a supplier to purchase those products, plan and order the products, select delivery methods, pay for the products, and monitor and track the supplier. Understanding these steps allows the company to identify those it wants to automate, he offers. “Each step will have components that can be leveraged to the Web and ones that cannot,” he explains. Identifying them is the first step.

- *Select the appropriate e-commerce package (or supplier that provides the software).* Many suppliers today offer e-commerce packages as a normal part of their services, Van Mieghem advises. This is especially true for integrated suppliers who want to make it easy as possible for a customer to order all of their needs fast and with little effort. “Additional value can be added by integrating the e-commerce package to other modules,” he explains. “Some suppliers will even provide the resources to program the necessary hooks.”

- *Reengineer purchasing procedures to incorporate e-commerce, not vice versa.* “The tool will not be enough,” he declares. “The organization will need to learn how to use the tool, and the procedures it will need to be updated.” In addition, in order to take advantage of automated purchase order development, the company will need to develop and program bills of material, sourcing guides, routing guides, and internal controls.

- *Review and test supplier base for e-commerce preparedness.* “Like any new procedure or approach, the least risky avenue normally includes selected testing and monitoring,” Van Mieghem maintains. Through this step, transition suppliers to e-commerce processing one at a time.

The promise of e-purchasing. Chris James, vice president of marketing at Digital Market, Inc. (Sunnyvale, Calif.; cjames@digitalmarket.com), provided his NAPM audience with a glimpse into the benefits of e-purchasing. He cited customer studies by Digital Market that show manufacturers who use automated, Internet-based sourcing and procurement can reduce the costs of acquisition by a minimum of 38%. Studies also show the cost of production materials themselves can be reduced 3% to 5%. The savings result from the following:

- Aggregation of purchases across plants and product lines, which allow for better economies of scale.
- Closer supply chain collaboration, which improves “design for manufacturability.”
 - Automating quoting/ordering fosters competitive bidding environment; the more suppliers bid, the lower component costs.
 - Supplier performance reports allow smarter buying decisions.
 - Contract management support increases both the percentage of parts under contract and the frequency of contract renegotiation.

SIX STEPS TO GET YOUR SUPPLY CHAIN READY FOR TRADING EXCHANGES

Despite the talk of electronic exchanges, it is still the telephone, fax, paper, and electronic data interchange (EDI) that dominate the media of information and business documents exchange among companies. Nonetheless, logistics managers must not overlook the fact that transportation and logistics exchanges are the wave of the future and offer some truly great benefits. Namely, they integrate the identification of transportation and logistics service providers, initiate service requests, and transmit replenishment orders to suppliers and transportation providers. With such benefits, here are six ways to prepare your supply chain for online trading exchanges.

1. Companies Should Be Working on Readiness. Internet-driven processes force internal and external organizations to come together and resolve problems of trust, collaboration, standard practices, and taxonomy. All constituencies need to focus on a readiness timeline for the potential integration of trading exchanges into supply chain practices.

A variety of software vendors plan to offer supply chain collaboration and integration tools and applications in the next few months. Some of these vendors include Adexa, Inc., of Los Angeles, Ariba, Inc., of Mountain View, Calif., Commerce One, Inc., in Walnut Creek, Calif., i2 Technologies, Inc., in Irving, Texas, IBM Corp. of Armonk, N.Y., J. D. Edwards & Co. of Denver, Manugistics, Inc., in Rockville, Md., Oracle Corp. in Redwood Shores, Calif., and webPLAN, Inc., in Kanata, Ontario. In addition to relying on software to get your company ready for online exchanges, executive

commitment is needed. Senior management must view the Internet as a supportive, integral, and supplemental means of doing business.

2. Companies Must Justify Exchanges. Supply chain organizations need to justify the use of online exchanges on the basis of the depth of services provided and the set of benefits. The keys to enabling an e-supply chain will be supply chain-wide visibility, integrated planning, speed of information, logistics, and transactional and customer service capability.

To get the most from a trading exchange, make sure that it offers

- direct and indirect procurement
- dynamic sourcing
- collaborative demand planning and forecasting
- inventory visibility and management
- supply planning and optimization
- intelligent order promising and real-time order status
- collaborative logistics planning

3. Business Practices, Processes, and Supporting Technology Must Align. Companies will have to bridge or supplant information from their internal enterprise resource planning (ERP), supply chain management, e-business relationship management, and legacy applications to one or many trading exchanges (see sidebar), either via a Web browser or system-to-system communication.

4. Established Relationships Remain a Priority. Companies must determine whether a private or public exchange will enhance relationships and brand loyalty. If a trading exchange squeezes suppliers on price or compromises services to customers, it is not worth it. Rather, private electronic services that complement and add more value to established channel relationships will prevent a better alternative.

If trading exchanges are not the sole or immediate answer to electronic connectivity within your supply chain, consider establishing collaborative processes with your trusted channel partners.

5. Companies Need to Consider Building Electronic Portals. Companies managing their own complex global supply chains and those with smaller more

Recommendations for Using Logistics Exchanges

- Do not ignore the implications of the Internet on the supply chain. Devote quality management time in understanding and influencing your company's value proposition for the Internet and its implications to both current and future supply chain practices.

Online trading exchanges can be positioned as an end-to-end supply chain cost savings alternative. Evaluate long-term use of a trading exchange based on its ability to impact supply chain best practices and provide quantifiable supply chain benefits.

- Rigorously assess whether an exchange's services impact the critical supply chain competencies of plan, source, make and deliver.

- Online selling, fulfillment, procurement, and service present challenges. Don't make the mistake of believing that electronically-driven supply chain processes are an intergalactic concept.

- Consider the use of electronic portals with supporting integration tools as the conduit for information integration with an external community. Get educated on standards and industry consortium practices for the electronic exchange of information.

- Seek out customers, suppliers and trading partners that have adopted the Web as a way of conducting business. Use this group as your benchmark for learning.

Four Online Trading Exchanges

Supply chain organizations need to determine whether a trading exchange selected as part of their selling, procurement, logistics or distribution strategy remains viable into the future. And while AMR Research, Inc. (Boston, 617-542-6600) has identified four types of exchanges (see accompanying table, below), each should provide certain degrees of benefit for the supply chain. At a minimum, these include

- information visibility and integration
- integration of sourcing with procurement
- collaborative and synchronized forecasting, planning, and logistics
- streamlined transaction costs

(continued)

Online Trading Exchanges—Purpose and Composition

<i>Private Trading Exchange (PTE)</i>	<i>Consortium Trading Exchange (CTE)</i>	<i>Independent Trading Exchange (ITE)</i>	<i>Vendor Trading Exchange (VTE)</i>
Based on relationship to sponsor	Based on industry supply chain participation	Based on industry or market registration	Based on industry or market affiliation
Manage interaction with the sponsor's community	Manage interactions and collaboration among industry participants	Manage interactions and collaboration among exchange participants	Manage interactions and collaboration among exchange participants
Suppliers and buyers known	Select group of buyers and sellers	Open group of buyers and sellers	Open group of buyers and sellers

Source: AMR Research.

streamlined supply chains will be better able to take advantage of trading exchanges by establishing their own electronic portals as an entry and exit point for electronic interactions.

Portals supplement communications with external business communications with styles that include personalization or filtering information to an individual user. Portals manage and personalize content such as catalogs, parts listings, and planning information and they can also support automated system-to-system communications and allow users to analyze data from multiple sources.

Finally, they give the supply chain professional a tool to facilitate the handling of alerts and exception messages. They can help coordinate logistics and transportation execution.

Vendors supplying products to build portals include Adexa, i2, Manugistics, Xelus, Inc., of Fairpoint, N.Y., and webPLAN.

6. Smaller Companies Have the Most to Gain in Utilizing Trading Exchanges. Benefits accrue from the selling, buying, and customer responsiveness aspects of their businesses. By participating in a private or industry-focused exchange, smaller companies gain the benefits of reach and speed of transaction flow. The added capability of auctioning services to sell or buy uncommitted inventory or even post excess available capacity is open to smaller firms.

HOW WEB-BASED TOOLS ARE FOSTERING SUPPLY CHAIN COLLABORATION

Companies looking to establish collaboration among supply chain partners have found their solution on the Internet. Web-enabled tools and solutions allow for the development of cost-efficient and service-effective supply chains. Here are some great examples of those solutions and how today's best-in-class organizations are using them to synchronize with partners in the areas of product design, purchasing, inventory management, and communications.

Internet Enhances Product Design

Many firms are using the Web to collaborate with trading partners on product innovation. Shrinking product life cycles requires companies to form partnerships to better customize product-to-customer demands in reduced time-to-market periods.

A collaborative design process over the Internet allows firms to iterate more design alternatives with suppliers: product upgrades can be achieved more efficiently; products can be rolled out faster; and product complexities are minimized, reducing supply chain inefficiencies and related logistics costs.

Hewlett Packard is one of the early adapters of eDesign. On the design and production of laser printers, internal and external design teams collaborated to develop a supply chain-friendly product, with modular parts and differentiating components that could be assembled at regional distribution centers rather than multiple dedicated production facilities.

National Semiconductor uses product design portals to allow customers and supply chain partners to collaborate in the early stages of design for a new circuit. And Adaptec, a hardware and software developer, has reduced design-to-delivery cycle times and saved \$10 million in inventory by using Web-based collaboration with key suppliers.

Web-Based CPFR

Collaboration online also strengthens customer relations. Sun Microsystems has developed Web-based collaborative planning tools to exchange forecast and product status information with customers on orders, ship-

ments and promotions, and help Sun manage its products through the entire life cycle.

This has substantially reduced lead times and forecast availability, improved inventory turns, increased customer satisfaction and more efficient supply chain operations.

Extranets Are Alternative to EDI

Many companies have used Internet technology to develop extranet systems to electronically link users in various locations in a move toward collaboration. These firms believe that an extranet yields the same benefits as electronic data interchange (EDI), but are easier to build and cheaper to maintain.

General Electric, for example, has halved its 14-day purchasing cycle by communicating with suppliers over an extranet, according to a survey of world-class companies conducted by Best Practices, LLC (Chapel Hill, N.C.; 919-403-0251).

And Lord Corp. introduced its own system, New Generation Data Interchange, to combat some of the difficulties with EDI. Here, PC-to-PC modems allow the company to interface with suppliers, allowing vendors to monitor their orders and performance measures.

Extranets can also help manage customers' inventory and eliminate production and billing inefficiencies. Shell Chemical is deploying Lotus Notes as the backbone to a customer inventory management system and considers the system an improvement over traditional EDI. The system change resulted from increasing confusion in the company's production planning group and difficulties in reconciling bills on last-minute shipments. Shell decided to emulate the relationship it had with its water supplier: One company supplied the need, the water was there on demand, and Shell made payments through an electronic billing system once a month.

With Lotus Notes, Shell could manage its customers' inventory and place orders for the customers rather than waiting for the customers to realize they were in short supply. Shell now bills the companies monthly for actual consumption instead of on a per shipment basis.

A server in the customer's purchasing department replicates any changes to Shell's internal server and makes them available to Shell account representatives. The system also calculates and issues an electronic bill to customers on a monthly basis.

Shell estimates that the new process has increased revenue by encourag-

ing many of its customers to make Shell their sole supplier. The additional revenue has exceeded implementation costs by a ratio of 10-to-1.

Improve Purchasing with Intranets

Intranet links are also being developed to support corporate and manufacturing purchasing programs. Ford's intranet program, called Direct Data Link, allows suppliers to get exact ordering and scheduling information for parts by accessing Ford's mainframe.

