



# Connecting with the Bottom Line

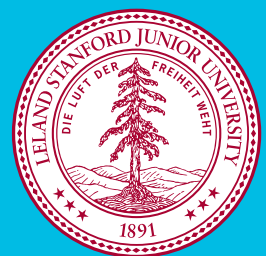
A Global Study of Supply Chain Leadership and  
Its Contribution to the High-Performance Business

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This report contains findings and analyses associated with a research project that sought to understand how companies derive competitive advantage from their supply chains. William Copacino and Dr. David Anderson of Accenture served as executive sponsors of the project. The research effort was led by Roger Dik, Hans von Lewinski and Dr. Jonathan Whitaker from the Accenture Supply Chain Management service line, in conjunction with Dr. Jeffrey Brooks of the Accenture Institute for High Performance Business; Dr. Luk Van Wassenhove, Dr. V. Daniel Guide, Jr., and Vadim Gritsay of INSEAD; and Drs. Hau Lee, Barchi Peleg and Seungjin Whang of Stanford University.



According to Dell, the supply chain is “the biggest leverage point we have.” At global clothing manufacturer/retailer Zara, “the supply chain is the business model.” And international trading company Li & Fung opines that “customer value lies in our ability to architect and operate supply chains.”

The above observations may not be those of typical companies. But more and more, they match the insights and opinions of today's leading companies. In fact, a real correlation has been drawn between companies' financial success and the depth and sophistication of their supply chains. That connection—supply chain excellence tied to financial performance—is a key finding of this report, which was developed by three interconnected research teams working with hundreds of companies on two continents.

However, the report's identification of a direct link from supply line to bottom line is only the beginning. The multidisciplinary research team also formed conclusions about how and why leading companies incorporate supply chain management into their business strategies. Another channel of inquiry focused on the design and development of integrated operating models—which researchers found to be the key strategic difference between supply chain leaders and also-rans. Furthermore, the team devoted significant effort to understanding how supply chain leaders execute against their operating strategies and adapt them to changing market needs.

Altogether, this report may represent the most comprehensive supply-chain-performance inquiry published to date. It synthesizes research results gleaned from interviews with business executives, analysts and academics; statistical analyses of publicly available data; extensive reviews of business and technical literature; and a multicountry survey on the supply chain views and experiences of leading executives. Most importantly, however, the report discusses the relationship between supply chain excellence and financial performance: the “why,” the “who,” the “what” and the “how.” Today's and tomorrow's leaders are invited to look more closely at the growing businesswide impact of supply chain mastery.

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# The Foundations of Competitive Advantage

Supply chain management hasn't always been a corporate priority. In fact, supply chains used to be viewed largely as cost centers: loose confederations of functions that companies had to have to manage materials and serve customers. When senior executives did turn their attention to the supply chain, it often was to cut costs from existing operations, rather than to explore opportunities for competitive advantage and differentiation.

Throughout the 1990s, however, innovative companies, such as Dell, Nokia, Seven-Eleven Japan, Wal-Mart and Zara, consistently outperformed their competitors—both financially and in customer satisfaction. For these companies, it became evident that supply chain management was among their most powerful weapons.

Today, the need for integrated, global supply chain management is largely unquestioned. It is accepted, for example, that supply chain leaders usually work more effectively with external business partners. They also tend to design, build, move, store, sell and service their products

with greater speed and economy. Now, more than ever, supply chains are regarded as sources of business value.

## Questions Remain

Although the importance of supply chain management is broadly acknowledged, few senior executives are sure about how and where to direct their supply chain investments to maximize business results. This is a critical disconnect. Opportunities for supply chain enhancement are everywhere, but specific information about strategic value often is absent. In other words, executives want—and need—to know what supply chain programs will affect their companies' performance in the most substantive way, and what paths they should take to manage the complexity and challenges that accompany supply chain initiatives. They also need more and better information about what it means to be a supply chain leader, what advantages are associated with supply chain leadership, and what supply chain leaders actually do to ensure or extend their competitive advantage.

