



Aberdeen *Group*

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The Technology Strategies for Inventory Management Benchmark Report

How to Convert Inventory From Cost to a Competitive Advantage

September 2006



Executive Summary

Inventory has been and continues to be the lifeblood of supply chains. Properly managed, it drives revenue and efficiency for companies. But as the nature of supply chains changes, so must the policies used to manage inventory. Traditional inventory management practices are being made obsolete by increasing global supply chains and contract manufacturing, more dynamic product life cycles, and multi-channel distribution.

Management Actively Re-evaluating Inventory Management Practices

Inventory management processes and technologies are being actively re-evaluated by companies today. Nearly two-thirds of respondents to Aberdeen's inventory management study say they have made or been asked to provide recommendations in the past six months to management on how to improve their inventory management technology. Fully, 83% of companies say they have made or been asked to make process recommendations within the past six months.

Inventory Management Goals Should be Re-evaluated: From Cost to Competitive Weapon

The majority of companies are looking at inventory as a cost-related item (63%) but 27% of companies are thinking of inventory as a way of gaining market share through superior service and product availability. The truly visionary companies are leveraging their inventory as a competitive weapon and have moved to network-based inventory management versus doing it a facility or company level. They use inventory to optimally position supply when and where it is most needed and most profitable. By performing segmentation of their customer channels and products, these companies are able to attain significantly higher return on assets than their competitors.

Characteristics of Best in Class Companies

Best in Class companies are defined as companies that have customer service levels above 96% and that have simultaneously reduced inventory carrying costs (which corresponds to the top 10% of respondents). The Best in Class are twice as likely as their peers to:

- Use **multi-echelon inventory optimization**
- Have deployed a **supply chain visibility** system
- Use a forecasting system that **supports customer-level forecasting**

Overall, Best in Class companies are more likely to supplement process changes with improved technology than are Industry Average and Laggard companies.

Recommendations for Action

1. Use network design technology for more frequent strategic decision making



Companies should increase the frequency of their network strategy assessment to at least once per year, and use this process for assessing business growth scenarios, supplier network design, etc.

2. Evaluate a commercial multi-echelon optimization solution

The new generation of commercially available multi-echelon optimization solutions at last enables companies to properly account for variation in the supply chain. Companies with multi-echelon manufacturing or finished goods distribution networks should not delay in investigating these solutions. Try a pilot project first before embarking on large scale implementations.

3. Leverage investments in existing demand management tools and evolve towards customer-level forecasting

Companies can gain significant value through customer segmentation for customer-specific service levels and developing customer-specific forecasts.

4. Look to do usage-based supplier inventory collaboration

Increase supplier inventory collaboration and move away from arms-length purchase order based transactions.

5. Actively manage in-transit inventory through supply chain visibility

Enterprises with long transit times should investigate the different ways to use in-transit inventory as a virtual inventory bin to lower safety stock levels, reduce total delivered costs, and maximize revenue opportunities.

6. Look for managed services approaches to bridge the skill set gaps for implementing inventory management technologies and processes

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Chapter One: Issue at Hand

Key Takeaways

- Inventory management and demand management/S&OP are the top supply chain application areas of interest for companies.
- Two-thirds of respondents say they have made or been asked to provide recommendations in the past six months to management on how to improve their inventory management technology.
- 27% of companies view inventory as a way of gaining market share through superior service and product availability.

Inventory has been and continues to be the lifeblood of supply chains. Properly managed, it drives revenue and efficiency for companies. But as the nature of supply chains changes, so must the policies used to manage inventory. Traditional inventory management practices are being made obsolete by increasing global supply chains and contract manufacturing, more dynamic product life cycles, and multi-channel distribution.

These trends are driving the need for companies to adopt new inventory management technology that better accounts for supply chain complexity and can reduce inventories by 20-30%, while simultaneously increasing customer service levels. Recent Aberdeen research indicates that there is growing interest in inventory management:

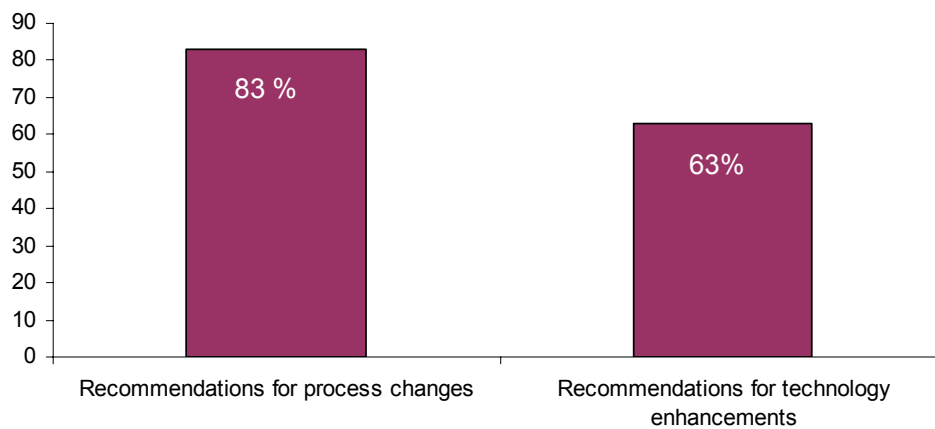
- Companies were asked in an Aberdeen research in April 2006 about their top application investment areas
 - Inventory Management and Demand Management/S&OP were at the top
 - Top performers and innovators were more likely to be prioritizing inventory management over demand management
- Aberdeen's July 2006 report on S&OP technologies revealed that only 11% of companies feel that their inventory management technologies are adequate to support their S&OP process whereas 57% of the companies would like to incorporate inventory management into their S&OP process.

In response to this interest, Aberdeen conducted a research survey on inventory management technology adoption and ROI in August and September 2006 across 160 companies. (See Appendix A for the demographics of the participants.)

This study confirmed that inventory management processes and technologies are being actively re-evaluated by companies today (Figure 1). Nearly two-thirds of respondents say they have made or been asked to provide recommendations in the past six months to management on how to improve their inventory management technology. Fully, 83% of companies say they have made or been asked to make process recommendations within the past six months.



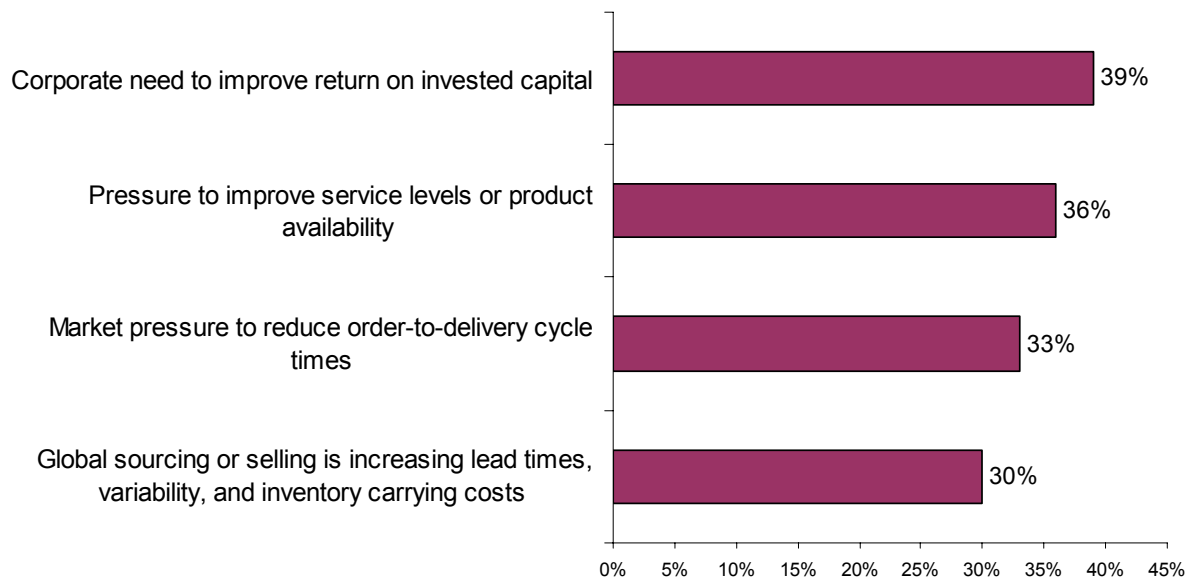
Figure 1. Companies Are Actively Re-evaluating Inventory Management



Source: AberdeenGroup, September 2006

As Figure 2 shows, the top reasons that companies are rethinking their inventory practices are to stem customer dissatisfaction and improve return on invested capital. An emerging pressure for improving inventory processes is the complexities caused by increased global sourcing and selling. Distribution-intensive companies are showing higher pressure with respect to customer service levels and order to delivery times whereas manufacturing-intensive companies are feeling more pressured to improve return on invested capital and cope with global sourcing issues.