Ford factory workers, in turn, choose the right colors and configurations as a car or truck moves down the assembly line. The cost for this low-tech communication system is a \$40 modem and a 386 computer.

Another online procurement option is the e-marketplace. Buying and selling product via Internet exchanges allow companies to lower procurement transaction costs, lower product acquisition costs, tap into unlimited supply sources to respond to changing market needs, and profitably dispose of unused excess inventory.

Matching Virtual to Physical

Leading organizations are also collaborating with supply chain partners to fulfill online orders. While the fulfillment process is done in the real world, online synchronization is crucial to ensuring that orders are taken and filled on time.

"The advent of the e-economy is pressuring the fulfillment operations of many companies, whether they are shipping small packages to individual consumers or operating tightly synchronized business-to-business transportation," says David L. Anderson, a partner in Accenture's (formerly Anderson Consulting) Supply Chain Practice (917-452-3536). "Companies will look for innovative ways to continue to reduce order-to-delivery times."

Accenture recently launched a Web site (www.ascet.com) that investigates the Internet's impact on the supply chain. A book, *Achieving Supply Chain Excellence through Technology*, Volume 2, accompanies the Web site.

No matter how you utilize the Internet, the pros recommend that you realize that true collaboration is only possible with the right partners; that data sharing requires trust and openness; and that low-cost supply chain operations remain critical.

FIVE WAYS LEADING COMPANIES CAN BECOME E-SUPPLY CHAIN INNOVATORS

Traditional opinion holds that companies closely aligned with their trading partners will have the best control of their supply chains. Internet connectivity is making this a foregone conclusion by using e-business technology to connect to partners in real time. We believe that the following companies have successfully mastered virtual manufacturing and distribution businesses. Here is how they have done it.

Link to All SCM Partners

Cisco Systems, a supplier of Internet switching, routing and networking equipment maintains an Internet system that links its suppliers, customers, manufacturers and processes via the Web. Orders are shipped directly to a customer's location, enabling a partial virtual distribution process.

Additionally, in a move to virtually eliminate all its warehouses over five years, Cisco has partnered with Federal Express Corp. to hand over all shipping and warehousing functions. Fulfillment will be accomplished by shipping order lines directly from plants and suppliers, possibly up to 100 order lines from different countries. Order lines will be consolidated and merged in transit to allow them to arrive within hours of each other for assembly at a customer's site. This replaces the method that requires Cisco to carry finished goods inventories in plant warehouses to ensure coordinated delivery.

Moving to Build-to-Order

Ingram Micro, a wholesale distributor of technology products and services is a virtual build-to-order manufacturer of PCs (see sidebar). The company has worked to shrink order cycle times by replacing traditional communication methods, such as telephone and fax, with EDI and Internet-based messaging.

Under the new system, orders placed on a reseller's Web site are electronically sent to Ingram's systems, which then automatically send order information to the factory and to logistics providers who hold and ship suppliers' inventories. The factory receives the inventories, assembles the PCs and ships them directly to the reseller or its customer.

Dell has also been successful in moving to a build-to-order manufacturing model while holding no inventory. To enable this environment, Inter-

Four E-Supply Chain Business Models

Electronic connectivity that is Internet based will allow manufacturers to outsource and reassemble their supply chains, enabling real-time coordination of fulfillment and processes among trading partners. This will spur the adoption of one of four new e-supply chain business models defined by AMR Research, Inc. of Boston (617-542-6600).

1. **Virtual Manufacturer**—This organization does not manufacture anything; nor does it have any plants. It does, however, control product development, marketing, and sales, as well as coordinate customer service for its products. It hires contract manufacturers and third-party logistics and fulfillment service providers to make, assemble, and ship final products to its customers.

Sun Microelectronics, a division of Sun Microsystems, Inc., in Palo Alto, Calif., is such an organization, as it outsources the manufacture of electronic boards, which are shipped by suppliers directly to customers.

2. **Virtual Distributor**—This company does not distribute anything and does not have any warehouses. It markets products and takes orders for multiple suppliers. The virtual distributor controls marketing and sales and coordinates order fulfillment. It relies on suppliers to make, assemble, and ship final products directly to its customers. Ingram-Micro represents this type of organization.

3. **Virtual Retailer**—Better known as an Internet retailer, this firm does not own any brick-and-mortar stores. It merchandises products in virtual stores and controls order fulfillment and products directly to its customers. Amazon.com, Inc., is the best example of this type of retailer.

4. **Virtual Service Provider**—This organization does not own any assets, but does provide SCM services. This includes Lead Logistics Providers that perform logistics management for a company.

net orders are sent every two hours to warehouses for final assembly or for component delivery to a plant within two hours.

Around-the-Clock Customer Care

Marshall Industries, an industrial electronic components wholesale distributor, has established a Web site to enable around-the-clock customer self-service. The site is linked to its internal systems to provide customers with unallocated inventory status, order history information, and design support. It is also linked to transportation carriers for order tracking. This streamlined

operation, eliminating handwritten sales reports, paper-based catalogs, and telephone calls. It has also improved customer service.

Speed Up the Supply Chain

HP Printers and PC Division has accelerated fulfillment on the outbound side by requiring all customer orders to come in via EDI or to be converted to EDI format by automatic loading into HP's ERP system.

During the order fulfillment cycle, customers and transportation carriers are connected via EDI links to speed up delivery and automatically update systems with order information. The organization only works with carriers that have Internet-based shipment tracking systems to ensure that customers can view shipment status electronically. A secure Web site allows customers to obtain order status information.

Purchase E-Business Functionality

Seizing the opportunity to help these eSCIs (e-Supply Chain Innovators), software vendors have started to offer products that can help. This deluge of new product offers has come from SCM, ERP and Internet procurement software vendors. Those most aggressively developing such functionality include i2 Technologies Inc. (Irving, Texas), Manugistics, Inc. (Rockville, Md.), Oracle Corp. (Redwood Shores, Calif.), Aspect Development, Inc. (Mountain View, Calif.), Ariba Technologies, Inc. (Mountain View, Calif.), and Commerce One, Inc. (Walnut Creek, Calif.).

While each vendor approaches the market differently, they are developing software technology that can be deployed in three ways:

- As licensed software to enable a company to establish its own exchange with its trading partners
- As part of a hosted site for use by a company and its partners, run by a third-party provider
- As a service within a public trading exchange, for use by a company and its trading partners

Each method helps establish real-time electronic connectivity with trading partners to coordinate and collaborate on supply chain activities.

WEB EXCHANGES SYNCHRONIZE SUPPLIER RELATIONSHIPS AND ORDER VISIBILITY

For logisticians looking to electronically synchronize with suppliers over the Internet, a set of specialty startup vendors can help. These Order Visibility Exchange (OVE; see sidebar) vendors specialize in Supply Chain Event Management (SCEM), which includes an end-to-end approach to supply chain management. Companies using OVEs get more control over the replenishment of direct production goods, potentially reducing inventories and cycle times. OVE functionality can also help expand the numbers of suppliers to which you are electronically connected and is a means to migrate your current EDI connections to the Internet.

Linking Procurement Electronically

Bloomfield, Connecticut-based Kaman Aerospace, a manufacturer of helicopters, is using an OVE solution from Eventra (Milford, CT; 203-882-9988) to manage its planning, forecasting, and collaborative supplier communications.

“Our company had no electronic linkage to manage the supply chain,”

Look Who Offers Visibility

A number of software companies can provide OVE functionality, but only four privately held startups specialize in the area:

Eventra (Milford, Conn.; 203-882-9988) focuses exclusively on order management functionality with an additional logistics focus. Its product, VendorSite, supports freight, logistics, and barcode data.

Sendorder.com (Mountain View, Calif.; 650-316-3991) targets smaller companies that cannot afford a license.

Effinity (Alisa Viejo, Calif.; 949-643-9700) offers functionality beyond OVE to include collaborative forecasting. The second version of its product has just been released.

Baker Street Technologies (Toronto, Ontario; www.bakerstreettech.com) offers OVE functionality through a Web site-hosted service only. Baker Street provides functionality to track orders sourced to multiple suppliers.

says Jack Bergquist, vice president of contracts management and procurement. "All transactions were completed via phone, fax, or mail. With the Eventra VendorSuite, we look forward to greater efficiency and cost savings by having our direct materials suppliers linked electronically."

In order to convert Kaman to VendorSite, Eventra had to interface with the company's legacy system. Eventra just finished Kaman's VendorSite pilot stage with 15 test suppliers and will increase to 40 suppliers by the end of the year. Vendors range from small businesses to manufacturers that supply hundreds of parts.

Visibility around the World

Network Appliance is using the new WorldChain solution to manage ordering, shipping, and delivering spare parts and inventory to customers around the world. "Network Appliance began to search for a way to leverage the Internet to link together our trading partners in customer service and support," explains Chris Liotta, senior vice president of Customer Satisfaction at Network Appliance, Inc. "We required a solution that provides real-time visibility for our customers to our outsourced partners' data and processes, could be rapidly implemented, and integrated transparently with existing IT infrastructures. The WorldChain [Santa Clara, Calif.; 408-245-2400] solution speeds time to market, enabling us to improve upon our Service Level Agreement performance and meet or exceed our customers' expectations."

WorldChain's hosted solution will be integrated with the Network Appliance Web site where the company, its customers, and its service partners can securely view, verify, and control all critical information relating to the movement of inventory through the supply chain. Network Appliance can eliminate manual procedures in its service and support operations and automate supply chain processes to enhance customer satisfaction globally.

Four Types of Order Management

Whether your trading partners are located worldwide or domestic, OVEs provides you with the following:

1. Data Translation Services—Allow trading partners to send to, and receive information from, an exchange in a variety of protocols, including EDI, XML, Internet, pager, fax, and e-mail, as well as simple browser software. This lets trading partners communicate with the site.

2. Transaction Management—Keeps track of the real-time status of purchase orders, order releases, acknowledgements, advance shipment notices, load tenders, and back-order notifications in a secure environment.
3. Notification and Alert Messaging—Lets trading partners know when the status of an order changes or when something goes awry, allowing exception-based order management.
4. Analytics—Enables users to generate performance reports from order history.

THREE NEW STUDIES ASSESS E-SUPPLY CHAIN SERVICE PROVIDERS

Logistics managers are well aware that electronic commerce has and will continue to make a significant impact on their organizations and supply chains. To help you take better advantage of all that technology has to offer your logistics operations, here is a quick update on the tools and vendors at your disposal.

LIS Speeds Things Up

Logistics Information Systems (LIS) are useful in carrying out EC initiatives. LIS can quickly and accurately concentrate, group, and process the needed logistics information involved in transportation, loading and unloading, custom clearance, storage, inventory control and distribution processing. Due to customers' growing demand for diverse products, smaller quantities and increased frequency, the LIS is inevitable and necessary.

One of the primary benefits of LIS is its ability to integrate Internet Logistics Management practices (ILM). ILM is defined as coordinating and centrally managing logistics activities to reduce total cost, improve customer service, and alleviate interdepartmental conflict. Research presented at the Council of Logistics Management annual conference indicated that 61.4% of logistics managers are using LIS for this purpose (see Figure III-5.2).