## Research Note 1: Three Fundamental Questions Addressed by the Research

### Why is the supply chain strategic?

- In what contexts do executives see the supply chain as a vital (i.e., strategic) component of their business?
- Can a clear relationship be established between supply chain performance and shareholder value?

### What is the nature and success probability of various transformation initiatives?

- What alternatives exist for structuring and managing supply chain transformation projects?
- What is the likelihood of success for each identified planning and implementation alternative?

### How are leading companies using the supply chain to drive competitive advantage?

- What forms of business value do companies most frequently desire from their supply chain initiatives?
- What supply chain functions are thought to provide the largest improvement opportunities?
- What are the most widely applied best-practice capabilities of supply chain leaders?
- On an ongoing basis, how do business leaders increase the value of their supply chains?

Team members from Accenture, INSEAD and Stanford analyzed corporate-disclosure data from more than 600 Global 3,000 companies and statistically related supply chain performance to market cap growth.

This report presents the findings of a multifaceted research initiative dedicated to addressing these concerns: understanding, demonstrating and creating supply chain value. Research Note 1 highlights the three overarching questions that Accenture, INSEAD and Stanford sought to answer through the research effort.

## Research Overview

Research undertaken to address the questions in Research Note 1 was particularly fruitful and unique because the team followed several distinct lines of investigation. First, to establish the supply chain's linkage to financial performance, team members analyzed corporate-disclosure data from more than 600 Global 3,000 companies, and statistically related supply chain performance to market cap growth during two three-year time periods. Varying patterns of supply chain performance were identified from this review.

Additionally, the team identified and documented the success factors leading to supply chain excellence. To achieve this, they:

- Conducted in-depth interviews with more than 75 executives from 60 companies. Those interviews focused primarily on how companies design, enable, execute and improve their supply chain capabilities.
- Developed and circulated a Web-based survey to capture the supply chain insights and experiences of leading executives from companies across North America and Europe. More than 100 business leaders responded (no overlap with the 75+ executive interviewees).
- Analyzed and compared results from previous Accenture, INSEAD and Stanford research studies, including "Unlocking Hidden Value in the Personal Computer Supply Chain" and "Winning Supply Chains in the Food and Consumer Packaged Goods Industry." These studies both concluded that linking supply chains to business strategies, and collaborating with supply chain partners to design products and operate fulfillment networks, are key to superior, sustainable financial performance.
- Consulted with outside industry analysts and academic experts, as well as Accenture executives. Extensive reviews of business and technical literature on supply chain management also were performed.

# Key Findings

**Key Finding 1 of 4:** Senior executives at leading companies view supply chains as critical drivers of shareholder value and competitive differentiation. Confirming that perspective, the research shows a strong connection between superior supply chain performance and financial success.

As noted at the outset of this report, the perceived value of supply chain management is an increasingly hot topic. However, the conclusions drawn by the researchers bring a new and important level of empiricism to this discussion. For example, a broad swathe of executives confirmed the critical role of supply chain management: Nearly 90 percent of survey respondents indicated that the supply chain is very important or critical to their business. An equal percentage have increased their supply chain investments in recent years (Figure 1).

Far more difficult to ascertain, however, is how (and how significantly) supply chain mastery actually contributes to increases in shareholder value. This mission—quantifying the

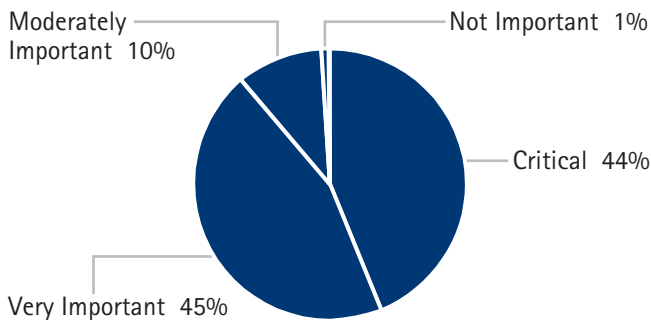
relationship between supply chain performance and business success—lay at the heart of the research effort.