Figure 2. Top Pressures for Improving Inventory Processes



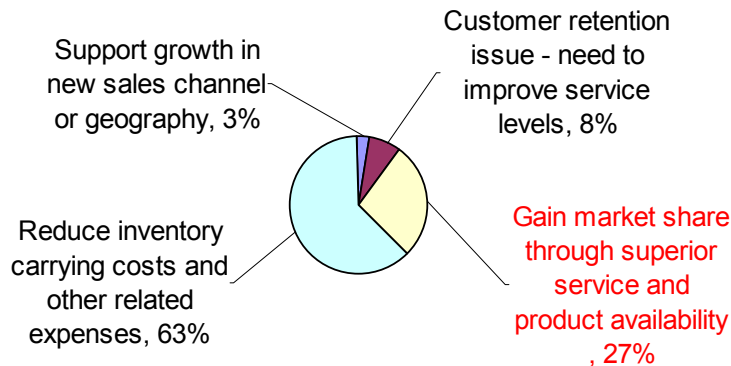
Source: AberdeenGroup, September 2006



Inventory Management Goals Should be Re-evaluated: From Cost to Competitive Weapon

The majority of companies are looking at inventory as a cost-related item but 27% of companies are thinking of inventory as a way of gaining market share through superior service and product availability (Figure 3).

Figure 3. Primary Goal for Improving Inventory Management



Source: AberdeenGroup, September 2006

During the past few years, companies have improved their supply chain performance through tactical supply chain planning and execution solutions and have attained improved operational capabilities. But the truly visionary companies are leveraging their inventory as a competitive weapon and using it to hedge the demand. They use inventory to optimally position supply when and where it is most needed and most profitable.

- By performing segmentation of their customer channels and products, these companies are able to attain significantly higher return on assets than their competitors.
- These companies are able to tie their demand management and sales and operations planning processes closely with the inventory process.
- They are able to achieve increased supply availability in response to the most profitable demand, resulting in increased customer service levels and market share gains.
- These companies are able to attain top line revenue increases through inventory management even in situations where the rest of their competitors are facing a flat market.

Through performing 80/20 analysis, these leaders are optimizing their investment in inventory, and production, procurement and distribution assets. These companies are able to analyze their inventory network as well as policies and able to add inventory where there are opportunities for winning additional market share and reduce inventory where they are not needed. They do not trim inventories across the board to reduce cost. Through this approach, they are able to increase their overall customer service levels while simultaneously reducing their total inventory carrying costs. Thus these companies are able to improve other key metrics like customer retention, gross margin and inventory turns.



Enterprise Accomplishments

High Tech Example:

Texas Instruments has consistently proven itself as a top-performer in regards to adherence to customer requested dates -- and has one of the best process disciplines with respect to inventory management.

The company indicates that this is no accident. Inventory Management within their companies, they assert, is more than just cost reduction – it has evolved into a competitive tool.

Pharmaceutical Example:

Organon, a global pharmaceutical manufacturer, operates 11 production facilities and distributes its products across a global supply chain. High stock levels were a constant concern for the enterprise, but necessary to ensure customer order fulfillment.

Organon needed a solution that would help reduce inventory costs and improve service performance with more accurate forecasts, provide visibility across the supply chain and help optimize the supply chain across the various sites from active ingredient to finished product.

Thanks to an inventory optimization solution, Organon has the right product at the right place at the right time. Forecast accuracy was improved by 20%-30%, resulting in stock reductions at the manufacturing sites of approximately 10%-15% while keeping a 99.9% delivery reliability.

Automotive Example:

Castrol, a leading global lubricant manufacturer, was faced with excess inventories and inaccurate forecasts. Slow moving products had excess inventory whereas the fast moving products were out of stock. Safety stocks were set manually mostly based on personal experience. In addition, there was significant expediting costs.

As an integral part of a Sales Inventory and Operations Planning (SIOP) program Castrol implemented a multi-echelon inventory solution. This has reduced total network inventories by 35% (20% in the first year after implementation and then 20% again in the following year). Despite the lowered inventories, service levels to customers, as defined by "line fill rates," are up by 9% overall.



Chapter Two: Key Business Value Findings

Key Takeaways

- 36% of Best in Class are doing **multi-echelon inventory optimization** (versus 17% of all companies)
- 57% of Best in Class indicate they have an existing **supply chain visibility system** (versus 27% of all companies)
- Best in Class are twice as likely to have **cross-functional product** teams.
- Companies that rate themselves above average are more than 2.5 times as likely to **update their inventory policies** multiple times a year.

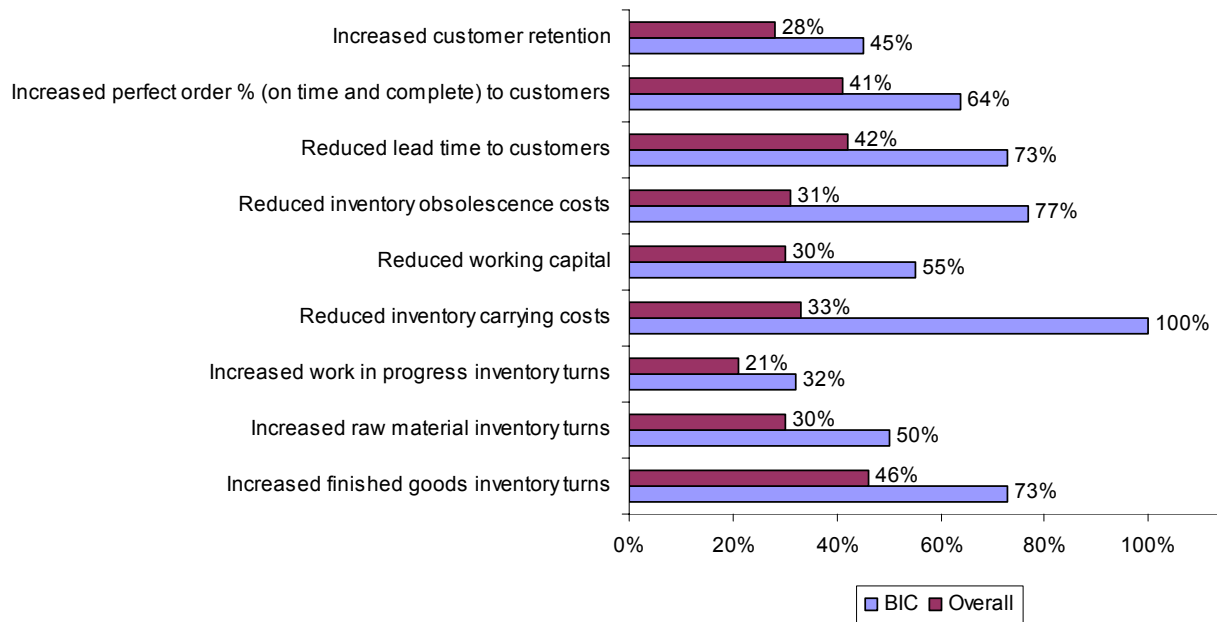
Aberdeen defined Best in Class companies as companies that have customer service levels 96% and above and that have simultaneously reduced inventory carrying costs. This corresponded to about 11.25% of the overall pool of respondents. About 55% of these Best in Class companies are distribution intensive and 45% of companies are manufacturing intensive. Roughly 38% of these Best in Class companies are large enterprises, with the rest primarily midsize companies.

Best in Class companies hold much different attitudes toward supply chain inventory management than do their peers. Best in Class companies achieve higher improvement rates as a result of their better inventory management practices (Figure 4).

These improvements are even greater when companies apply technology to these practices, such as supplier collaboration technology or multi-echelon inventory optimization tools. In fact, these technology-enabled companies are achieving 20-30% improvements in these KPIs from their inventory management initiatives.



Figure 4: Best in Class Companies Achieve Better Results



Source: AberdeenGroup, September 2006

Characteristics of Best in Class Companies

These are some of the differentiating characteristics of Best in Class companies:

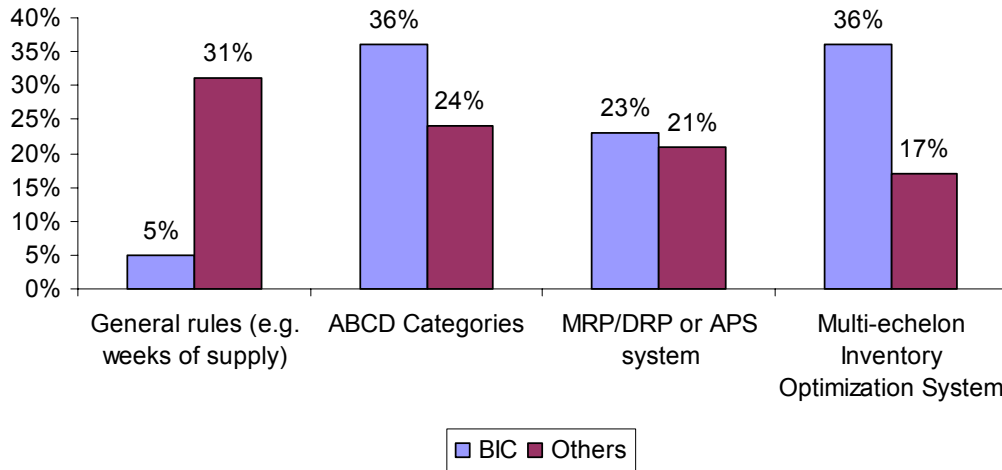
- 36% of Best in Class are doing **multi-echelon inventory optimization** (versus 17% of all companies)
- 57% of Best in Class have an existing **supply chain visibility** system (versus 27% of all companies)
- 52% of Best in Class have a forecasting system that **supports customer-level forecasting** (versus 27% of all companies)

It is clear from the above that technology plays an important role in inventory management success. Process changes are important but in order to achieve sustainable benefits, Best in Class companies are more likely to supplement process changes with improved technology.