Extranets Prove to Be Cost-Effective

When suppliers and customers are added to the mix, managers are less likely to invest in technology. A comparison of resellers to manufacturers here

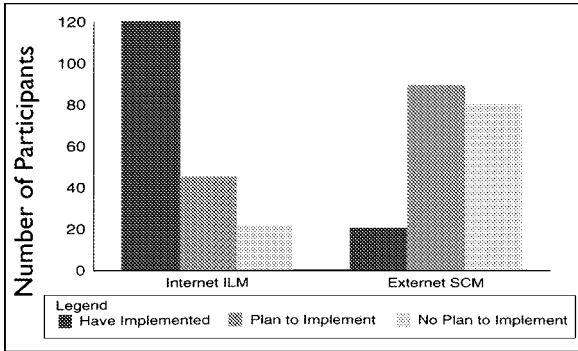


Figure III-5.2 Use of LIS For EC Activities

Source: Auburn University, Georgia Southern University, CGR Consultants.

shows that while resellers are more interested than manufacturers in developing extranet capabilities to manage supply chain activities, neither group has rushed to implement them (see Table III-5.3).

Brian Gibson, associate professor of logistics at Auburn University (Auburn, AL; 334-844-2460) and Craig R. Gustin, principal, CGR Management Consultants (Atlanta; 404-633-8058), who conducted the research study, found that the benefits of EC may be the cost savings and efficiencies garnered from supply chain improvements. While sales increases generate publicity, taking cost out of a supply chain has a more direct impact on bottom line profitability.

Table III-5.3 Summary of Chi-Square Test Results for Extranet SCM

<i>Implementation Activity</i>	<i>Percentage of Manufacturers</i>	<i>Percentage of Resellers</i>	<i>Comments</i>
Have already implemented	9.3	13.2	A smaller than expected proportion of both groups collaborate with suppliers and customers via extranets
Planning to implement	41.1	50.9	A smaller than expected proportion of manufacturers plan to collaborate with suppliers and customers via extranets
No plan to implement	49.6	35.8	A larger than expected proportion of manufacturers have no plans to collaborate with suppliers and customers via extranets

Source: Auburn University, Georgia Southern University, CGR Management Consultants.

“Both manufacturers and resellers need to be more proactive in leveraging the cost-effective capabilities of extranets,” states Gibson.

A Lucrative Market for Providers

Aiding managers in this leverage are supply chain management service providers. According to International Data Corp. (Framingham, Mass.; 508-988-6757), current market conditions are causing logistics managers to seek out firms that provide supply chain consulting, implementation, operations management, training support, and supply chain services (see Table III-5.4).

“The increasing complexity and variety of the available software solutions, the demands of the new e-business paradigm, and the need for ever-shortening implementation time frames are just some of the factors causing companies to seek the help of supply chain management service vendors in strategizing, planning, enhancing, integrating, and managing their supply chains,” says Nelly Zaharinov, senior research analyst with International Data Corp.’s Supply Chain Services research program.

“In the past, supply chain management projects were undertaken by companies that wanted to differentiate themselves in the marketplace and achieve operational excellence,” continues Zaharinov. “Today, however, these projects are becoming a necessity for many of the big, middle-market, and dot-com organizations due to their growing need for collaboration and integration.”

Table III-5.4 Top 10 Supply Chain Service Providers by Revenue, 1999 (\$M)

<i>Service provider</i>	<i>Revenue</i>
PricewaterhouseCoopers	1,358
Andersen Consulting	1,200
Ernst & Young	1,093
IBM Global services	990
KPMG	500
Deloitte Consulting	470
Cap Gemini	440
EDS	430
CSC	390
Arthur Andersen	32

Source: IDC.

DOZENS OF NEW NET-BASED LOGISTICS SOLUTIONS AID SUPPLY CHAIN MANAGEMENT

From simple transportation management to the complexities of export documentation, Internet-based software solutions sophisticate even the smallest logistics departments. Best of all, managers can access the systems at little cost, usually on a per transaction fee. The benefit: no need to invest hundreds of thousands of dollars in best-of-breed or customized solutions. A PC and Web browser are all you need to run your logistics operation today. Here is a quick look at some of the newest solutions to hit the market.

Tracking and Tracing

Unveiled at a recent Distribution/Computer Expo, *NextLink Logistics* enables shippers to track global shipments. The solution allows users to make more informed decisions by offering multiple rates, routes, and schedules. It electronically books and confirms shipments and enables clients to trace and track freight from door to door. An intelligent messaging feature alerts shippers in real time of any changes to planned schedules.

NextLink's data source, Global Commerce Knowledge Base, will provide content for landed costs, logistics, and government trade regulations for shipping to and from 100 countries. Global Commerce Knowledge Base currently maintains over 19,000 HTS product classifications and more than 40 landed cost components. NextLink is built on Oracle databases and uses http and XML transactions, with the ability to process 10 million transactions per day.

Contact: NextLink Corp., 1505 Farm Credit Drive, 6th Floor, McLean, VA 22102; 703-547-2000 or 800-900-NEXT; Fax: 703-547-2023; www.nextlink.com.

I-Deliver is a Windows 95-based program that provides real-time shipment tracking and proof of delivery over wide area wireless networks. The open system can be integrated into existing logistics automation and enterprise systems, aiding decision support for routing and optimized load planning. Mapping software allows dispatchers to assign drivers to pick-up locations and view a map of driver stops and last-reported locations, making this solution ideal for LTL, private and parcel delivery operations.

Contact: Intermec Technologies Corp., 6001 36th Avenue, West, P.O. Box 4280, Everett, WA 98203-9280; 425-348-2600 or 800-347-2636; fax: 425-355-9551; www.intermec.com.

Export Management

Shipping Solutions 2000 export software is meant to reduce the time it takes to complete export documents, and virtually eliminate costs by allowing shippers to closely monitor expenses. Users are required to enter export information and the program automatically completes more than two dozen standard export forms. Users then select the documents they wish to print, or they can e-mail their shipping data to the freight forwarder customs broker or customer.

Shipping Solutions 2000 runs on Windows 95/98, 2000 and NT. It requires a 75 MHz or faster microprocessor, 16 MB RAM, VGA or higher resolution display adapter, and at least 10 MB available hard disk space.

The solution costs \$995 and a network version for up to four workstations is available for \$2,495. Additional network licenses are available for \$200 per workstation.

Contact: InterMart, Inc., P.O. Box 22267, Eagan, MN 55122; 651-905-1727; fax, 651-905-1827; www.shipsolutions.com.

Transportation Management

ShipLogix is collaborative Web-based software for shippers, carriers, and third-party providers. Designed to streamline transportation, *ShipLogix* aims to reduce administrative time and expenses associated with several transportation functions. For example, an RFQ process can be completed via the Internet by ranking carrier bids according to predetermined shipper criteria.

The first *ShipLogix* product will feature electronic load tender, electronic shipment status, and electronic invoicing. In exchange for a nominal monthly fee, each trading partner needs a PC and Web browser to access the software.

Contact: *ShipLogix*, 86 Owen Brown Street, Hudson, Ohio 44236; 888-352-4007; www.shiplogix.com.

The Web-enabled version of *ExpressWORKS*, distributed on CD-ROM, houses two modules on the desktop—bill of lading and rate quotes—while a direct link to myroadway.com provides customers the ability to track shipments, view open invoices, and check claim status. An interactive tutorial guides shippers through the steps of creating databases.

Contact: Roadway Express, Inc., 330-643-6608.

EShip is an Internet-based transportation management system that

allows organizations to better manage the physical fulfillment process, including shipment tracking, rate estimation, and performance reporting. According to company CEO, shippers will be able to lower the cost of managing their logistics operations by as much as 60% through reduced paperwork and streamlined communication with customers and suppliers.

Contact: TranSettlements Network Services: 800-432-6428; www.eship.com or www.transettlements.com.

Order Fulfillment

E-fulfillnow for dot-com companies, provides warehousing, logistics, and transportation management functionality in as few as seven weeks for those who qualify. E-fulfillnow was designed to address the problem facing many dot-com firms—late shipments, mispicks, inventory shortages, and poorly processed returns. The solution includes a preconfigured version of PkMS, Manhattan Associates' signature warehouse and transportation software. The functionality offered with e-fulfillnow includes inventory management, wave management, allocation, loading, automated bill of lading, and integrated parcel shipping.

Contact: Manhattan Associates, Inc; 770-955-5533; www.manhattan-associates.com.

Conquest is a fully integrated transportation and order fulfillment solution designed to handle order and shipment processing, task scheduling, documentation, and shipment, and delivery status. In addition, Conquest's multicarrier rating engine allows customers to shop for best prices. All shipping information is consolidated into a single database for better insight into cost-saving opportunities.

"Conquest allows us to support our rapid growth," says Lee Tomten, shipping system specialist for ADC Telecommunications. "It has allowed us to leverage shipping rates, increase our throughput, and plan for the future."

Contact: TranScape; 10800 Lyndale Ave. S., Suite 300, Bloomington, MN 55420; 612-885-7121; www.pbTranScape.com.

CONCENTRATE ON FOUR AREAS FOR SEAMLESS E-TAIL LOGISTICS

Growth in the e-tail market has turned retail logistics processes upside down. To be prepared, managers need to concentrate their efforts on four logistics

How Do You Know if E-Tailing Is Right for Your Firm?

The e-tailing group (www.e-tail.com) suggests that you ask yourself the right questions in order to determine if your company has the logistical ability to sell its products over the Internet.

- Is your company Web-enabled?
- Will your product sell online?
- Are you currently missing an opportunity to reach your customers online?
- Are you facing the likelihood of competitors within your product category?
- Can you improve business productivity through Web transactions?
- Will your cost structures likely be impacted by e-commerce?
- Are you concerned about your market cap without an Internet presence?
- Can the Internet deliver your company a global presence likely to increase overall revenues and market share?

areas (see sidebar): order management, fulfillment, shipping, and reverse logistics.

It's All in the Software

Robert L. Olsen, CPIM, project manager, Tompkins Associates (Raleigh, N.C.; 919-876-3667), recommends software as the easiest and most effective tool to manage these four areas. Here is how to go about it.

1. *Ordering over the Net.* Companies should evaluate order management systems by their capability to receive and process orders from the Internet without the need to manually enter or review every order. The ability to interface directly from the enterprise database to the Internet software is critical.

Also consider how freight and other charges will be processed by the order management system. And, look for a system that can calculate sales tax for all states.

2. *Fulfilling "Each" Orders.* Consider the distribution operation that has traditionally served the retail market. The operation has most likely dealt

with full case or pallet movements with order volume reaching 100 orders a day. If an item is in short supply, the distribution center might ship short. The delivery system is most likely common carrier, with delivery times of four to seven days.

Under the e-tail business model, the fulfillment requirement becomes an “each.” The total number of items shipped does not change, but the order volume does, from 100 to several thousand a day. Shipping, manifesting, and labeling requirements are now imposed on the supply chain.

The makeup of the warehouse will need to change drastically to support consumer-direct marketing, most importantly, the ability to pick large quantities of small orders. At a minimum, flow racking is imperative. Pick-to-light automation, carousels, and A-frame or V-frame picking systems may be required to handle the extra volume.

Realize that parts of orders may be picked manually while others are handled by automation. Scheduling them and bringing the information and inventory together calls for systems and capabilities that many current systems cannot handle.

3. *Develop a Multicarrier Strategy.* Shipping is one of the more interesting aspects of e-tail. At the current rate of growth, the industry’s impediment is the inability of parcel carriers to accommodate the growing volume of package shipments to residential addresses.

The requirement for the emerging e-tail organization is to develop a multicarrier strategy and have a single integrated parcel management system in place that can accommodate all the carriers.