To establish such a relationship, the research team analyzed corporate disclosure data from 636 Global 3,000 companies in 24 industries. For each company, three supply chain performance variables were measured: inventory turns, cost of goods sold as a percent of revenue, and return on assets. Two distinct time periods—1995 to 1997 and 1998 to 2000—were used to relate gains or slips in supply chain performance to improvements or deterioration in financial performance.

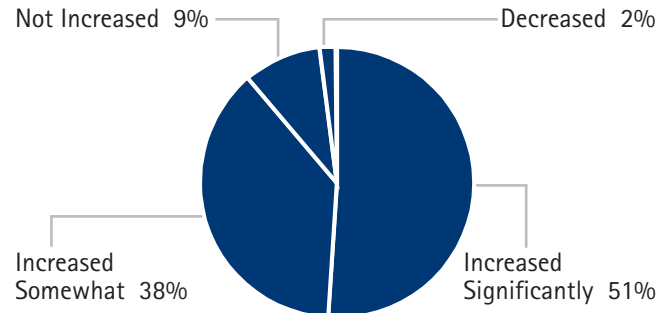
For the purposes of the research, superior supply chain performers were defined as those whose supply chain execution was ranked in the top third for at least two of the three variables (inventory turns, cost of goods sold and return on assets). Companies were assessed according to these criteria for each time period and placed in one of four categories (Figure 2):

- **Leader:** Superior supply chain performance demonstrated in both time periods.
- **Transformer:** Supply chain performance migrated into the superior range over time.

**"How important is supply chain management to your company/industry?"**



**"Over the previous three years, your investments in supply chain capabilities have..."**



**Figure 1:** Survey recipients were asked to note the level of importance they attach to supply chain management and whether their supply chain investments have increased over the previous three years.

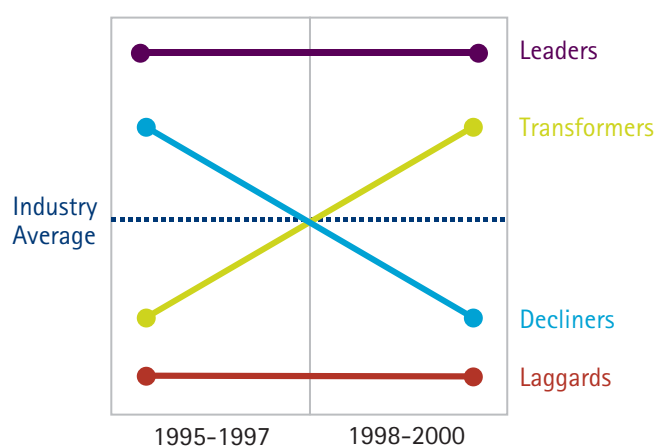


Figure 2: Classifications of supply chain performers.

- **Decliner:** Supply chain performance deteriorated over time, from within the superior range to below it.
- **Laggard:** Superior supply chain performance was not achieved during either time period.

Next, a similar exercise was performed to identify and categorize each company's financial performance across the same time periods. Superior financial performance was defined as better-than-average compound average growth rate (CAGR) of market capitalization within an industry. Again, each company was defined as a leader, transformer, decliner or laggard based on its financial performance across both time periods.

From there, the team cross-tabulated the researched companies on the supply chain and financial performance categories noted above, and determined the actual percentage that fell into each category (the upper number in each cell of Figure 3), as well as the percentage expected if no relationship existed between the supply chain and financial classifications (the lower number in parentheses).

Transforming supply chain operations can have a substantial impact on growth in market capitalization, enabling improvement-driven companies to catch up with—and even outpace—the growth of traditional supply chain leaders.