As Figure 5 shows, the Best in Class are much less likely than their peers to be relying on simple rules of thumb for setting inventory policies. Instead, they are much more likely to be using multi-echelon inventory technology. This technology globally optimizes inventory policies across supply chain tiers, accounting for both demand and supply variability using a stochastic (probabilistic) approach versus a rules-based or deterministic approach that does not fully account for variability.



Figure 5. Inventory Policy Approaches

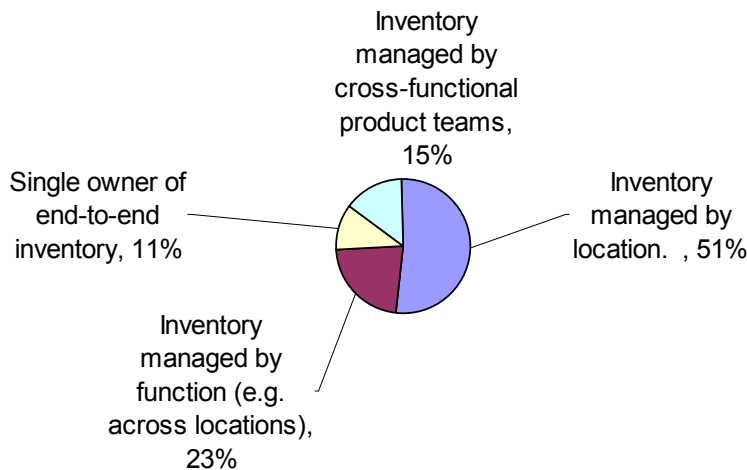


Source: AberdeenGroup, September 2006

Inventory Management Organization Strategy

One of the concerning results from the survey is that some 50% of companies are still not managing at a network level but at a location level (Figure 6). Best in Class companies are two times more likely to have cross-functional product teams than other companies.

Figure 6. Inventory Organizational Strategy



Source: AberdeenGroup, September 2006

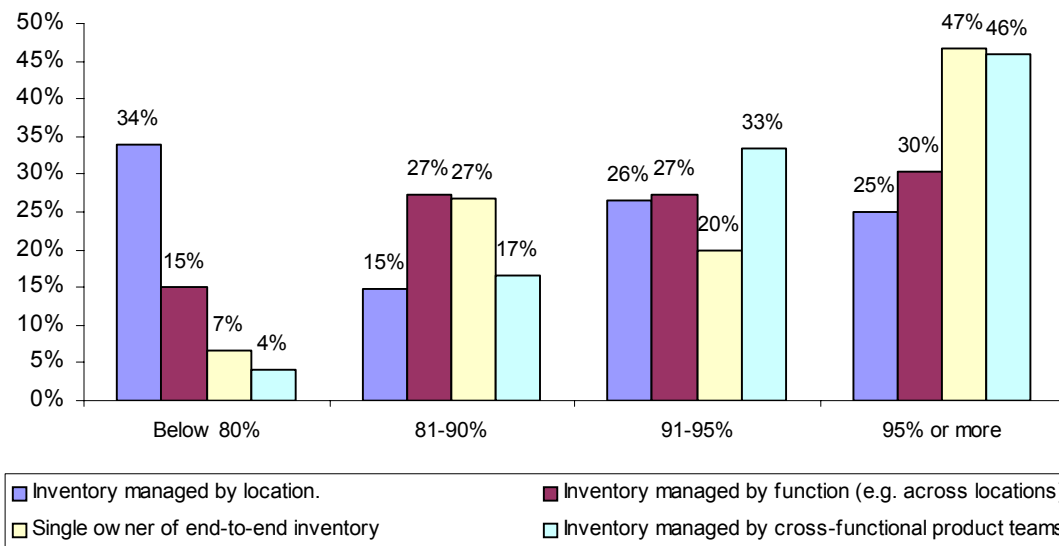
Customer service levels are higher for those companies that manage inventory through cross-functional teams or have a single owner of end-to-end inventory (Figure 7). Companies that have cross-functional teams are able to identify innovative ways to reduce customer lead times and inventory carrying costs across their functions rather than focus-



ing on how to slash inventory within their own functions, which can create undesirable side effects for other parts of the organization. Renewed interest in sales and operations planning is resulting in more process innovations in the area of inventory management.

One of the survey respondents was a director at a large high-tech electronics manufacturer. Their company has created an S&OP cross-functional team with a specific individual responsible for inventory. Their current technology stack consists of a large ERP system and a best of breed APS solution which is set up in a siloed departmental manner. However he hopes that this system can be modified in the future to support their cross-functional focus on inventory and S&OP.

Figure 7. How Inventory Organizational Strategy Impacts Customer Service Levels



Source: AberdeenGroup, September 2006

Strategic Actions to Improve Inventory Management

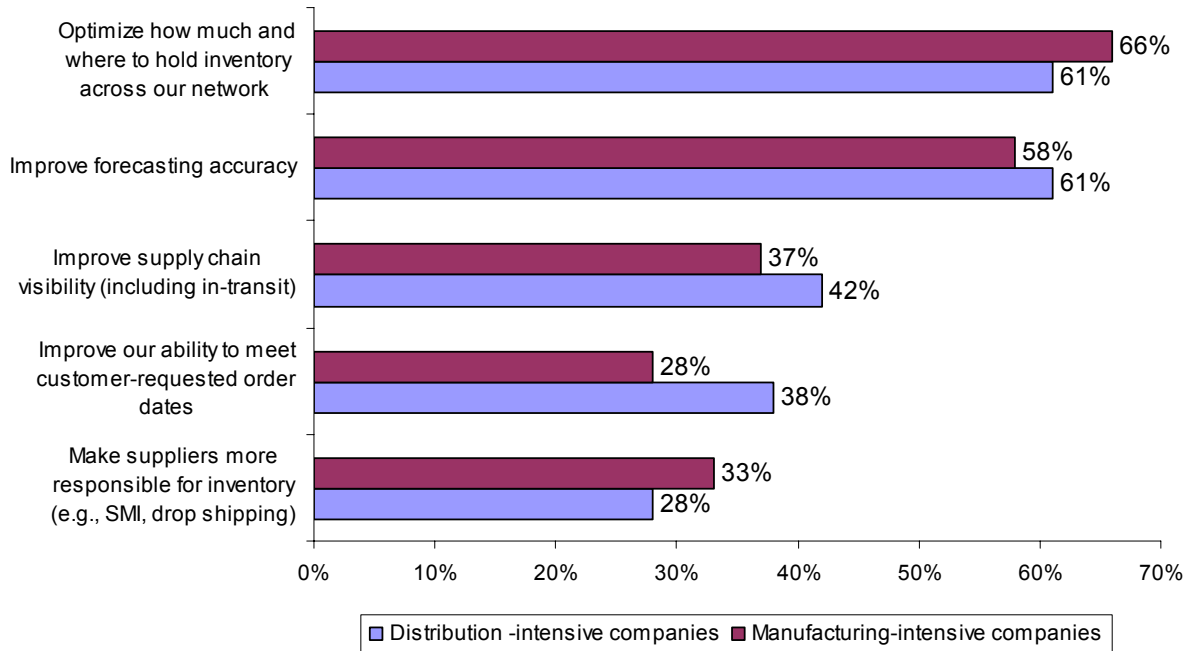
Two classes of organizations were surveyed about their inventory management practices: distribution-intensive companies and manufacturing-intensive companies.

- Distribution-intensive companies have a large percentage of supply chain costs tied up in finished goods inventory and distribution networks. These include consumer packaged goods, distribution, wholesale, and retail organizations.
- Manufacturing-intensive companies have a large percentage of supply chain costs tied up in manufacturing processes, including the management of contract manufacturers and component suppliers. These include auto, high tech, industrial equipment, metal products, and aerospace manufacturing.



Each group was asked about the strategic actions that they are taking to address the key pressures within their industries (Figure 8). The objectives of distribution-intensive companies and manufacturing-intensive companies are surprisingly similar except that the distribution-intensive companies are slightly more focused on customer requested dates.