Be aware that parcel carriers are moving to strict labeling requirements to expedite handling and in some cases, new bar code symbols are required that call for new software and printers on your part.

An added element is the need to interface the shipping system to the enterprise or warehouse management system. Shipping at larger volumes requires the shipping system to retrieve data from the order file. Scanning the order number bar code on the pick ticket or label should suffice to initiate the shipping process.

4. *Handling the Returns.* The rate of return in e-tail is much higher, occurs everyday, and will come in one item at a time. Accommodating this calls for physical and system preparations.

Physically, the operation must have an efficient space for receiving and processing the returns. This will include opening, inspecting, disposing or repackaging and crediting the customer with the return. Repackaged items

must be placed back in stock as quickly as possible, and you might need visibility of the inventory before actually reshelving, in order to prevent over-purchasing the material.

The system requirements for this process involve the warehouse operations to direct and manage the movements. Interfaces must also be supported to the enterprise system for accounting, inventory and sales update information.

Index

- A.T. Kearney Inc., 648
Allied Die Casting Co., 911
ABC (activity-based costing), 104, 113–115, 390, 252, 270, 434–35, 439, 448, 494, 566, 573–76, 599, 744
ABF Freight System, Inc., 125, 373, 383
Acacia Technologies, 208, 645, 647, 710
Accenture, 261, 266, 268, 358–59, 404, 408, 654, 777, 968, 1009
Access Data Systems Inc., 202, 204
Access WMS, 660
ACCPAC, 528, 530
Achieving Logistics Excellence through Supply Chain Synthesis, 756, 757
Achieving Supply Chain Excellence through Technology, 665, 666–67, 1009
Ackerman Warehousing Forum, 642
Action Optimization, 52, 361, 536
Active Media International, 418
ActiveProject, 239
Activity-based costing, 104, 113–115, 390, 252, 270, 434–35, 439, 448, 494, 566, 573–76, 599, 744, 963
Adexa, Inc., 238, 1003, 1006
Adonix, 53, 538
ADP Distribution 2000, 509
ADR North America LLC, 835
Advanced Micro Devices, 994
Advanced Planner and Optimizer (APO), 209, 372, 378
Advanced Supply Chain Planner, 215
AES (automated export system), 374
Affiliated Warehouse Company, Inc., 640
AGENTics, 213, 214
Agile Software Corp., 381, 532, 717
Agile Sourcing, 944, 982
Agilent Technologies, Inc., 389, 757
Aims Logistics, 71, 73
Air Products and Chemical, 415
Airborne Express, 56, 127, 212, 367
Airborne@Home, 367
Airlines on the Web (AOW), 356
Alford-Bangs formula, 34
Allegiance Healthcare Corporation, 810–12
Alliance MRP II, 512
AlliedSignal, 835, 861, 939
Alpha Technologies, 898
Alternative Distribution Systems, Inc., 383
American Airlines, Inc., 867–70
American Eagle Outfitters, 230
American Export Register/China, 356
American Freight Exchange (AFE), 349
American Freightways, 122, 373
American Honda Motor Co., Inc., 995
American Management Systems, Inc., 236
American National Standards Institute (ANSI), 654, 737
American President Lines (APL), 94
American Production and Inventory Control Society (APICS), 141, 206, 368, 387, 471, 482, 517, 540, 569, 708, 729, 865, 928, 984
American Productivity & Quality Center, 66, 651
American Society of Transportation and Logistics (AST&L), 350
American Software, 92, 207, 211, 377, 417, 617, 631, 981
American Tech, Inc., 214, 665, 982
American Textile Partnership, 789
Americans with Disabilities Act (ADA), 823, 824
AMR Research, Inc., 27, 178–79, 211, 236, 281, 293, 333–34, 357, 414, 517, 613, 619, 630, 634, 649, 654, 774, 945, 992
AMT (asset management tool), 490–93
ANETorder.com, 281
Ann Arbor Computer, 48
AnswerThink, 226
Antitrust Counselor, The, 63–66
APICS Dictionary, 655
APICS Small Manufacturing SIG Quarterly, 628
APL, 94, 358

- Applied Komatsu Technology, 835
 Applied Management Solutions, Ltd., 569
 Applied Tactical Systems, Inc., 50, 534–35
 APS (advanced planning and scheduling), 52, 238, 357, 517–20, 533, 536, 760
Are We Moving from Buyers and Sellers to Collaborators?, 789
 Argosy Safety Concept Vehicle, 162
 Ariba Technologies, Inc., 212, 214, 223, 1012
 Ariba, Inc., 984–85, 995, 1003
 Arizona State University, 101, 960
 Armstrong & Associates, Inc., 260, 340, 368, 611, 623, 628, 632, 637, 647, 796
 Armstrong World Industries, Inc., 3, 599
 ARP (automatic replenishment programs), 426–29
 Artemis Management Systems, 239
 ASD Systems, Inc., 177
 Aspect Development, Inc., 372, 1012
 Aspen Technology, Inc., 322–23, 326, 985
 Asset Management Tool (AMT), 490–93
 AssetIQ, 53, 537–38
 AT&T, 940
 ATS Continuum for the Warehouse, 50, 534–35
 Atwood Richards, Inc., 418
 Auburn University, 1016
 Auto Industry Action Group, 788
 Auto/ExpressShip, 351
 Automated Export System, 96, 369, 374
 Automotive Network Exchange, 788
 AutoPalletP3, 626–27
 Auto-Soft Corporation, 52, 536
- B/L (bills of lading), 95–96
B2C Internet Practices, 226
 Baan Company, 248, 346, 361, 365
 Bailey-Killen Associates, 581
 Baker Street Technologies, 1013
 Bakery Crafts, 302–304
 Bank of Montreal/Harris Bank, 982
 Bar coding, 34, 113, 134, 147, 163, 260, 373, 416, 435, 504, 568, 737, 812, 848
 Barter, 418–20
 Basement.com, 231
 BASF Corp., 3, 5, 600
Basic Techniques of Inventory Management, 643
 BAX Global Inc., 133, 380
 BCcomponents, 132–34
 Bearing Distributors, Inc. (BDI), 323
- Becoming Demand Driven: The Foundation for e-Business Leadership*, 633
 Becton Dickinson & Co., 161
 Behera & Associates, 401–402
 BellSouth Telecommunications, 393, 806, 934, 946, 949, 951
 Bellwether Software Corporation, 214–15
 Beltech, Inc., 272
 Benchmarking Partners, 231–32
Benchmarking Warehouse Operations, 632
 Benchmarking, 3–38, 81, 129, 134, 167, 237, 245, 357, 365, 410, 479, 585, 596, 752, 774, 810, 821, 872, 915, 918, 945, 963
 BenchmarkReport.com, 623
Benchmarks for U.S. Manufacturing Productivity, 585–88, 739–41
 Bender Management Consultants, 250
 Bendorf & Associates, 104–105
 Bernd Remmers Consultants AG, 582
Best Practices in Supply Chain Partnership and Certification, 333, 937
 Best Practices, LLC, 333, 336, 937, 1008
 BetterManagement.com, 343–44
 Bid Freight.com, 130
 BidPro, 365
 BigVine.com, 623
 bill of lading, 94–96, 122, 278, 349, 811, 882, 1019
 Black & Decker, 325
 Blinco Systems, 356–57, 624, 635, 644, 881–82
 Blue Streak, 292–93
 Boeing Company, 358, 802
 Bolero International Ltd., 96
 BOM (bill of materials), 296, 398–401, 502, 547, 550, 552, 573, 744, 757, 892
 Boscov's, 772–73
 BP, 322–23
 Braun Consulting, Inc., 382–83
 Buker, Inc., 569, 663
 Business Intelligence Portal, 617
 Business Laws, Inc., 63, 822, 965
 BusinessWorks, 528, 530
- C. S. Report, Inc., 43, 205, 270, 289, 404, 534, 751
 Cahners In-Stat Group, 342
 Caliber Logistics, 17
 Caliber RM, 240
 Canadian National (CN), 376, 380–81

- Canadian Pacific Railway (CPR), 95
 Canadian Tire Corp., LTD., 342
 Canon U.S.A., Inc., 299–302
 Cap Gemini Ernst & Young, 345, 747, 1017
 CAPS Logistics, 116, 250–51, 346, 365–66
Career Patterns of Women in Logistics, 189, 192
 Cargill, 358
 CargoFinder.com, 130
 Cargo4less.com, 124, 130
 Cargo theft, 39–42, 340
 Case Corporation, 199, 475, 810, 830
 Cass Commercial Corporation, 30, 163
 Cass Information Systems, 30, 31, 32, 72, 160, 163, 618, 793
 CastaLink.com, 985
 Catalyst International, Inc., 265, 290, 298, 615, 657
 Categorical Software Corporation, 702
 Caterpillar, Inc., 67, 141–44
 CDL (consumer direct logistics), 776–80
 Celarix, Inc., 326, 367
 Celarix.com, 131
 Celerity Solutions, Inc., 50, 215, 290, 654, 707, 709
 Cell Fusion/RSI Group, 417
 Center for Advanced Purchasing Studies (CAPS), 97, 101, 250, 346
 Central Transportation Intl., 349
 Centricity, Inc., 346
 Certification: Certified Logistics Management Professional (CLMP), 369, 661; supplier certification, 476, 800–803, 866; warehouse ISO certification, 154–56
 CGR Management Consultants, 354, 1016
 ChainLink, 382
Changing Role of Warehousing, The, 265, 651, 659
 Chesapeake Decision Sciences, 211, 250
 Chicago Consulting, 242–43, 272, 581, 627, 658
 Chrysler, 975
 Ciba Specialty Chemicals, 583
 CiMatrix, 614
 Cisco Systems, 998, 1010
 Clarke Inc., 381–82
 Claunch & Associates, Inc., 799–803
 Clicklogistics.com, 335, 349
 CMRP (constraint-based manufacturing resource planning), 396–400
 Coca-Cola Enterprises Inc., 324, 772
 Coca-Cola Retail Council, 772
 CoCreate Software, Inc., 241
 Colgate-Palmolive, 327–28, 344
 Commerce One, 998
 CommerceHub, 280
 CommerceQuest, 351
 CommercialWare, Inc., 178, 354–55
 ComPair Schedules, 356
 Compaq Computer Corp., 236, 325, 358, 655, 827–29
Comparing Logistics Management in Small and Large Firms: An Exploratory Study, 11–13
 Complete Business Solutions, Inc., 812–13
 Computer Associates International, Inc., 208, 645, 647
 Computer Centerline, 180–81
 Computer Training Services, Inc., 529, 532
 Computerized Packaging Consultants, Inc., 161
 Computerized shipping systems (CSSs), 127–28
 Concentric, 239
 Concours Group, 371
 Conex Global Logistics Services, Inc., 355
 CONNECT, Inc., 215
 Connectware Solutions Inc., 652
 Connexions.net, 177
 Conquest, 292, 1020
 Consignment inventory, 170, 431, 450, 457–58, 464, 478, 500, 559, 762, 959
 Consolidated Freightways (CF), 348, 370
 Constrained Distribution Planning, 207
 Consumer's Supply Chain Excellence Catalogue, 364
 Continually Advance Supplier Excellence (CASE), 906
 Contract manufacturer (CM), 879
 Contracts, 184, 201, 221–22, 798, 825, 932, 938; length of, 54–55, 174, 234, 236, 846; negotiation of, 155, 175–76, 961–68; non-diversion, 420; performance-based, 808–809; termination of, 63–65, 183, 185–86
 Corning Inc., 486, 488, 940
 Corporate Barter Council, Inc., 418
 Corporate Strategic Services, Inc., 173
 Council of Logistics Management (CLM), 17, 54, 113, 183, 318, 339, 387, 611, 635, 636, 645, 650, 739
 CounterPart, 338