Supply Chain Category	Financial Category			
	Lagg.	Decl.	Trans.	Lead.
<b>Leaders</b>	1% (5%)	7% (5%)	1% (4%)	<b>9%</b> (4%)
<b>Transformers</b>	2% (2%)	2% (2%)	<b>3%</b> (2%)	3% (2%)
<b>Decliners</b>	3% (3%)	<b>5%</b> (3%)	1% (2%)	2% (2%)
<b>Laggards</b>	<b>22%</b> (17%)	13% (16%)	19% (15%)	9% (14%)

Upper percentage in cell = Actual percent of researched companies

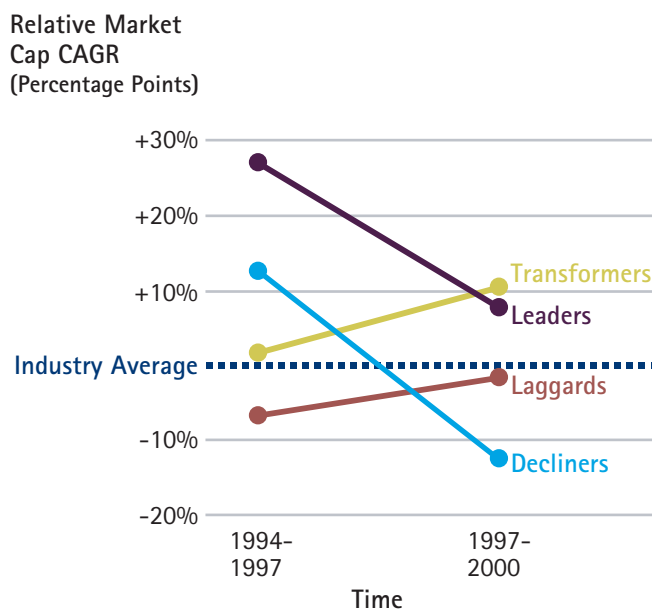
Lower percentage in cell = Percent expected from random or no relationship

Figure 3: Cross-classification percentages of the 636 studied companies reveal a strong relationship between supply chain performance and financial performance.

For example, the upper-right cell of Figure 3 indicates that 9 percent (57 of 636) of the researched companies were classified as both supply chain leaders and financial leaders. This is higher than the expected value for the cell (4 percent). The same connection was demonstrated all along the main diagonal: Supply chain transformers showed a higher-than-expected probability of also being financial transformers; supply chain decliners showed a higher-than-expected probability of also being financial decliners; and supply chain laggards showed a higher-than-expected probability of also being financial laggards. This pattern strongly suggests a direct relationship between supply chain and financial performance. In addition, companies in any particular supply chain category (those in a single row of the table) are most likely to also be

classified in the corresponding financial category. A subsequent statistical test (Chi-Square,  $p < .0001$ ) provided strong supporting evidence for the existence of a relationship between the supply chain and financial classifications.

As shown in Figure 4, supply chain leaders showed a market cap CAGR between seven and 26 percentage points higher than the industry average growth rate. Over time, transformers showed an average boost in relative market cap CAGR of eight percentage points. Conversely, laggards' market cap CAGRs trailed the industry average growth rate by two to five percentage points, while decliners showed an average drop in relative market cap CAGR of 25 percentage points.



Note: Time periods cover four years to calculate three-year CAGRs.

**Figure 4: The financial success of companies in the four categories tracked tightly to supply chain performance.**

The team also tabulated relative financial-performance data by industry. As shown in Figure 5, virtually all companies that improved their supply chain performance (transformers) had a higher growth rate in market capitalization in the second time period. On average, they outpaced the average growth rate of leaders in the second period by three percentage points (as noted in Figure 4). For example, supply chain leaders in the air transport industry experienced market cap growth from 1994 to 1997 that was 39 percentage points higher than their industry's average. From 1997 to 2000, however, their relative advantage over the industry average dropped to 13 percentage points. In fact, the top companies in most industries saw their performance advantage decrease over the time periods studied. This clearly shows the strength of up-and-coming transformers in these industries.