Figure 8: Top Strategic Actions for Improving Inventory Management



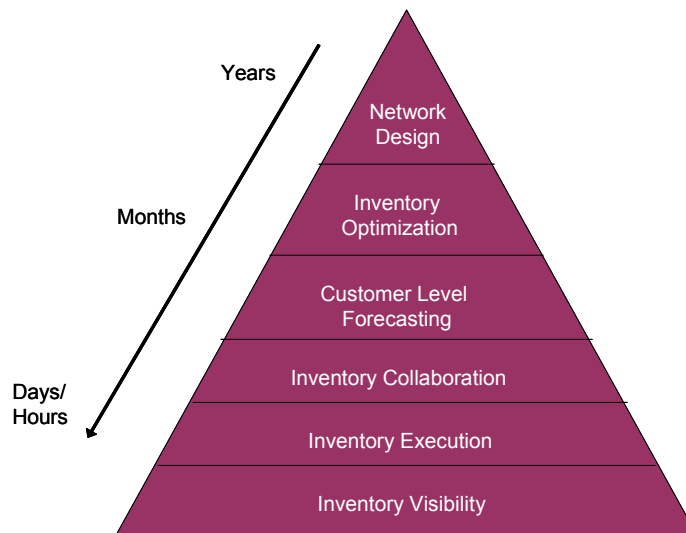
Source: AberdeenGroup, September 2006

Technology Components of Inventory Management

Figure 9 illustrates the six major components of a technology-enabled inventory management strategy. For each of these components, companies need to identify what levers need to adjust within the lead-time, variability and profitability dimensions to improve their customer services levels and reduce inventory simultaneously. Each of these six areas can deliver significant value for companies and help them move toward using inventory management not just to control costs but to drive market advantage.



Figure 9. Components of an Inventory Management Technology Strategy



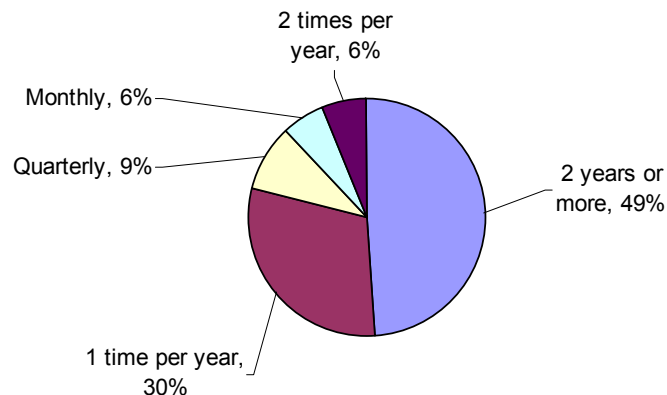
Source: AberdeenGroup, September 2006

Network Design

Frequency of Network Design Evaluation

Given globalization and dynamic customer requirements, it is concerning that half of companies are looking at their network design only once every two to five years (Figure 10). One reason is the lack of adequate technology tools as well as associated processes. This area has been dominated by spreadsheet based tools as well as private consultants.

Figure 10. Frequency of Network Design



Source: AberdeenGroup, September 2006



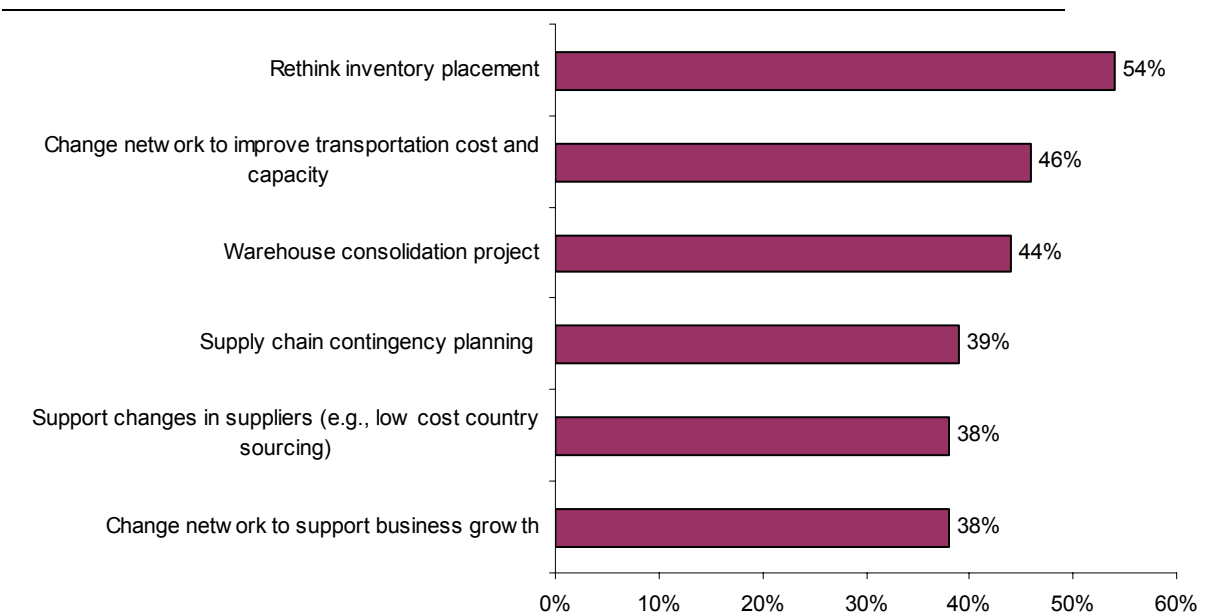
What Are Companies Doing Within Network Design?

Companies are increasingly using network design beyond just identifying where to build facilities and warehouses (Figure 11). They have started thinking about where and how much inventory to place along with how to redesign distribution networks to mitigate transportation time, cost, and capacity constraints.

Best in Class companies are more likely than their peers to be maximizing the use of network design technology:

- Changing network to support business growth (59% versus 37% of all companies)
- Supplier network change modeling (e.g., Low Cost Country Sourcing) (73% versus 39% of all companies)
- Changing network to improve transportation costs and capacity (64% versus 46% of all companies)

Figure 11. Goals for Doing Network Design



Source: AberdeenGroup, September 2006

The network design architect at a large diversified manufacturer with global operations indicates that in last 12 months they have been facing more and more challenges with getting data due to rapid globalization of their supply chains – cost/pound, cost/carton, lead-times, freight lanes, etc. They are resorting to doing simulation and stochastic analysis to come up with more accurate network designs.

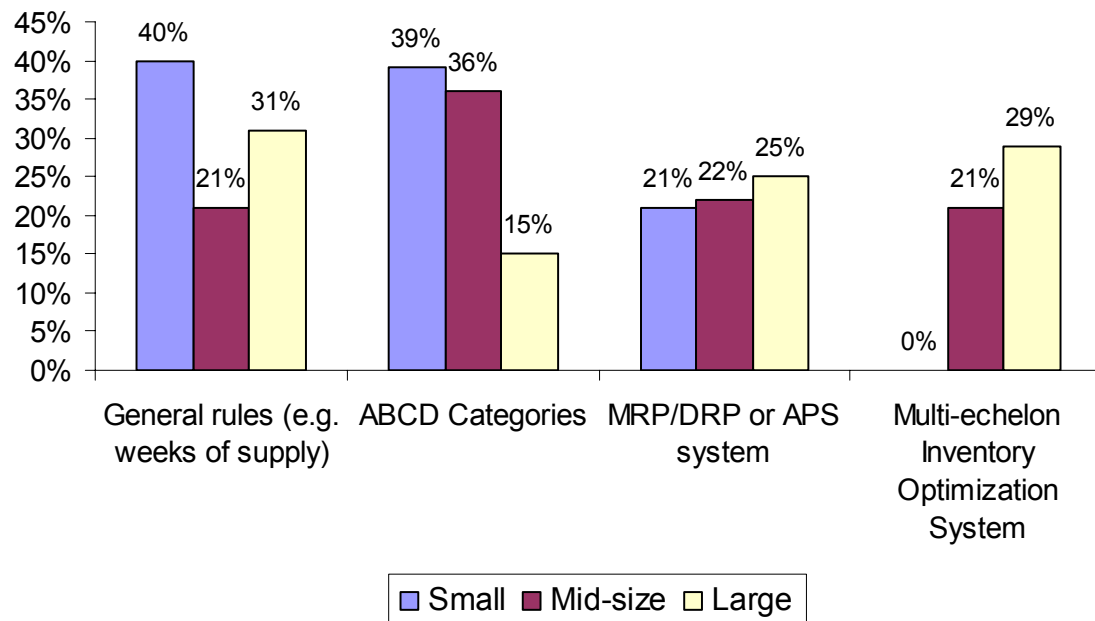
Inventory Optimization

Aberdeen research finds that companies have been slowly but steadily moving toward more advanced inventory optimization techniques like multi-echelon inventory optimization.



tion (Figure 12). Today, 20% of companies report using multi-echelon techniques compared to 12% of companies in 2004. And 29% of large companies are saying that they are using this approach. As previously mentioned, Best in Class companies are more than twice as likely to use multi-echelon techniques than other companies.

Figure 12. Inventory Policy by Size of Company



Source: AberdeenGroup, September 2006

The definitions of each of the approaches in Figure 12 are:

- √ **General rules-based approach:** Set blanket inventory targets for product lines or facilities, frequently as a static “weeks of supply” rule.
- √ **ABCD approach:** Categorize inventory into fast, frequent, and sporadic movers and apply inventory targets to each category.
- √ **MRP/DRP and APS approach:** Use a deterministic approach to compute inventory targets, which are computed sequentially for each supply chain echelon (tier); assumes a normal demand distribution.
- √ **Multi-echelon inventory optimization approach:** Use a stochastic (probabilistic) approach to compute inventory targets in one pass across multiple echelons. This approach accounts for supply chain variability (e.g., real demand distribution or lead time variability) and the interdependencies across multiple echelons.