- CPFR (collaborative planning, forecasting, and replenishment), 290, 347, 369, 749, 751, 771–74, 784, 788, 794, 871–72, 1007
- Cross-docking, 51, 259, 282, 296, 332, 402–418, 535, 749–51
- CRP (continuous replenishment planning), 426, 517
- CSC Consulting, 250
- CT Logistics, 364
- Cultures, international, 101–103
- Customer Satisfaction Improvement Process (CSIP), 138–40
- Customer service, 25–26, 28, 67, 113, 138–40, 180–82, 279, 280, 305–330, 334, 343, 428, 482–83, 503, 752, 830
- Customized Transportation Inc. (CTI), 325
- CyberSource Corp., 342
- Cycle counting, 69, 283, 388, 430–39, 446–50, 506, 561–68, 573–78,
- Cypress Associates, 266, 641
- Cysive, Inc., 354
- D.N. Frank, Inc., 643
- DaimlerChrysler, 89–91, 973
- Daisytek International, 230
- Dan River Apparel Fabrics, 616
- Darmstadt University of Technology, 423
- Dart Transit Company, 320
- Dechert-Hampe & Co., 28
- Decision support systems, logistics, 115–17, 209, 240, 317, 327, 330, 381, 423–24, 490, 528, 533, 988, 1018
- DecisionTime, 666
- Deere & Co., 7–8, 323, 826
- Defense Supply Center, 113, 677
- DeliveryNet, 53, 328, 537
- Dell, 1010–11
- Deloitte & Touche, 226, 228–29, 786, 803, 805
- Deloitte Consulting, 267, 360, 663, 735–39, 803, 805
- Demand Activated Manufacturing Architecture, 789
- Demand Management, 526
- Demand Partner, 378
- DemandIT, 617
- Demystifying e-Fulfillment*, 619
- Descartes Systems Group Inc., 53, 328, 350, 537, 649
- Desktop Innovations, Inc., 638
- DHL Airways, Inc., 125, 311
- Digital Commerce, Ltd., 366
- Digital Market, Inc., 1002
- Digital Transportation Marketplace, 381
- Dillard's, Inc., 315
- DispenseSource, Inc., 622
- Distinction Software Inc., 207
- Distribution Management in the New Economy: A Blueprint for Success*, 628
- Distribution Planning Model (DPM), 653
- Distribution Research & Education Foundation, 362, 552
- Distribution Research and Education Foundation, 362, 552–57, 646, 658, 664
- Distribution Resources Company, 51, 536
- Distributor's and Wholesaler's Advisor, The*, 656
- Dolphin Marine International, 356
- D-SCOR, 316
- DSRP (distribution system requirements planning), 308, 451
- Dun & Bradstreet, 215, 362, 907–909, 944, 981
- DWL Uni .Consumer Products, 985
- E/Step Software, Inc., 206, 634, 643
- E3 Corporation, 526
- Eastman Chemical Company, 871–72
- Eastman Kodak Company, 729
- Eaton Corp., 319
- E-Business and ERP: Bringing Two Paradigms Together*, 944
- E-Business in the Supply Chain, 364
- e-business, 52, 78, 123, 128–31, 226–29, 290, 334, 387, 536, 873–75, 944, 985
- e-commerce, 45–46, 192, 212–41, 292–95, 339, 342–44, 350, 363, 373, 383, 476, 741, 873, 976–79, 1000–1002
- Economist Intelligence Unit, 758, 996
- ECOutlook.com, 985–86
- EDI (electronic data interchange), 47, 93, 113, 208, 259–60, 265–66, 308, 341, 410, 435, 486, 508, 541, 582, 731, 846, 848, 875, 931, 984
- Edifice Information Management Systems, 709
- Edison Group, Inc., 377
- EDS, 236, 361, 1017
- Efinity, Inc., 626, 1013
- eflatbed.com, 335, 345, 353
- e-fulfillment, 177–79, 227, 292, 350, 1020

- E-fulfillnow, 1020
 e-genco, 345
 Egghead.com, 230–31
 EGL, Inc., 322
 Eigner + Partner AG, 241
 Eisner Consulting, 928
 ELabor.com, Inc., 240
 Elcom Systems, Inc., 216
 Electron Economy, 230–33, 345
Electronic Commerce for Distribution Channels, 362, 553, 555, 557, 658, 664
 Electronic Data Systems Corp. (EDS), 236, 361, 1017
 ELEKOM Procurement, 212
 Eli Lilly and Company, 890–93
 Elite Series software, 50–51, 535, 697
 EliteWorld.Net, 292
 eLogistics Management, LLC (eLM), 343
 e-logistics, 229–32, 293, 343
 e-marketplaces, 347, 1009
 EMC Corporation, 173
 Emerson Electric/Fisher Controls, 809, 811, 816, 821, 953
 Emery Worldwide, 122, 326, 353–54, 379, 382
 Emons Transportation Group, Inc., 123
 Employee management, 169, 179, 181, 270, 276, 338, 452, 508, 554–56, 832, 864, 919
 EnableNet, 351
 Enact Enterprise System, 239
Energizing the Supply Chain, 735
 Energy DeliveryNet.com Mobile Business Optimizer, 537, 649
Enhancing the Warehouse's Role Through Customization, 254
 Enovia Corp., 241
 Enterprise software, 240, 381, 667
 eProphesy.com, 369
 e-purchasing, 223, 741, 973–1023
 Equal Employment Opportunity Commission, 824
 Equistar Chemical, LLP, 676
 Eraterequest.com, 131
 e-retailing (e-tailing), 1021
 Ernst & Young, 316, 345, 638, 653, 747, 989, 1017
 eRoom Technology, Inc., 241
 ERP (enterprise resource planning), 48, 118, 158, 209–210, 248, 326–27, 357, 388, 436, 486, 488, 507–508, 549–52, 576, 606–607, 729, 872, 930, 981,
- ERP and Flow: The Status Quo Meets Its Replacement*, 414, 417
 eSCM (electronic supply chain management), 339, 765–70
 eService Portals, 122
 EShip, 1019–20
 ESPN, Inc., 977
 E-SupplierLink, 944
 eSupply-Chain, 664
 E-Sync Networks, Inc., 355
 e-tailing group, 1021
Ethical Issues in Global Buyer-Supplier Relationships, 97–101
 E-Trans Logistics, 348
 E-Transport Inc., 124
 eTruck.net, 49
 European Logistics and Supply Chain Management (ELSCM), 360, 364
 Eurotrans.com, 130
 Eventra, 986, 1013
 Eventus Logistics, 378, 526
 EXceed Cross-dock Component, 51
 Excess inventory, 68–69, 387, 390, 391, 413, 420–22, 451, 459, 465–66, 479
 Exchange/Outlook, 241
 Exchanges, 129–30, 335, 339, 352, 418, 766, 973–74, 1003–1006, 1009,
- EXE Technologies, Inc., 51, 208–209, 211, 327, 535–36, 651, 663, 704
 Exel Logistics, 43–44, 638, 653
 Exide Electronics, 802
 Export documents, 351, 1019
Exporting and Importing: Negotiating Global Markings, 355
 Express Ship Version 7.2, 49
 ExpressLINK PARS Center, 349
 ExpressWORKS, 1019
 EZ-Claim 2000, 372
- Facing the Forces of Change*, 646
 Failure Mode and Effect Analysis (FMEA), 801
 Fairmont Supply Company, 67
 F.C. Rock & Associates, 127
 FDX Corp., 54, 366, 378
 Federal Express Corp., 56, 126–27, 177, 1010
 Federal Motor Carrier Safety Administration, 31
 Fiera.com, Inc., 343
 Financial Times Retail, 364

- Fingerhut Business Services, Inc., 177, 230
 Flagship Customs Services, Inc., 368
 Fleet Advisor, 319
 Fleet management, 83
 Florida Power & Light, 937
 Flow Manufacturing, 207, 631
 Flow-through inventory, 414–18
 Ford Global Technologies, 148–51
 Ford Motor Company, 148, 327, 998
 ForecastX Wizard, 682
 Forrester Research, Inc., 223–25, 339, 993
 Fort James Corp., 347
 Foundation Technology Services, 376
 Fourth Shift Corp., 623, 693, 720, 724
 Fourth Shift MRP, 439, 448
 Framework Technologies Corp., 239
 Freight All Kinds (FAK), 111
 Freight Plus, 127
 Freightgate.com, 131
 FreightMatrix, 349
 Freight-on-line.com, 131
 FreightWatch Intl. Ltd., 340
 FreightWise, Inc., 49, 335
 FreitRater, 364
 Fulfillment Systems International, 797
 Fulfillment, 89, 177–78, 226, 769, 778, 1020
 FullStream, 292
- G.A. Landis Associates, 633
 GAINSystems, 526, 701
 Galleon Distributed Technologies, Inc., 178
 Gap Gemini Ernst & Young, 345
 Gartner Group, 664
 GATX Corp., 57, 200, 375
 GATX Logistics, Inc., 56, 177, 375
 GE Capital IT Solutions
 GE Information Services, 224
 General Mills, 345, 945
 General Motors, 35, 665, 675, 940, 998
 Gensym Corp., 316
 GeoLogistics Americas, Inc., 84–85, 374
 Georgia Freight Bureau (GFB), 350
 Georgia Institute of Technology, 632
 Georgia Southern University, 1016
 Gerber Products, 780–82
 Gifts in Kind International, 372
 Gillette Company, 792
Global Business, 335
 Global Logistics Exchange, 368
- Global Logistics Technologies, Inc. (G-Log), 341, 345
 Global logistics, 42, 107–108
 Global Network Services, Unisys, 616
Global Retailing in the New Millennium: An Industry Briefing Paper, 105
 Global Sourcing Solutions, 630
 Global sourcing, 101, 104, 847, 869
 Global Sports, 279–80
Global Supply Chain Benchmarking and Best Practices Study—Phase II, 637
 Global Supply Chain Security Assurance Joint Venture, 340
 Glovia International LLC, 206–207, 714
 GoCargo.com, 123–24, 131, 335
 Goldman Sachs, 975
 GoShip, 128
 GOwarehouse.com, 290
 Grainger Industrial Supply, 582
 Grant Thornton LLP, 662
 Graphic Packing Corp., 347
 Graybar Electric Company, 67
 Great Plains Accounting, 528, 530, 986
Growth and Development of Logistics Personnel, The, 168, 635
 GTE Supply, 883–87, 939–40
Guide to Effective Motivation and Retention Programs in the Warehouse, A, 244, 660
- Hackett Benchmarking & Research, 226–28
Hackett Group Best Practices Benchmark Study of Procurement, The, 814
 Hackett Group, 812–16
 Hallmark Cards, Inc. 54–55
 Haluch and Associates, 650
 Hamilton Sundstrand, 317–18
Handbook of Supply Chain Management, 354
 HardCloud, 231
 Harding & Associates, 621
 Harley-Davidson, 322, 836, 909–12
 Harris Consulting, Inc., 935, 952
 Haushahn, 51, 369, 535; *see also* Provia Software
 Hazard Analysis and Critical Control Point (HACCP), 627
 Heilig-Meyers, 331
 Heineken USA, Inc., 314–15, 788
 Hennessy Industries, 396, 482–84, 864–67
 Henredon Furniture Industries, 393–94