Once again, these findings suggest that transforming supply chain operations can have a substantial impact on growth in market capitalization, thus enabling improvement-driven companies to catch up with—and even outpace—the growth of traditional supply chain leaders that do not continually improve their capabilities. These results validate the efforts of forward-thinking executives who are increasingly looking to the supply chain to spur corporate differentiation and growth in shareholder value.

After determining that supply chain performance improvements contribute to shareholder value growth, the team concluded this stage of the research by identifying industries in which supply chain leadership opportunities currently exist (Figure 6). The team used inventory turns as the measure of supply chain

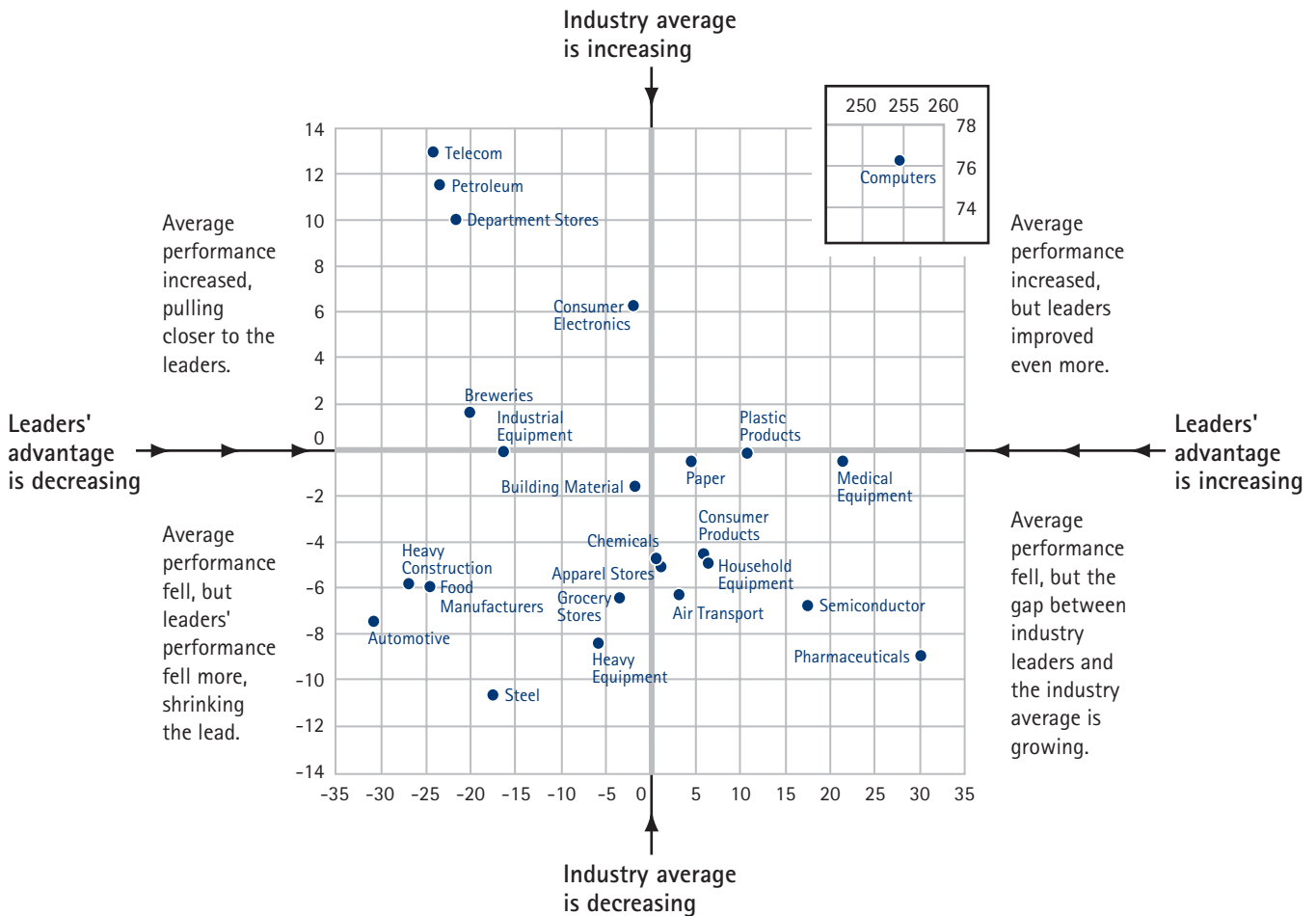
performance. Individual industries' shifts in average supply chain performance (the vertical axis) were mapped against changes in the gap between average industry performance and the performance of the top three companies within each industry (the horizontal axis).