However, the use of multi-echelon approaches is still maturing. In fact, around 40% of the companies that report using multi-echelon tools are in fact not taking a pure multi-echelon optimization approach. Instead, they are setting customer service levels for each level in the supply chain and separately calculating the inventories rather than obtaining



the inventory based on global cost and service-related calculations. In addition, 60% of companies are planning at the finished goods regional distribution warehouses and 53% are planning at the manufacturing and assembly locations. In other words very few customers are planning at every level in the echelon – still the ability to consider variability and the ability to focus on the critical levels of their supply chain based on their industry (manufacturing intensive or distribution intensive) results in better performance through usage of multi-echelon solutions.

A large consumer product company has been able to achieve 99% service levels with a 25% reduction in inventory through the usage of “mix-optimization” techniques resulting in the ability to re-plan inventory once every 2 months. Mix-optimization enables operations to reduce inventory while maintaining stringent customer service level requirements.

If a product group demands a 98% service level, operations can mix the physical inventory – set some of it at 99%, some at 95% percent. This helps the company achieve a 98% service level overall, with 20%-30% less inventory.

How Old Is Your Inventory Policy?

Another drain on financial performance is that companies’ inventory strategies are rarely kept up to date with real-life conditions. Nearly 50% of companies (both distribution-intensive as well as manufacturing intensive) say they update their inventory strategies on an annual or less frequent basis. This frequency of analysis is not sufficient given today’s global sourcing and contract manufacturing strategies, which create more variability. **Survey results show that companies that are above average inventory performers are more than 2.5 times as likely as other companies to update their inventory strategies and policies multiple times a year.**

Farma Lepori , an European Pharmaceutical manufacturer, has implemented an inventory management and replenishment system that integrates with their ERP system and addresses the unique characteristics of their pharmaceutical supply chain, including: lot-based production, lengthy replenishment times of up to three to four months due to fixed lot sizes, lot track and traceability, etc.

The company now has improved demand modelling accuracy at highly granular levels of aggregation and has defined a global service policy that takes into account expiration dates and lot sizes. This has allowed them to establish higher service levels for selected SKU/Ls; such as newly-launched or promotional products, strategic products, etc.



Customer Level Forecasting

Companies need to adjust their forecasting process to leverage inventory as a competitive weapon. One way to do this is to align their forecasting process to the customer service level and lead-time reduction requirements.

Different products have different costs and lead times. For e.g. a customer who requires a custom part from a manufacturer (Build to Order) will have different service requirements as compared to a customer who sells a commodity (Build to Stock) part. Thus segmentation of the customers based on their inventory management requirements is necessary.

Seasonal industries can see large swings in demand as well as lead time variability across demand peaks and lows driven by seasonality. Construction equipment companies are examples of companies that have long-term seasonality and apparel industry involves short term seasonality.

Customer-level forecasting is particularly critical for effective inventory management in these environments:

- Combination of Build to Order/Build to Stock business models
- Seasonal or cyclical environment
- VMI environments
- Promotion-driven environments

Remy International is a leading global manufacturer and re-manufacturer of aftermarket electrical components, original equipment electrical components, and aftermarket power train/drive train components for automobiles, light trucks, heavy duty truck vehicles.

As a re-manufacturer, Remy needed a way to: manage demand across multiple channels through improved forecasting of both sales and reverse logistics; optimize inventory across its supply chains; and integrate reverse logistics into its production planning process.

Remy implemented a customer-level forecasting system along with other inventory technologies.

The Director of Supply Chain and Inventory Management, Remy International, comments: "Now we actually walk through the summer season together with our customers. As they ramp up their inventory, we are in synch with their needs," comments the director. "As we get to the middle of August, when the retailers historically stop placing orders, we know what is coming, and we already have our factories winding down."

Inventory Collaboration

Aberdeen research finds that inventory collaboration and collaborative forecasting are driving the best improvements among collaborative efforts (Figure 13).

Nearly half of respondents from an Aberdeen survey report shifting from using purchase orders and release notices to trigger supplier replenishment to having some suppliers do min/max replenishment instead. This is often called supplier-managed inventory. To do this, a company sets the minimum and maximum target levels for an item at a plant or

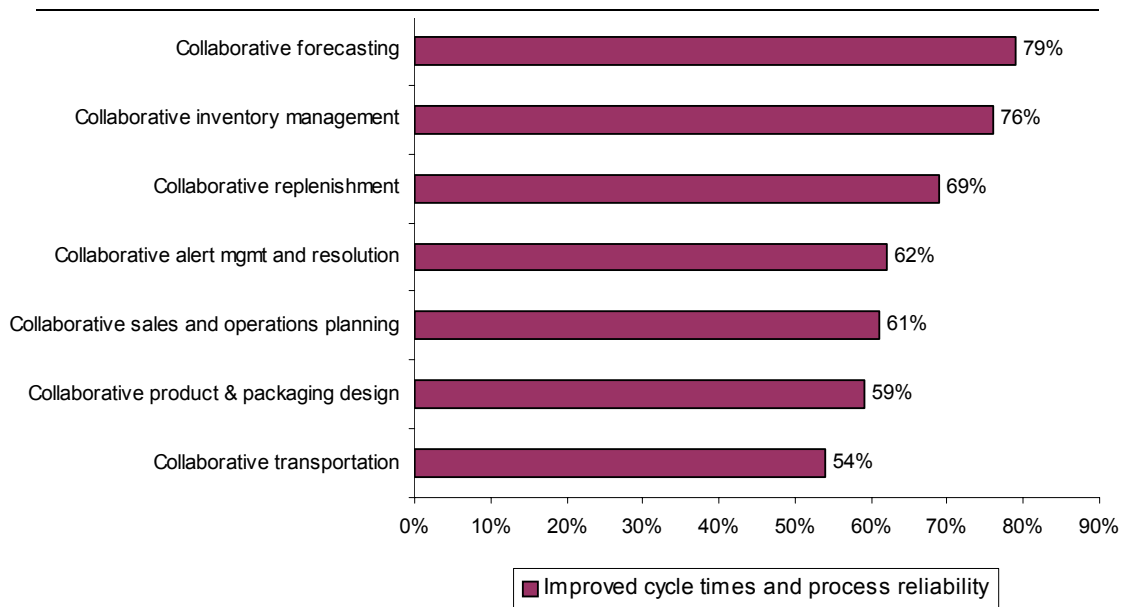


other company location, and then asks the supplier to take responsibility for ensuring that inventory is maintained within that range.

Supplier collaboration technology is helping companies execute these strategies by:

- 1) Providing real-time views to suppliers of information, such as on-hand inventory, forecasts, current and future production schedules, and order commitments – this helps suppliers plan efficient replenishment processes.
- 2) Providing shared status dashboards to warn of impending problems, such as red (under the minimum), blue (over the maximum), and green (in range) indicators for inventory positions.
- 3) Letting a company's materials managers and purchasing agents see shipment notifications and perhaps even supplier in-process activities. With visibility to in-transit inventory, for instance, a materials manager can understand that even though on-hand inventory has dipped below its minimum target, a shipment is on its way so no action needs to be taken.

Figure 13. Value Gained Through Collaboration Initiatives



Source: AberdeenGroup, September 2006

Inventory Execution

Companies are facing challenges with inventory execution both at the customer and supplier sides. From a customer perspective, having disparate ERP systems at the different warehouses and distribution centers results in poor replenishment/execution capabilities at the network level. This results in increased cost of operations and declining customer satisfaction due to the inability to react to customer compliance needs and increasing inventory costs. To address this, many supply chain execution systems have an inventory



execution module that allows a single view to the customer irrespective of various execution systems

On the supplier side, typical inventory execution systems are based on purchase orders rather than based on demand signals. Supplier min/max replenishment can be done with or without the supplier owning the inventory at the customer. It will generate inventory savings and service level improvements to a company, while helping its supplier minimize inventory excesses and create more efficient production schedules and transportation moves.

Being successful with the min/max approach requires inventory accuracy and good planning systems and planners. For instance, a standard kanban process may be more appropriate if on-hand inventory accuracy is an issue.

Ideally, companies need to move towards a usage based replenishment system because it is more accurate than a process based on forecasts. An enterprise example of this is shown below:

Company Spotlight - Usage-Based Replenishment with Suppliers

The Airbus UK Wing assembly plants at Broughton, North Wales and Filton have implemented an innovative usage-based replenishment system within their assembly plants, supply base and 3PL partners.

The Airbus US plant and their suppliers were facing the following issues: they had trouble managing multiple stock numbers for same parts, too much staff was involved in managing c-class parts, and they lacked visibility of suppliers' inventory levels.

Specifically, Airbus faced issues with consignment stocking and visibility/control, while suppliers faced issues with long-term contracts and usage data so that they can maintain consistent inventory levels without fire drills. In addition, the 3PLs and distributors in the supply chain faced a high cost of business due to having inefficient systems.

To cope with these issues, Airbus implemented a Collaborative Inventory Replenishment Management system to help manufacturers and suppliers gain optimal profitability from their supply chains and collaboratively increase their overall control and visibility. The company was able to reduce inventory shortages and overall inventory handling costs.