- Herbert W. Davis and Company, 102, 118, 250, 332, 334, 337, 340, 609, 617–18, 790
- Hewlett-Packard Company (HP), 97, 230, 326–27, 341, 375, 678, 1007
- High Performance Value Chains*, 747, 750
- HighwayMaster Communications Inc., 320
- Hi-G-Tek, 378–79
- HK Systems, 49, 52, 351, 370, 382, 537, 625, 629, 639–40, 667
- Hoffman–La Roche Inc., 940
- Home delivery, 328, 333–34
- HomePort, 358
- Honda Trading America Corporation, 644, 880–83
- Honeywell Inc., 809, 861–64, 947
- HotStatus Enterprises, Inc., 610
- How Can We Collaborate? Let Me Count the Ways*, 630
- “How to Make Satellite Tracking an Effective Tool,” 41–42
- How to Plan and Manage Warehouse Operations*, 367
- How to Unlock the Power of Your ERP System*, 652
- Hub Group, Inc., 123, 354
- Hudson’s Bay Company, 342
- i2 Technologies, 211, 216, 238, 349, 512, 639, 711, 785, 1003, 1006, 1012
- IBM, 127, 343, 490–93, 527, 529, 665, 774, 1003, 1017
- iCollaboration, 238, 382
- i-Community, 691
- IDAT Consulting, 297–98
- I-Deliver, 1018
- IEC-SupplyNet, 216
- IIR Solutions*, 358, 656
- ILM (internet logistics management), 1015
- iLS.X, 335
- iMAN, 241
- IMark.com, 350–51
- IMPACT Encore, 528, 530
- Impact Products, Inc., 837
- Industrial Data & Information, Inc., 336–37
- Industri-Matematik International Corp., 211, 363
- Industry Directions, Inc., 347, 633
- IndX Software Corporation, 210
- INFIMACS II, 679
- Info*Engine, 210
- Infolink, 612
- Information Strategy: The Executive’s Journal*, 354
- Information Week*, 351
- Ingersoll-Rand, 146–48
- Ingram-Micro, 230, 232, 1010–11
- INNOLOG, 53, 537
- Innovators Will Control the E-Supply Chain, The*, 992
- INSIGHT, Inc., 250
- Instant Notification, 353
- Institute for International Research, 35, 193, 357, 500, 600, 649, 676, 802, 826, 904, 914
- Institutional Investor*, 641
- Integrated Development Enterprise, Inc., 239
- Integrated Indirect Supply (IIS), 224
- Integrated Warehousing Solutions, 624
- Intel Corp., 873–75, 951
- Intelisys Electronic Commerce, LLC, 216
- InterBiz Supply Chain Group, 637, 642
- Interlink Technologies, 613
- INTERLOG, 36, 616, 675
- InterMart, Inc., 1019
- Intermec Technologies Corporation, 303, 713, 1018
- Internal Revenue Service (IRS), 637–38
- International Air Cargo Association, The (TIACA), 373
- International Data Corporation, 229, 377, 1017
- International Federation of Technical Analysts (IFTA), 319
- International Game Technology, 493–97
- International Logistics, 92–109, 187, 190, 199, 311, 374
- International Reciprocal Trade Association, 418
- International Warehouse Logistics Association, 648
- Internet Truckstop, 353
- Internet, 46–47, 78, 94–97, 112, 136, 153, 177–79, 182–83, 210, 281–82, 308, 333, 590, 737, 758, 765, 805, 872–75, 944, 973–76, 1005, 1007–1021
- Interpersonal Business Solutions, Inc., 102
- InterWorld Corp., 178, 350
- Intranets, 106, 148, 216–18, 221, 224, 308, 831, 1009

- Intrenet, Inc., 372
 Intrepa LLC, 679
 Intuitive Manufacturing Systems, 517
Inventory Management: Do You Have the Goods: The AMR Report on Supply Chain Management, 525
Inventory Management: Enhancing Profits by Controlling Distribution, 66, 651
 Inventory quality ratio (IQR), 494–97
Inventory Reduction Report, 387, 430, 504, 543, 565, 595, 613, 644, 656, 794
 Inventory turnover, 13, 16, 407, 410, 435, 479, 585, 599, 792
 Inventory-to-sales ratio, 31
 InvoicePLUS, 371
 IPA (inventory profile analysis), 411–14
 ipTeam, 241
 IQR (inventory quality ratio), 390, 494–97
 IQR International, Inc., 390, 494, 723
 iQVC, 280
 IristaVision, 610
 Ironside Technologies Inc., 373
 ISO 9000, 9001 ... etc. standards, 102, 154–56, 367, 848, 944
 ISuite, 367
- J.B. Hunt Transport Services, Inc., 374
 J.C. Penney Company, Inc., 177
 J.D. Edwards & Co., 417, 510, 612, 986, 1003
 JIT (just-in-time inventory), 54, 84, 133, 142, 225, 247, 310, 327, 401, 432, 478, 508, 542, 575, 605, 749, 755, 836, 849, 882, 942, 958
 Jo-Ann Stores, Inc., 327
 JobsInLogistics.com, 353, 626
 John Carroll University, 10, 13, 368, 660, 796, 837
 John Constanza Institute of Technology (JCIT), 417
 John Deere CWP, 101
 John Galt Solutions, Inc., 682
 Jones Act, 162, 795
Journal of Business Logistics, 423, 426–28, 798
 JSA (joint service agreement), 481, 932–34
- K.B. Ackerman Company, 286, 561, 617, 630, 634, 641, 646
 kaizen, 483–84, 499, 507, 893–97, 904–905
 kanban, 207, 218–19, 396, 400–404, 414–15, 432, 439, 449, 458–59, 469, 471–74, 484, 505, 559, 579, 866
Keeping Score: Measuring the Business Value of Logistics in the Supply Chain, 17, 18, 20
 Kellogg's Company, 875–77
 KETRON Management Science, 250
 Kewill Systems PLC, 323, 612–13, 619, 700
 Keystone Internet Services, Inc., 177
 Kinetic Computer Corporation, 49, 53, 537, 705
 KLM Cargo, 379
 KPMG LLP, 75–77, , 637, 1017
- Land O'Lakes, 347
 Landstar System Inc., 354
 Lanier Worldwide, Inc., 316–17
 Lawson Software, 510, 678
 LCR-M Corporation, 67
Lean Manufacturing Advisor, 00 609
Lean Production Report, 472
 Learning Express, 329
 Lehigh University, 650, 800
Leveraging the e-Business Marketplace, 999
 Lewis-Goetz and Company, Inc., 809, 826, 952, 959
 Lifetime Products, Inc., 897–901
 LIS (logistics information systems), 352, 291, 1015
 LiveExchange 3.5, 987
 LMS 4.1, 351
 LogicStock, 884–87
 Logility, 290–91, 350, 367, 524, 649, 691, 872, 987
 Logistics Foundation of America (LFA), 350
 Logistics Management Center, 288, 369, 661
 Logistics Management Institute, 659
Logistics Outsourcing: A Management Guide, 183, 611
 Logistics PRO, 679
 Logistics Suite, 291
 Logistics Trends in European Consumer Goods, 364
 Logistics.com, Inc., 327–28, 335, 344, 381
 Logmatrix, Inc., 644
 Lord Corp., 1008
 Lot Management System (LMS), 627
 Lotus, 241, 1008
 LPA Software, 527
 Lucas Group, 337–38

- Lucent Technologies, 84–86, 315–16, 773
Lyte Group, 47
- M&M/Mars, 86–89
Macklanburg-Duncan, 472, 816
Macola Software, 488–90, 513, 528, 530
Maddocks Systems Inc., 47
Made2Manage Systems, Inc., 380
Maersk, 94
MainBoss Mobile Inventory Application, 638
Majure Data Inc., 47, 634, 660, 686
Making the Move to Cross Docking: A Practical Guide to Planning, Designing, and Implementing a Cross Dock Operation, 332
Management Solutions International, 576
Managing Logistics, 6–7, 21, 110, 134, 156, 247, 305–30, 552
Manhattan Associates, Inc., 211, 287, 320, 354–55, 368, 612, 616–17, 693, 1020
Manufacturing Consulting Partners International, Inc., 395
Manugistics, Inc., 49, 211, 320, 524, 785, 1003
MAPICS, Inc., 533, 618, 621
MARC Systems, 317–18
MARC-CS, 317–18, 690, 722
MarketStream, 215
Marshall Industries, 1011
MAS90, 528, 530
Massachusetts Institute of Technology (MIT), 387, 637, 651
MasterCard International, 212
Materials Handling and Management Society, 644
MatrixOne, Inc., 240
MAX software, 619, 700
Maximizing Your Resources through Warehouse Slotting, 653
Maytag, 675, 947
McDonnell Aircraft and Missiles Systems, 800
McGladrey & Pullen, LLP, 585, 649, 740
McHugh Software International, 211, 291, 375
MCS Two Thousand, 52, 536
Mercer Management Consulting, 364–65, 796, 943, 945
Merck & Company, 223, 831–32
Merge-in-transit, 84–86, 294–95, 750–51
Meritus Consulting, 758, 996–98
Metaphase, 241
MetLife, 363
MFG Pro, 158, 308
MGI Management Institute, 643
Miami University, 406, 615
Michelin North America, 676
Michigan State University, 333, 336, 641, 800
MicroAnalytics, 50, 250, 610, 615
Microsoft, 241, 337, 788
Milgo Solutions, Inc., 392, 500–503
Millard Refrigerated Services, 324
Mincom, 343
MK Group, 208, 639
Moai Technologies, 987
Mobil Corporation, 988–92
Modal usage, 10–11
Modern Business Solutions, Inc., 572, 631
Modus Media International, Inc., 177
Motorola, Inc., 17, 744–46, 927
Motts, 780–82
Moving the Supply Chain into the Digital Age: Integrating Demand and Supply, 758, 759, 996
Mozart, 355
MRP (manufacturing resource planning), 136, 209, 357, 388, 438–39, 484, 507, 541, 582, 599, 729, 841, 863, 930, 983
MSC International, Inc., 973
MSS for OBJECTS, 720, 724
Multiship, 366
my.roadway.com, 125
myABF, 125
MyAgile.com, 381
mySAP.com, 28, 376
- Nabisco, 61–62, 788
NAPM Info-Edge, 644
National Aeronautical and Space Administration (NASA), 614
National Association for the Exchange of Industrial Resources (NAEIR), 371, 420, 422, 613, 620, 655
National Association of Manufacturers (NAM), 585, 739–40, 741–42, 742, 743
National Association of Purchasing Management (NAPM), 102, 173, 212, 475, 677, 851, 858, 934, 744, 973
National Association of Wholesaler-Distributors (NAW), 362, 363, 552, 628
National Energy Team, 213