Industries in the lower half of the chart experienced decreasing inventory turns over time, perhaps due to additional SKUs or declining demand. The supply chain leaders in industries in the left half of the chart saw their performance advantages

decrease over time. The only industry shown to experience increases in average industry supply chain performance and leadership advantage was the computer industry. This supports the contention that tremendous opportunities for value creation and performance improvement exist in virtually all industries. It is good news for companies trying to catch up, but it also should serve as a wake-up call to industry leaders about the improvement potential of their own supply chains.

	Air Transport	Apparel Stores	Auto-motive	Breweries	Building Material	Chemicals	Computers	Consumer Electronics	Consumer Products	Dept. Stores	Food Mfrs.	Grocery Stores
<b>1994-1997</b>												
Leaders	39%	17%	23%	7%	20%	19%	47%	30%	4%	11%	19%	21%
Transformers	0%	49%	16%	2%	4%	-12%	-27%	10%	9%	-26%	14%	-1%
Decliners	1%	0%	-6%	0%	2%	11%	6%	-2%	10%	21%	18%	5%
Laggards	-7%	-9%	-7%	-3%	-4%	-5%	-12%	-9%	-3%	-2%	-7%	-8%
<b>1997-2000</b>												
Leaders	13%	22%	-14%	5%	9%	-6%	44%	20%	-2%	4%	6%	15%
Transformers	-9%	7%	-5%	-1%	-1%	14%	9%	10%	1%	-4%	8%	8%
Decliners	-22%	0%	20%	0%	-19%	-5%	-13%	-25%	-15%	-32%	-17%	-10%
Laggards	3%	-7%	1%	-2%	1%	0%	-11%	2%	3%	3%	-1%	-5%
	Heavy Construct.	Heavy Equip.	Household Equip.	Industrial Equip.	Medical Equip.	Paper	Petroleum	Pharma	Plastic Products	Semi-conductor	Steel	Telecom
<b>1994-1997</b>												
Leaders	38%	15%	33%	20%	29%	10%	9%	29%	18%	26%	26%	40%
Transformers	6%	0%	0%	-12%	-16%	3%	-1%	20%	12%	-3%	-21%	5%
Decliners	53%	0%	2%	23%	15%	7%	18%	-6%	12%	-1%	34%	40%
Laggards	-20%	-8%	-6%	-10%	-11%	-4%	-6%	-11%	-14%	-6%	-12%	-20%
<b>1997-2000</b>												
Leaders	-4%	5%	-5%	4%	4%	3%	3%	-5%	3%	-3%	-2%	45%
Transformers	49%	0%	0%	24%	6%	20%	5%	-10%	17%	20%	43%	86%
Decliners	-4%	0%	-6%	-18%	2%	-6%	-6%	-2%	-32%	-15%	4%	-39%
Laggards	-5%	-3%	3%	-2%	-2%	-4%	0%	3%	8%	1%	-7%	-17%

Figure 5: Relative market cap growth by supply chain performance category and industry.