"The team's success has enabled the Filton plant to become the aerospace industry benchmark with regards to parts supply and stock holding," reports the operations manager, for Airbus Filton.

Inventory Visibility

Companies are on a path to take their inventory visibility systems far beyond basic order and shipment tracking. They are looking to turn these systems into exception-based process management platforms that enable staff to manage exceptions rather than micro-managing steady-state processes. Key elements include escalation policies to help manage exceptions, incorporation of resolution advice or workflow (e.g., expedite options and policies for a late shipment), and performance trending and root cause analysis of disruptions and lead time fluctuations.



Enhanced insight into end-to-end inventory positions and mobile assets such as containers and equipment rank high on companies plans. An emerging enabler for this is RFID technology. Incorporating RFID data into their inventory visibility solutions is on the roadmap for many companies. In fact, respondents express concern that very few inventory visibility systems today are set to handle RFID-tagged products, containers, or mobile assets and that global RFID standards are still in flux.

Levi Strauss & Co., for example, uses an on-demand inventory visibility application. "The tool provided more complete and accurate data regarding finished goods destined for the United States, which has allowed us to better manage incoming products and to proactively address issues by exception," says the Logistics Process Consultant, Levi Strauss & Co. "As a result, the cost of tracking inbound shipments has been reduced by 98 percent."



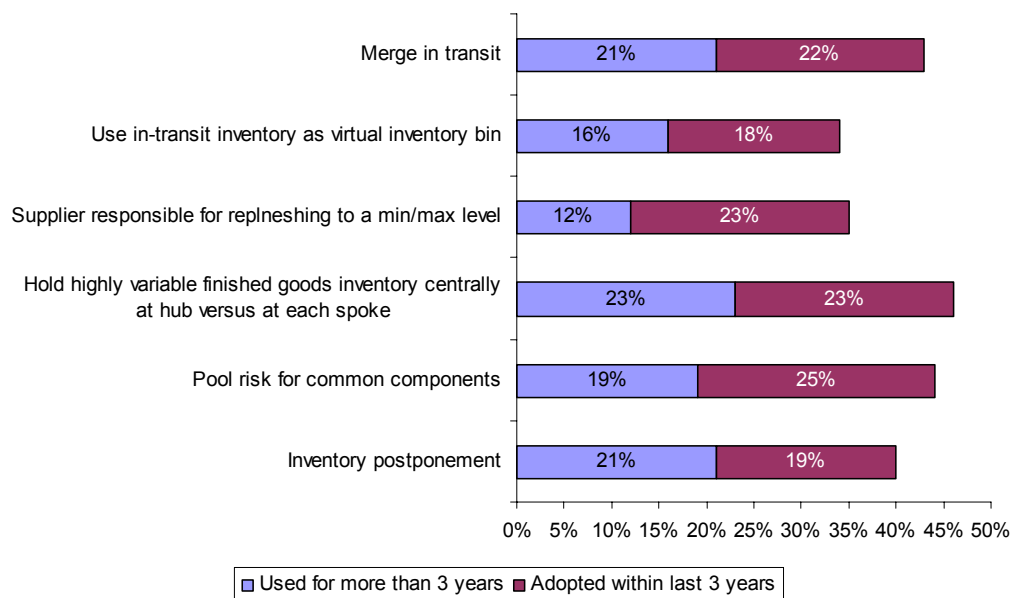
Chapter Three: Implications & Analysis

Key Takeaways

- Respondents have roughly doubled their adoption of inventory management tactics since 2003.
- Best in Class companies apply more technology to inventory management.
- Companies using a visibility or supply chain event management system are three times as likely to have faster order to delivery times as those companies that had no plans to adopt such a solution.
- Companies need to focus on a stepwise, continuous improvement process to avoid long payback periods from inventory management initiatives.

Supply chain inventory tactics such as postponement, risk pooling, and merge in transit have been around for years, but more organizations are now embracing these practices across more product types and geographies. **Respondents have roughly doubled their adoption of supply chain inventory tactics since 2003** (Figure 14).

Figure 14: Adoption Rates of Supply Chain Inventory Tactics



Source: AberdeenGroup, September 2006



Assessing Your Inventory Management Maturity

Companies can use Table 1 to identify their maturity level across four dimensions of inventory management. Areas in which your company is not Best in Class can be targeted for improvement.

Table 1: Inventory Management Competitive Framework

| | Laggards | Industry Norm | Best in Class |
|---------------------|---|--|--|
| Process | <ul style="list-style-type: none"> • Hold finished goods. Treat each product separately. • Send purchase orders to suppliers. • Companies do product family level forecasting(not at customer level) • Companies do network design sporadically or not at all | <ul style="list-style-type: none"> • Some product postponement and component risk pooling. • Supplier-managed min/max replenishment. • Companies do forecasting at sku-location but not at customer level • Companies do network design for warehouse and facilities placement | <ul style="list-style-type: none"> • Postponement, risk pooling, and supplier-managed inventory strategies are a fully integrated process from product design through delivery. • Companies do customer level forecasting • Companies do network design for improving business growth and supplier network modeling. • Consideration of inventory within S&OP process. |
| Organization | <ul style="list-style-type: none"> • Inventory handled by function and location. | <ul style="list-style-type: none"> • Some cross-functional collaboration on inventory strategies. | <ul style="list-style-type: none"> • Single owner of end-to-end inventory. |
| Knowledge | <ul style="list-style-type: none"> • Analysis performed at an aggregate product level. | <ul style="list-style-type: none"> • Some analysis by product or product family. | <ul style="list-style-type: none"> • Analysis at the item-location level and consideration of customer specific service levels. |
| Technology | <ul style="list-style-type: none"> • Inventory policies set using general rules (e.g., hold 8 weeks of supply for all products). • Inventory visibility at location level within MRP/ERP systems | <ul style="list-style-type: none"> • Inventory policies set by ABCD categories or by MRP/DRP or APS system that evaluates one echelon at a time. • Inventory visibility solutions that are across locations | <ul style="list-style-type: none"> • Inventory policies set using a multi-echelon inventory optimization system that considers variability. • Technologies used deployed for supplier and customer inventory collaboration • Inventory visibility solutions are used that are closely tied with execution systems |

Source: AberdeenGroup, September 2006

The Critical Role of Technology in Inventory Management

Improving inventory practices calls for a high degree of collaboration and visibility across the supply chain, as well as more sophisticated optimization. Companies that do not use technology to enable their supply chain inventory initiatives will not achieve the



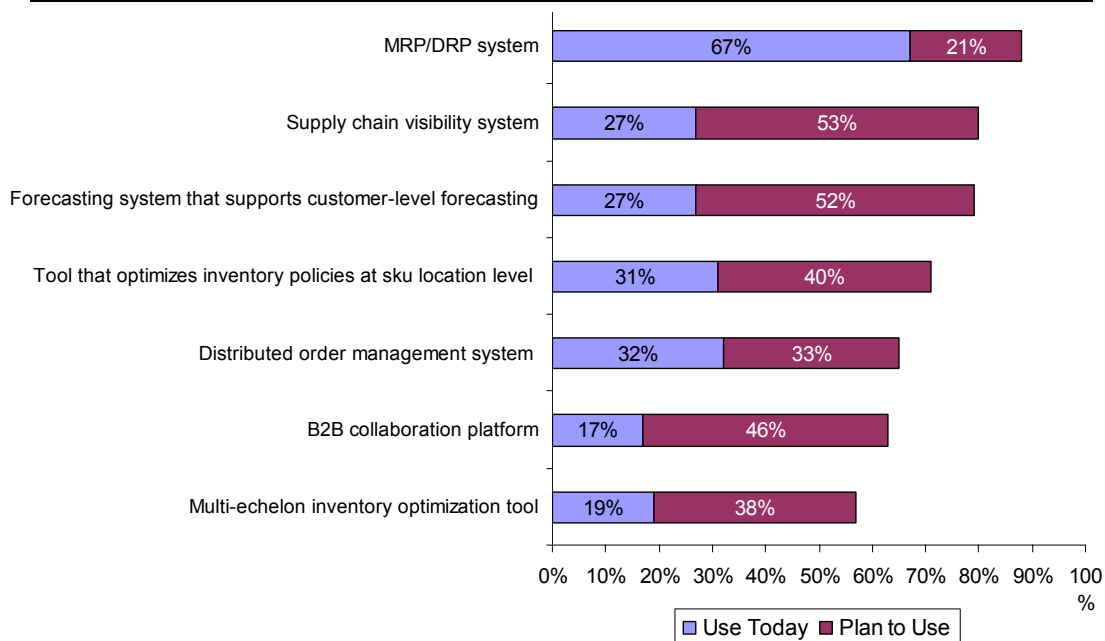
same level of performance. Spreadsheet methods are not sufficient in today's demanding environment because they are incapable of evaluating all of the trade-offs.

- *Companies using MRP/DRP system (which meet service or cost objectives at one level of supply chain and are then propagated to the other levels) were two times more likely to have customer service levels above industry average than those companies that plans on inventory policies using general rules (e.g., hold eight weeks of supply for all products).*
- *Companies using a visibility or supply chain event management system were three times as likely to have faster order to delivery times as those companies that had no plans to adopt such a solution*

Disturbingly, key supply chain inventory technologies are used by just 10% to 35% of companies today (Figure 15). Future adoption plans, if executed, would raise that to 60% or more of companies.