- National Industrial Transportation League, 161
- National Initiative of Supply Chain Integration (NISCI), 910–11
- National Traffic Service, 49
- National Transportation Exchange, Inc. (NTE), 130, 352, 376
- National Vendor Compliance Association, 340
- National Wooden Pallet and Container Association (NWPCA), 359, 363, 364, 639, 648, 650
- Navision Software, 529, 530
- NCR, 675
- Nemosphere, Inc., 239
- NeoModal.com, 346
- Neopost Logistics Systems, 335
- NeoSolutions, 346
- Nestle SA, 28
- Network Appliance, Inc., 1014
- NetWORKS, 320, 325–26, 331
- New Meadows Venture Partners, 341
- Newgistics Inc., 342
- NexPrise, Inc., 241
- NEXstep, 329, 945
- NextLink Corp., 1018
- NFI Interactive Logistics, 177
- Nike, 782, 785–86
- Nistevo.com, 324, 335, 945
- No Boundaries: Moving Beyond Supply Chain Management*, 346
- Nortel, 400
- North American Market for Warehouse Management Systems, Software, and Systems Integration Services, The*, 625
- North American Survey of Trends in Supply Chain Management, The*, 786
- North Highland Company, 540, 580, 656, 759, 928
- Northeastern University, 231, 232, 938, 939
- Notes/Domino, 241
- Novell, Inc., 241, 528–29
- nPassage, 335, 348
- Numetrix Ltd., 211, 698
- NxTrend Logistics Division, 272–73
- ObTech, LLC, 569
- Ocean Shipping Reform Act, 795
- Ohio State University Survey of Career Patterns in Logistics, The*, 187–92
- Ohio State University, 113, 387, 608
- Oliver Wight, 400, 472, 616, 618–19, 627
- OM2, 334
- OMI International, 297, 348
- OneWorld Xe, 612, 986
- Online exchanges/marketplaces, 49, 129, 349, 766, 983, 1003–1004
- onPlan, 209
- OnTrack, 715
- OpenOcean, 347
- OpenOrders, Inc., 178
- OpenShip.com, 131, 335
- Operating Resource Management System (ORMS), 214, 223
- OptiBid, 327–28, 381
- Optimum Logistics Ltd., 348
- OptiSite, 610
- Optum, Inc., 52, 178, 211, 281, 330, 344, 361, 536, 706
- OPW Fueling Components, 471, 474
- Oracle Corp., 48, 51, 211, 236, 239, 271, 378, 417, 532, 700, 998
- ORBCOMM Global, LP, 364
- Order Accuracy: How High Is The Hurdle?*, 275
- OrderFusion, 178
- OrderTrust, Inc., 342
- Orient Overseas Container Line (OOCL), 94, 124
- Outsourcing Institute, 183
- Outsourcing, 42, 118, 121, 132–34, 157, 172–77, 183–84, 186, 199, 200–201, 227, 230–33, 285–86, 311–12, 327, 332, 334, 460, 745, 764, 796–99, 814, 997–98
- OVE (order visibility exchange), 1013
- Paccar Automotive, 305
- Pacer International, Inc., 355
- Pallets Move the World . . . With Your Help*, 363, 650
- Panduit Corporation, 67
- Pan-European Logistics, 364
- Pan-Pro, 556
- Paragon Management Systems, Inc., 305, 352, 361, 382, 520–23, 532, 716
- parcel delivery, 45, 55, 59, 1018
- Parcel Plus, 56
- Pareto analysis, 501, 859
- Pareto's Law, 434, 468, 562, 581, 859
- PARTner Program, 621
- Passage Inc., 315

- PBB Global Logistics, 366–67
 PC/Piranha, 53, 537
 PC/Rover, 53, 537, 705
 P-cards, 212, 814, 849–50, 907, 980, 989
 PEAK Technologies, 291
 Peapod, 777
 PECO Energy Company, 213
 PECOS Procurement Manager, 216
 Pennsylvania State University, 398
 PeopleSoft Inc., 211, 335, 417, 508, 684, 703, 805, 987, 995
 Perfect.com, 981
 Performance Measurement Group, LLC (PMG), 78–80, 365, 629, 659
 performance measures, 194, 597, 810, 916
 Perot Systems Corporation, 978, 999
 PFSweb, Inc., 177, 230
 Philips Semiconductors, 520–23
 Pillsbury Company, 347
 Pinkerton Consulting and Investigations Services, 39
 Pinkerton Global Logistics, 42
 Pioneer-Standard Electronics, Inc., 877–80
 Pittiglio Rabin Todd & McGrath, 80, 365, 478, 556, 602, 648, 659, 761, 890, 932
 Pittsburgh Logistics Systems, Inc., 345, 353
 Pivotpoint, Inc., 703
 PkMS, 355, 368, 616–17, 1020
 PlanView, Inc., 240
 Platinum Software, 529, 531
 Polaroid, 101–109
 Portals, 122, 124, 241, 290, 341, 343, 347, 381, 944, 975, 981, 985, 986, 987, 1004–1007
 Porter-Cable Corporation, 901–903
 Portland State University, 836
 Preactor, 625
 Pre-Arrival Review System (PARS), 349
 Premiere Inc., 318
 Prescient Systems, 527, 629, 657, 678, 683
 Price, 71, 236, 350, 558, 819, 863, 978; changes in, 927, 953–56; negotiation of, 126, 808, 847, 965–66, 970–71; quantity breaks in, 477; shipping rates and, 128, 130; variance of, 740, 857, 931
 PricewaterhouseCoopers, LLP, 77, 180, 266–69, 382, 646, 944, 1017
 Price Waterhouse Management Consulting LLP, 792
 Primavera Systems Inc., 239
 PRMS 9.0, 645, 710
 Pro-Action Group, 999
 PROACTION Management Consultants, 390, 576
 Process1.Net Ltd., 236
 Processors Unlimited, 198–99, 377
 Procter & Gamble, 106, 773, 777–79, 835
 ProcureNet Inc., 981
 ProcureWorks, 216–17
 Productivity Press, 645
Profiting from Supply Chain Strategies, 631
 Progress Group, 358, 393, 656
 ProLogis, 30, 160, 793
 ProModel Corporation, 687, 701
 Prophecy Transportation Software, Inc., 369
 Provia Software, 317, 369, 613, 695
 PulseMark, 585, 588, 739, 741
PulseMark, Benchmarks for U.S. Manufacturing Productivity, 585, 739–40
Purchaser's Legal Adviser, 822–25, 965
 Purchasing & Planning Solutions, 652
 Purchasing and Materials Consulting, Inc., 173
 PurchasingCenter.com, 944, 976
 Purchasing Management Extra (PMX), 214
 PurchasingNet-SQL, 214, 665, 982–83
 PwC, 180
 Pyramid forecasting, 411
 QAD, Inc., 93, 211, 619, 627
 QRS Corp., 351–52
 Quaker Oats Company, 760, 780–81, 931
 QUALCOMM Inc., 364
 Quality Management Solutions, Inc., 388, 579
 Quality Systems & Software, Inc., 240
 Quick Response Engine, 642
Quick Response Manufacturing, 645
 Quick Win, 652
 Quickship, 366
 QuoteShip.com, 130, 344
 R. Wilson, Inc., 32
 R.A. Stahl Company, 561, 661
 R.D. Garwood, Inc., 391, 655, 757, 928
 R.R. Donnelley Logistics Services, 342
 Racal Electronics PLC, 500
 Radcliffe Systems Inc., 8, 48, 291–92, 618, 621, 622, 632, 689

- Radio frequency (RF) technology, 47, 166,
203–205, 208, 255, 296, 303–304, 416,
435–36, 454, 504–505, 508, 511, 533, 568
- Raytheon Systems Company, 517
- Real World Technology, 715
- Realworld Corp., 529, 531
- Red Leaf Soft Inc., 653
- Redwood Systems, 327
- Refrigeration Suppliers Distributors (RSD),
272–73
- Reinventing EDI: Electronic Data Interchange Ser-
vices Market Review and Forecast*, 377
- Relevant Business Systems, 679
- Renaissance Software, Inc., 47–48
- Repetitive manufacturing, 395, 401–402, 485,
589
- Report on Supply Chain Management, The*, 334,
357, 525–27, 649, 654, 787
- Request for quote (RFQ), 104
- Rescue ERP, 627
- Resident supplier, 751, 861–64
- Resource, Inc., 127
- Retail Council of Canada (RCC), 341, 342
- ReturnCentral.com, 345–46
- Reverse logistics, 144–46, 151, 197–99, 285,
292, 296, 317
- RF Navigator, 47, 634, 660, 686
- RHYTHM Global Procurement Manager,
216
- Right Service at the Right Price: Your Competitive
Edge, The*, 635
- Rightfreight.com, 352
- RightWorks Corporation, 216–17, 987–88
- Risk and Insurance Management Society, Inc.
(RIMS), 341
- RiskWatch Inc., 340
- Rite Aid Corp., 197–99
- Roadrunner Trucking, Inc., 372
- Roadway Express, Inc., 95, 125, 350, 370,
1019
- Roadway Package Service (RPS), 54–56, 126,
366, 371
- Robert Abair Associates, Inc., 608
- Roberts Express, 56
- Roberts Sinto Corporation, 916–23
- Robinson–Patman Act, 64, 66
- Robocom Systems International Inc., 642,
662, 682, 685
- ROC, 48, 291–92, 618, 622, 632, 689
- RockySoft Corp., 944
- Rohm and Haas Co., 325–26
- Roseburg Forest Products Company, 330
- RoutePro Replenisher, 365
- Roxane Laboratories, 887–90
- RPS, 54–56, 126–27, 366, 371
- RSM McGladrey, Inc., 585, 740
- RT Systems, 303–304
- Ryder System, Inc., 349
- Safety stock, 392, 429, 431–32, 434, 436, 461,
475–78, 482, 486, 500, 502–503
- Sage Software Inc., 528
- SAILS, 250, 308
- SAP, 209–11, 239, 325, 372–76, 378, 417,
507, 510, 629, 711, 785, 805, 872, 991
- Satellite tracking, 39, 41, 320, 364
- SBT Corp., 529, 531
- SCEM (supply chain event management),
1013
- Schneider Logistics, 322, 345, 350–51
- Schneider National, Inc., 200, 320, 345
- Schonfeld & Associates, Inc., 590
- SCM (supply chain management), 47, 346,
537, 729, 877, 1010
- SCM/Enterprise, 49, 52, 351, 370, 537
- SCM/Express, 52, 537
- SCOR (supply-chain operations reference
model), 307, 365, 479, 813, 887–90
- SCORE (shipping consolidated orders for re-
plenishment efficiencies), 60–62, 478
- Scorecards / report cards, 194, 195, 209, 586,
782, 820–21, 826–29, 855, 859, 886, 916,
946, 947
- SCS (supply chain synthesis), 751
- Sea-Land, 94
- Sears Canada Inc., 342
- Sears Logistics Services Inc., 116
- SED (shipper's export declarations), 96
- Sedlak Management Consultants, Inc., 205,
294, 620
- SeeChain software, 46, 375, 662
- Seiban Workbench, 206–207
- Semiconductor Equipment Center, 415
- Sendorder.com, 1013
- Sequent Computer Systems, Inc., 193–95,
912–16
- Serengeti Eyewear Inc., 486–90
- Service Merchandise Company, Inc., 330
- ServiceCraft Corp., 60–61
- Shapiro, J.F., Associates, Inc., 250