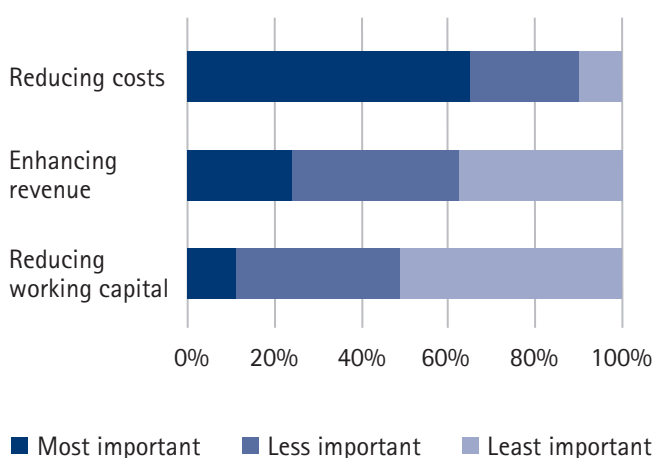
X Axis = Change in Gap between Top 3 Companies and Industry Average (Percentage Points)  
 Y Axis = Change in Average Inventory Turns (Percent)

Figure 6: Change in industry supply chain performance, 1995 to 1997 and 1998 to 2000. Analysis of inventory turns shows deteriorating performance in a majority of industries and an inability of many supply chain leaders to consistently sustain or grow their operational advantage. In the petroleum industry, for example, average inventory turns increased by roughly 12 percent from the first study period to the second. Concurrently, the gap between the industry's average inventory turns and those of supply chain leaders narrowed by almost 25 percentage points. In the pharmaceutical industry, average inventory turns decreased by nearly 10 percent from one study period to the next. However, the gap between the industry average and the inventory-turn performance of pharma supply chain leaders grew by about 30 percentage points.

## Key Finding 2 of 4: Leading companies incorporate supply chains into their business strategies and devote significant attention to designing integrated operating models.

After determining that 1) supply chain management is a topic of broad importance to senior executives, 2) supply chain performance and financial success are closely related, and 3) significant room for operational improvement exists in most industries, the research team sought to learn how—and toward what goals—the most successful companies leverage their supply chains.

In pursuit of these ends, the team conducted a Web survey. The survey revealed that, from a financial perspective, "reducing costs" is still the preeminent driver of supply chain improvement initiatives (Figure 7). This is to be expected, since supply chain management always has been a linchpin of operational efficiency.



**Figure 7: Survey recipients were asked to rank various financial performance drivers in order of importance to their company's supply chain initiatives over the previous three years.**

More noteworthy, however, is that nearly 25 percent of survey respondents cited "enhancing revenue" as their initiatives' most prominent driver. Among North American respondents, those giving priority to revenue enhancement exceeded 30 percent.

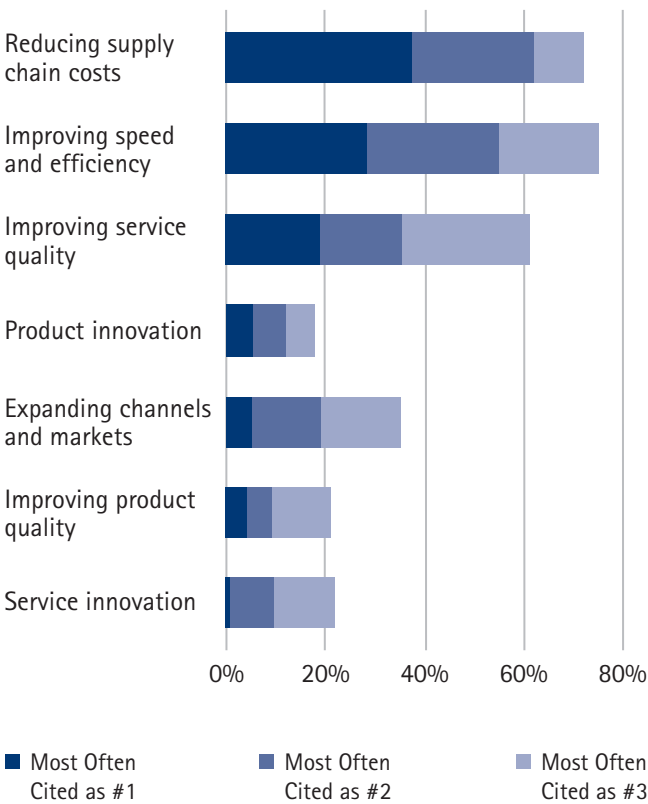
Of course, companies citing "enhancing revenue" as their initiatives' principal driver are not unconcerned about reducing costs. But they are acknowledging supply chain management's growing potential as a front-office tool.