A large number of companies are using either spreadsheets or homegrown custom applications for inventory management functions. For instance, 37% of companies report they are using spreadsheets for inventory management. These fragmented applications are not capable of effectively modeling and managing inventory across a network of locations.

Figure 15: Top Technologies for Supply Chain Inventory Management



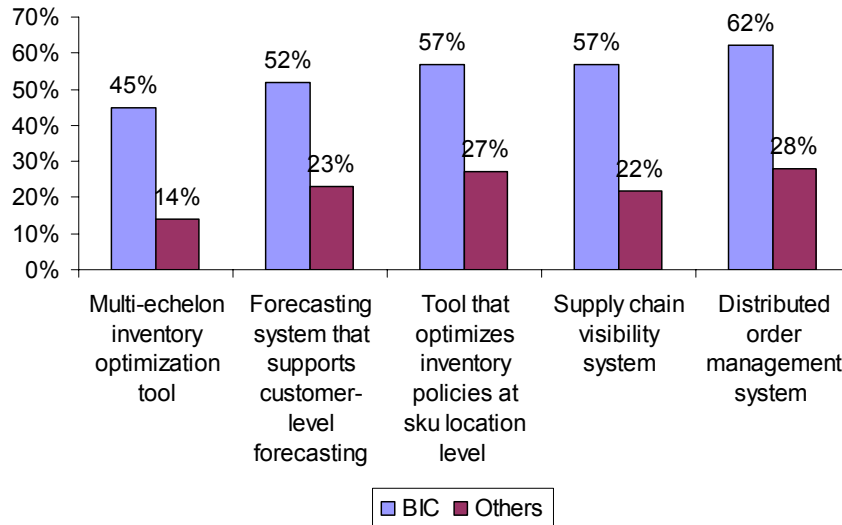
Source: AberdeenGroup, September 2006

As shown in Figure 16, best-in-class companies are much more likely than their peers to already be applying technology to supply chain inventory management. Even when technology is used, however, most is homegrown and does not deliver the collaboration and optimization capabilities of current commercially available solutions. For instance, of the respondents that do multi-echelon optimization today, only a fraction use a tool that takes



into account multiple elements of variability or time-varying demands and capacities, which are critical to achieving significant cost savings.

Figure 16: Best in Class Use More Technology to Execute Inventory Strategies



Source: AberdeenGroup, September 2006

Today’s Inventory Management Technology Deployments Are Insufficient

Companies view their current inventory management functionality as immature as exemplified by the results in Table 2. For instance, only 9% of companies say that their current technology fully meets their network design needs and only 10% say it fully supports inventory optimization. The spreadsheet-based, homegrown applications, and fragmented department systems used by many companies for inventory management are root causes of the general unhappiness with current solutions.

Other companies may have access to functionality via their ERP or supply chain management vendor but have either not activated their inventory management functionality, or have been challenged to create workflow and data integration that bridges the multiple application solutions they have across their organization.

Table 2: The Inadequacies of Companies’ Current Inventory Management Technology

| Inadequate to support current requirements | Adequate for some of our needs but needs improvement in other areas | Meets current needs but we anticipate future requirements that it will not meet | Meets all our current and future anticipated needs |
|--|---|---|--|
| | | | |



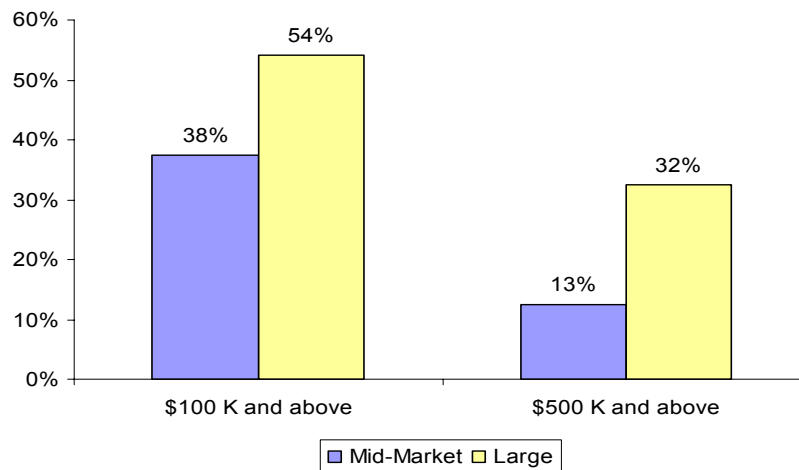
| | | | | |
|----------------------------------|-----|-----|-----|-----|
| Supply Chain Network Design | 37% | 40% | 14% | 9% |
| Inventory Optimization | 31% | 40% | 19% | 10% |
| Inventory Visibility | 18% | 39% | 26% | 16% |
| Supplier Inventory Collaboration | 39% | 39% | 14% | 7% |
| Customer Inventory Collaboration | 42% | 38% | 12% | 7% |
| Inventory Execution | 19% | 45% | 25% | 11% |

Source: AberdeenGroup, September 2006

Technology Spending Plans

More than 54% of large companies plan to spend \$100,000 or more in the next 12 months on new inventory management technology. Significantly, 32% of large companies are planning on spending \$500,000 or more (Figure 17). Companies that have not made investment plans should closely assess their inventory management technology to see whether enhancements would drive financial or customer service benefit and help the company remain competitive. Results show that companies are focused on prioritizing visibility, execution and forecasting systems ahead of inventory optimization.

Figure 17. Inventory Management Technology Spending Plans of Companies



Source: AberdeenGroup, September 2006

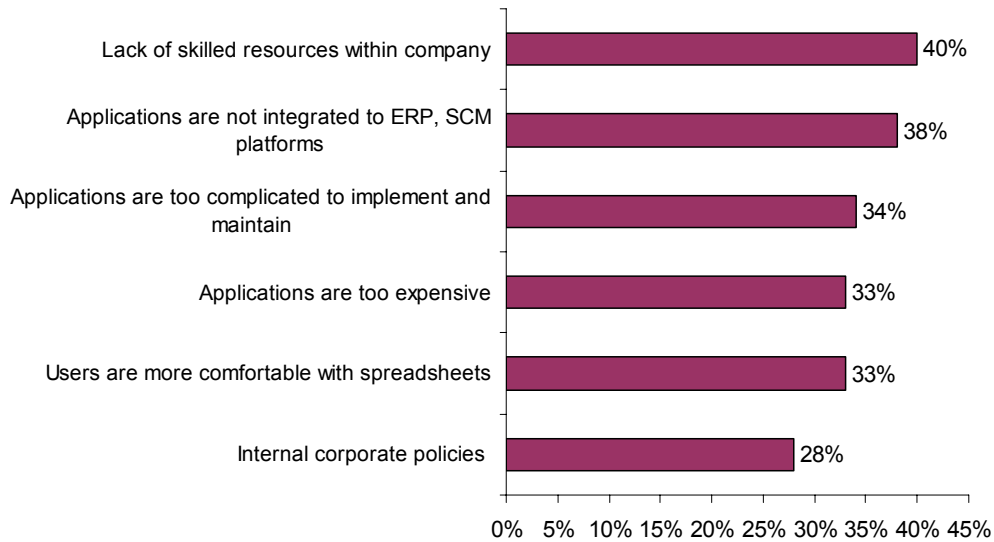
Barriers Companies Face Implementing Technology

Figure 18 shows the top challenges supply chain executives face when they try to implement inventory management technology. In 2004, a lack of senior management support across the organization was the top-rated barrier. However that is no longer the issue today. This indicates that companies are having better traction in terms of getting management buy-in. Today, the lack of skilled resources within the company while implementing and rolling out inventory management technology is the key issue. Inventory management solutions require adjusting of critical parameters like demand variability, supply



variability and numerous other product configuration parameters that can become overwhelming to end users.

Figure 18. Barriers to Realizing Value From Inventory Management Technologies



Source: AberdeenGroup, September 2006

The top barrier to inventory technology adoption is the lack of skilled resources. Managed services is one approach by which this issue can be resolved. Two-thirds of respondents from a recent managed services related survey are either highly interested or somewhat interested in having a managed services approach for network design and strategic inventory optimization.

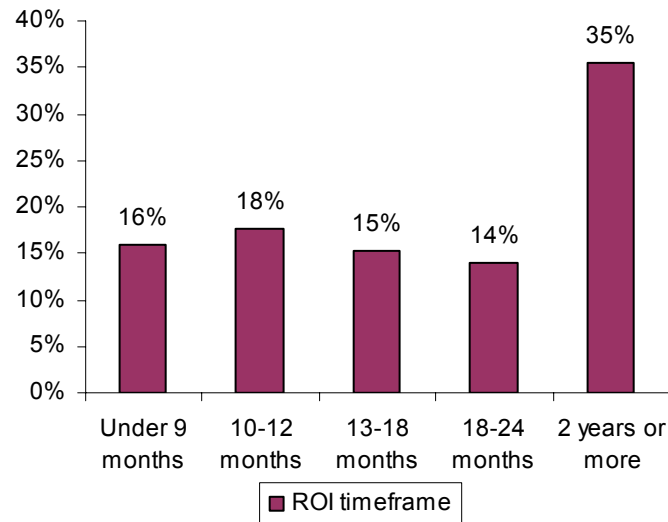
A leading consumer electronics manufacturer has moved to the managed services model through their APS vendor to circumvent the challenge of a lack of skilled resources. This has freed up their line of business people to focus on the core business decisions and leave the data crunching and software operations to offshore skilled MBA resources.