- ShareMax.com, 944, 982
Sharp Electronics Corp., 326
Shell Chemical, 1008–1009
ShipHere.com, 124–25
ShipLogix, 1019
Shipment Planner, 383
Shipper's export declarations (SEDs), 96
Shipping Solutions 2000, 1019
ShipXact.com, 338
ShopKo Stores, 315
Sikorsky Aircraft, 893–97
SimChain, 615
Site selection, 56–57, 59, 204
Slingshot ecity, 50, 290
Slotting, 286–88, 295, 337, 598
Smart Inventory System, 622
Smart Software, Inc., 700
SmartTran, 54
Software: inventory management, 16, 409, 410, 435, 504, 509, 513, 525, 534; logistics, 94, 149, 346, 362, 379; purchasing, XXXX; supply chain management, 206, 210, 215, 330, 379, 492, 526, 881, 996, 1017; *see also* eSCM and names of software programs and manufacturers
Software Solutions, Inc., 661
SOLA Optical USA, 411–14
Solar-Mates, 486–87
Solelectron, 827–29
Solomon Software, 529, 531
Somerset Food Service, 319
SONAT, 959
Sonica Corp., 46
SonicAir, 687
Sony, 358
Sorensen Group, 74
SourceTrack, 983
Sourcing Net, 944
Southware, 529, 531
SPC (statistical process control), 422, 800, 920
Speech-based technology, 296–98, 344
Sprint PCS, 144–46, 196–97, 782
SPSS Inc., 666
St. Onge Company, 794
Staples Inc., 676
State of Contract Logistics Report, 647
State of Logistics Report, 30, 32, 34–35, 160, 618, 793, 795
Steelcase Inc., 903–907
Sterling Commerce, 635
Stradivari, 611
Structural Dynamics Research Corp., 241
Style365.com, 231
SubmitOrder.com, Inc., 177
Succeed Warehouse Optimizer, 208
Sugar Foods Corp., 320
Sun Microsystems, 870–71, 1007–1008, 1011
Supplier brief, 968, 970, 972
Supplier MarketPlace, 215
Supplier scheduling, 220, 394, 549, 550–51
SupplierMarket.com, 944, 983
Supplier Selection and Management Report, 101, 217, 455, 558, 799, 840, 862, 924, 976
Supply Chain Authority, 343
Supply Chain Challenges of Electronic Shopping, 364
Supply Chain Council, 609, 624, 647–48, 654, 666, 678, 813, 887
Supply Chain Designer, 116
Supply Chain in a Box, 987
Supply Chain Integrator, 698
Supply Chain Logistics in Central and Eastern Europe, 364
Supply Chain Management Benchmarking Series, 659
Supply Chain Management in China, 364
Supply Chain Management Review, 360
Supply Chain Operations Reference (SCOR) software, 609, 624, 647
Supply Chain Planner, 215, 707
Supply Chain Solutions, 527
Supply Chain Value Assessment, 358, 654
Supply-Chain Council, 813, 887
SupplyChannel, 213
SupplyLinks, Inc., 341
SupplyPro, 723
SupplyWorks, Inc., 338, 983–84, 983, 988
SureLock, Inc., 257–58
Symix Systems, Inc., 380
Synkra Software, Inc., 362, 652, 660
Synkra Systems, Inc., 347, 629, 634
SyncUp Hosting Service, 633
SynQuest, 149–50, 211, 327, 352, 361
Syspro, Inc., 528
SyteDistribution, 380
SyVox Corp., 298, 344
T/K Methods Inc., 730, 734
Tafp, Inc., 124
TakeStock, 661

- TanData Corp., 382
 Taxes: excise, 74–77, 366; transportation, 74–77
 TBB Global Logistics, Inc., 381
 TCLogic, 666, 885
 TCP/Reliable Inc., 379
 Technology Builders, Inc., 240
 Technology Group Intl. Ltd., 381
 TECSYS Inc., 50–51, 292, 535, 697
 Tekelec, Inc., 546–49
 Tektronix, Inc., 357, 677
Ten Best Warehouse Networks, 242
 Tennessee Tech, 659
10 Trends Warehouses Must Follow for 21st Century Success, 259
 Termination, distributors, 63–66, 183–87
 Terry Lunn Enterprises, 653
 3M, 138–38, 423, 739
 3PF.COM, Inc, 177
 3PL (third-party logistics), 60–62, 71–72, 145–46, 161, 177, 194, 200, 210, 231–32, 260, 290, 321, 349, 367, 368, 381, 438, 545, 779, 796, 798–99
Third Party Logistics Services: Views from the Customers, 638
 Third-party logistics, see 3PL
 3RDWAVE4.com, 624
 3RDWAVE software, 356, 635, 644, 881–83
 Thomson Corporation, 220–23
 Thomson Multimedia, 322
 Thomson Optimized Purchasing Services (TOPS), 220–23
 Thru-Put Technologies, 692, 712
 TigrSoft, 533
 TimeKeeper, 373
 TNT Logistics North America, 177
 Tompkins Associates, 166, 181, 254, 259, 343, 346, 376, 404, 615, 619, 621, 626, 631, 636, 643, 645, 654, 657, 667, 757, 1021
 TotalChain, 355
 TQMS International, 154–56
 TrackWare, 320
 TrackXact, 338
 TRADE'x Electronic Commerce Systems, Inc., 217
 TradeOut.com, 631
 TradePath Technologies, LLC, 236
 TradeStream, 281
 Tradewell Inc., 418
 TradeXchange, 998–99
 Tradiant, 129, 347
 Tradiant.com, 130, 335
 TradingDynInc., 355
 TrafficPro, 48
 Trans/Air Manufacturing, 622
 TranScape, 292, 1020
 TranSettlements Network Services, 1020
Transform Your Supply Chain: Releasing Value in Business, 832–35
 Transit Group, Inc., 347
 TransLink, 348
 TranSolutions, 372
 Transplace.com, 129, 130, 335
Transportation Management, 646
 Transportation Solutions Inc., 46–46
 Transportation.com, 130, 336
 Transtech Consulting, Inc., 416, 638
 TRICEPS, 297
 TriStar 2000, 330
 TruckMate, 47
 TruckStops, 49
 TRW, 690, 722
 TTI, Inc., 540
 Turnover: inventory, 13–16, 68, 406, 410, 411, 435, 461, 479, 545, 585, 588, 595, 599, 603, 792; personnel, 245, 246, 953
 TVCOM International, 647
21st Century Logistics: Making Supply Chain Integration a Reality, 640–41
 Tyco, 326, 395
 U.S. Customs Service, 96, 363, 369
 U.S. Department of Transportation (DOT), 31, 319, 967
 U.S. Postal Service (USPS), 127, 367
 Underhill & Associates, 170–71, 959
 Unigraphics Solutions, Inc., 241
 Unisys Corp., 152, 616
 United Parcel Service (UPS), 54, 55, 56, 97, 127, 177, 194, 368, 915
 United Shipping & Technology (US&T), 126
 University of Maryland, 98, 798–99
 University of North Carolina (Chapel Hill), 804
 University of North Florida, 182, 187, 608
 University of North Texas, 37–38
 University of Oklahoma, 426, 612
 University of Pennsylvania, 640
 University of Technology (Darmstadt), 423
 University of Tennessee, 17, 335, 638, 653, 872

- University of Wisconsin–Madison, 735–36, 738
- UPS Logistics Group (UPS LG), 133–34
- UPS of America, Inc., 378
- UPS Worldwide Logistics (UPS WWL), 90–91, 145–46
- USCO Logistics, 69–71
- USF eLogistics, 639
- USF Logistics, 161, 177
- USF Processors, 317, 342, 377
- USFreightways Corp., 198, 230, 317, 371, 377, 639
- Value America, 317
- Value Chain Initiative, 788
- Value chain, 491, 733, 747–49, 788, 910–11, 944
- Value-Added Purchasing: Partnering for World-Class Performance*, 173
- Vantage Tracking Solutions, 320, 364
- Vendor Interface, 123, 354
- Vendor managed inventory, see VMI
- VendorSite 3.0, 986
- Venture Development Corporation, 625
- Vermeer Manufacturing Co., 497–500, 857–61, 947
- Vertex Interactive, Inc., 611
- VIAWARE WMS, 695
- Views, 239
- Viking Freight Inc., 349
- Vik–Quick Pass, 349
- Virtual Logistics: Exchange Services and Fulfillment in Electronic Supply Chain Management*, 337, 339
- Virtual Source Network, 944
- virtual supply chain integration (V-SCI), 342
- Virtual Supply Chain Integration: The Future of Participation in Online Supply Chains*, 343
- Virtual Supply Logistics Pty Ltd. (VSL), 328
- Virtual transportation control center, 69–71
- Virtual warehousing, 77, 280, 290
- Visa U.S.A., 212, 980
- Vision in Manufacturing*, 803–806
- Visual Flow Manufacturing, 207
- VIT, 375
- Vite, 240
- Vivaldi, 363
- VMI (vendor managed inventory), 119, 137, 159, 207, 394, 426, 435, 478, 504, 539–57, 589, 749, 759, 983
- Vocollect, Inc., 292–93, 296
- Voice-based technology, 46, 293, 296–99
- VoiceLogistics, 293, 297–99
- Voluntary Interindustry Commerce Standards Association (VICS), 105, 290, 314, 771, 772
- Voxware, Inc., 46, 293, 296, 297, 725
- Wal-Mart, 54, 106, 196, 315, 342, 773–74
- Waltrip and Associates, Inc., 217
- Warehouse Boss software, 208, 637, 647
- Warehouse Equipment, Inc. (WEI), 344
- Warehouse Inventory Turnover: Trends, Change Drivers, Measures, Using the Data*, 13, 16, 406, 615
- Warehouse Management Handbook, The*, 182, 376
- Warehouse Optimization, 627
- Warehouse Simulator, 289
- Warehouse Systems and the Supply Chain: A Survey of Success Factors*, 205, 261, 264
- Warehousing Education and Research Council (WEREC), 13, 70, 205, 244, 332, 406
- Warehousing Isn't Just about Storage Anymore*, 293, 634
- Warehousing Profitably: A Manager's Guide*, 282–86, 630
- Warehousing Salaries and Wages*, 338
- Warner–Lambert, 782–85
- Warren Featherbone Company, 315
- Washington Manufacturing Services, 658
- WEB Buyer, 217
- webPLAN Corp., 209–10, 614, 617, 664, 688, 1003, 1006
- Welch's Inc., 17, 396–97
- Wellman, Inc., 947
- WERCsheet*, 287–88, 294, 297–98, 405, 408, 638
- Werthan Packaging, 394–95, 539–40, 542, 549–52
- Whirlpool Corp., 4, 5, 9, 10, 35, 539, 600–601, 657
- Whittlesey and Hadley, 628
- Whittman–Hart, 760
- Who's Who in e-Commerce Fulfillment? Armstrong's Guide to e-Fulfillment Services Providers*, 628
- Who's Who in Logistics? Armstrong's Guide to Third-Party Logistics Services Providers*, 260, 368, 623, 796

- Who's Who In Logistics Software? Armstrong's Guide to Supply Chain Management Systems*, 637
- Who's Who In Logistics Web Sites? Armstrong's Guide to Internet Transportation and Supply Chain Management Solutions*, 339–40, 611
- WHSe-LINK, 613
- Why How Consulting Company, 558
- WiData Corporation, 533
- Wieland Electric, 202
- Windchill, 241
- Windsor Foundation for Business Development, 832
- Wisconsin Tissue, 948, 950
- WMS (warehouse management system), 48, 153, 202, 251, 317, 337, 409, 438, 511, 751
- WMS 5.0, 654
- WMS Implementation: Not for the Impatient or Faint of Heart*, 643
- WorldChain, Inc., 344, 1014
- Worldtariff, 366
- Worldwide Business Research, 36, 299, 616
- www.bestroutes.com, 50, 615
- XA, 533, 618
- XATA Corp, 319–20
- Xelus, Inc., 680, 1006
- Xerox, 8–10, 940
- XIS, Inc., 239
- XML (extensible markup language), 293, 375, 982
- XPDT, 51, 536
- Yantra Corp., 178, 532
- Yellow Freight, 122, 352, 359–60
- Zona Research, 233–35, 333, 337, 339, 341, 765–71