ROI Timeframe for Companies

A significantly high number of companies (36%) indicate the timeframe for attaining ROI from their inventory management solutions took more than 2 years (Figure 19). Companies have traditionally felt that inventory related solutions -- especially related to visibility and collaboration -- have high ROI timeframes and this is validated by the data. Companies need to be very aware of the critical success factors that other companies have seen in terms of achieving fast ROI.



Figure 19. ROI Timeframe from Inventory Management Projects



Source: AberdeenGroup, September 2006

Examples of Rapid ROI

Network Design

A global producer and distributor of cereals, snacks and processed foods was looking to implement a strategic network design software platform for its global supply chain – and after doing so, found an ROI within 6 months.

The IT Director for this application says, “We were lucky in that we had extensive data already available in the ERP systems and in spreadsheets within our production department for us to move quickly in building the network model. We also had to adjust the nature of the model to fit the data that we had – the application was flexible enough to allow that.”

Inventory Optimization

A large retailer was experiencing high stock-outs at the store and central warehouse level due to inadequate safety stocks and poor forecast accuracy. Instead of a “big bang” implementation approach that would radically restructure their network, the enterprise chose to add a bolt-on inventory optimization solution on top of their existing ERP.

The result: the enterprise retained its existing customer service levels and improved inventory calculations, resulting in a significant inventory reduction.



Chapter Four: Recommendations for Action

Key Takeaways

- Stop thinking of inventory as a problem asset and focus on how to leverage it to build market share and improve customer service levels.
- Laggards should move away from simple rules of thumb based inventory placement strategies.
- Industry average companies should appoint a single owner of inventory or move to cross-functional teams for inventory management.
- Best in Class companies should use commercially available multi-echelon optimization solutions.

Instead of thinking of inventory as a problem asset, companies need to think of how to intelligently manage inventory levels to maximize customer service levels and reduce inventory simultaneously. Technology support will be critical to selecting and executing a successful supply chain inventory program. In particular, companies should seek solutions that let them optimize globally across supply chain tiers, rather than locally, scale for item-location policies, and enable supplier-managed processes such as min/max replenishment. Change management and metric re-alignment also need to be part of the program.

Below are recommendations for action based on a company's current maturity stage. Whether a company is trying to move its supply chain inventory practices from "Laggard" to "Industry Norm," to move from "Industry Norm" to "Best in Class," or to remain at "Best in Class" status, the following actions will help improve performance:

Laggard Steps to Success

1. *Move away from simple weeks of supply and ABCD inventory policies*
Simplistic methods lead to flabby supply chains. Companies facing high customer service levels, short product life cycles, or multi-tier manufacturing or distribution networks have the most to gain from moving toward item-location level inventory policies. Look to APS or multi-echelon optimization solutions and simultaneously look at increasing replenishment planning frequency.
2. *Leverage tools that allow visibility of inventory across locations*
3. *Leverage tools and adopt processes that allow network design to be performed at least once a year*
Start off with doing warehouse and facilities locations because costing data is more likely to be available for these. One of the common problems faced by companies is the lack of costing data for performing network design especially when it comes to global sourcing.
4. *Set up some level of cross-functional teams* to manage inventory, perhaps as part of the S&OP process



5. *Look for lower cost, on-demand offerings to ease-into more advanced inventory management technologies and processes*

If the users are accustomed to spreadsheets, there are commercial offerings available that mimic the spreadsheets but have more advanced workflows/business logic behind them. These tools should be evaluated as well.

6. *If you have a large inventory investment and a multi-tier supply chain, explore doing low-risk pilot projects with multi-echelon inventory optimization vendors and work out a value-based strategy with the vendor for moving to larger-scale rollouts.*

Industry Norm Steps to Success

1. *Appoint a single end-to-end owner of inventory*

Less than a quarter of companies have created a single owner for inventory across the supply chain. Without this level of accountability, local inventory reduction and service level programs will thrive. Locally optimized programs, despite their good intentions, almost always lead to higher working capital costs and service level challenges. Make sure metrics are changed so that local staff members are measured on how well they follow the optimal supply chain inventory and service level policies that have been set, while central inventory planners are compensated on how much they have been able to improve customer service levels and take out cost from the total supply chain.

2. *Leverage tools and processes that allow network design to be done at least once a year* and moving beyond warehouse designing to looking at international sourcing. Get quotes from suppliers for freight lane information for global sourcing for costing data.

3. *Start doing customer level forecasting for the key customers*

Evolve your current forecasting systems to enable customer-level forecasts. This may involve extensive process changes in some cases and in other cases this may be more of an incremental shift.

4. *Leverage existing investments in APS systems* to make sure that inventory management capabilities are being utilized within the solution. In a lot of cases, inventory management is still being done as a general rule-based system in spite of more functional capabilities available in the tool. In addition, look towards bolt-on multi-echelon solutions for pilots and build confidence with the planners before rolling out the solution to other business units or product lines.

5. *Move toward supplier inventory collaboration*

Look to do supplier inventory collaboration, including sharing more data with key suppliers, such as inventory and forecast data, which will help make shipments move more quickly and easily and improve performance.



Best in Class Next Steps

- 1. Actively manage in-transit inventory through supply chain visibility*

Enterprises with long transit times should investigate the different ways to use in-transit inventory as a virtual inventory bin to lower safety stock levels, reduce total delivered costs, and maximize revenue opportunities.
- 2. Look to do network design for strategic decision making*

These companies should aggressively work towards integrating their network design process with downstream processes, increase the frequency of these processes to twice per year, and use it for assessing business growth opportunities, supplier network design etc.
- 3. Use a commercial multi-echelon optimization solution*

The new generation of commercially available multi-echelon optimization solutions at last enables companies to properly account for variation in the supply chain. Companies with multi-echelon manufacturing or finished goods distribution networks should not delay in investigating these solutions.
- 4. Leverage investments in existing demand management tools and evolve towards customer-level forecasting*

Best in Class companies usually have spent a lot of time in implementing technology solutions as well as processes for demand management. These companies can get significant additional value through customer segmentation for customer specific service levels and also deciding on product postponement strategies based on product types.
- 5. Expand your program of supplier inventory collaboration*

Look to expand the scope of supplier inventory collaboration to all of your primary suppliers, regardless of technology sophistication. Supplier portal technology can be instrumental in achieving this.

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Appendix A: Demographics

Between August and September 2006, Aberdeen Group examined the inventory management technology usages, planned investments and experiences of more than 160 enterprises in several industries like consumer goods, consumer electronics, automotive, industrial equipment etc.

Responding supply chain, logistics, sales and marketing, finance, procurement and operations executives completed an online survey that included questions designed to determine the following:

- The degree to which inventory management impacts corporate strategies, operations, and financial results
- The structure and effectiveness of existing inventory management technology procedures
- Current and planned use of technologies to aid these activities
- The benefits, if any, that have been derived from inventory management initiatives

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on inventory management strategies, experiences, and results.

Responding enterprises included the following:

- **Job title/function:** The research sample included respondents with the following job titles: senior management (CEO, CFO, COO) – 4%, CIO/IT Leader – 4%, (Senior) vice president – 6%, director (23%), manager (43%), staff (8%), internal consultant (6%).
- **Industry:** The research sample included respondents from both distribution intensive as well from manufacturing-intensive industries. Consumer goods industries comprised 24% of the respondents, retail/distribution industries comprised 16%, automotive, industrial, aerospace and defense comprised 19%, high-tech electronics comprised 11% and process industries like chemicals, metals, gas, oil etc comprised 17%.
- **Geography:** 74% of study respondents are from North America. Remaining respondents hail from Europe (9%), Asia/Pacific (9%) regions.
- **Company size:** About 37% of respondents were from large enterprises (annual revenues above US\$1 billion); 43% were from midsize enterprises (annual revenues between \$50 million and \$1 billion); and 20% of respondents were from small businesses (annual revenues of \$50 million or less).



Appendix B: Related Aberdeen Research & Tools

Related Aberdeen research that forms a companion or reference to this report include:

- *Technology Strategies for Integrated Business Planning, July 2006*
- *Are your Inventory Management Practices Outdated?, March 2005*
- *Supply Chain Inventory Strategies Benchmark Report; December 2004*
- *The China Trade Management Strategies Benchmark Report; September 2004*
- *The Outsourced Manufacturing Strategies Benchmark Report (September 2004)*
- *The Lean Strategies Benchmark Report (June 2004)*
- *The Quiet Revolution in Supplier Management (June 2004)*
- *Supplier Performance Management: What Leaders Do Differently (June 2004)*

Information on these and any other Aberdeen publications can be found at www.Aberdeen.com.



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