**Nearly 25 percent of all survey respondents (and 30 percent of North American respondents) cited "enhancing revenue" as their supply chain improvement initiatives' most prominent driver.**

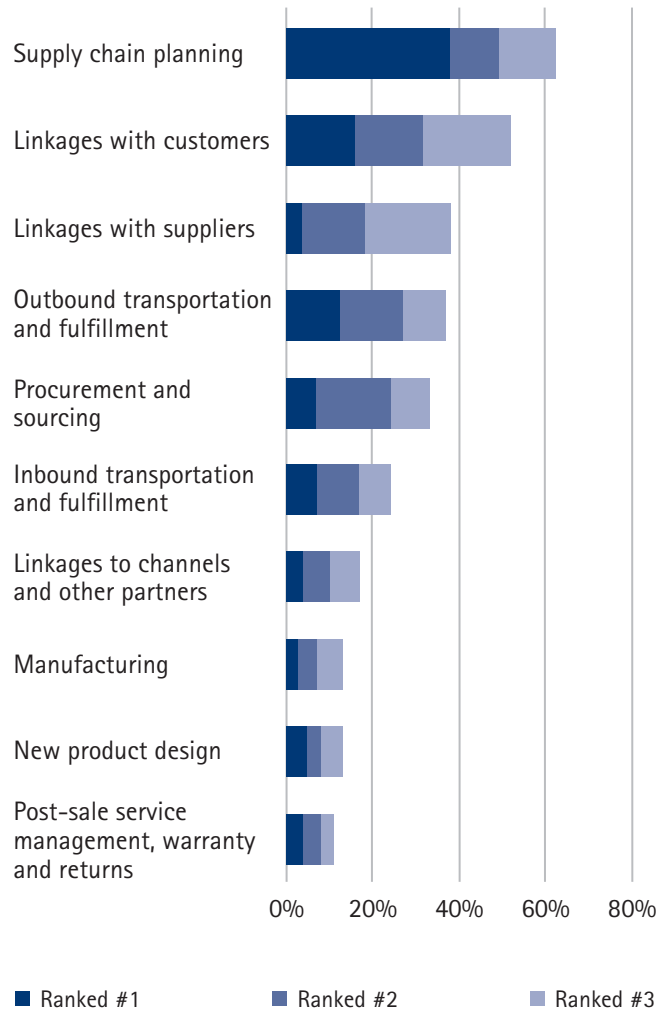
Consider the newer ways that demand manifests itself (via the Web, through online marketplaces or in conjunction with partnerships) and how critical supply chain proficiency is to supporting each of these venues. It also is true that more and more margin potential is being derived after a product ships. In effect, service and support are becoming as important as the product itself. And supply chain management is the heart of profitable service and support.

Confirming the above observation, "service quality" was one of the most frequently cited drivers of operational performance improvements (Figure 8). Nearly 20 percent also identified "product innovation" as a top-three motivator. Clearly, these respondents appreciate the increasingly important role that supply chain management plays in supporting collaborative design processes and maintaining tight control over the complete, end-to-end product life cycle.

In addition, the survey revealed that “supply chain planning” and “linkages with customers and suppliers” are perceived to offer the greatest operational-improvement opportunities (Figure 9). Planning and linkages also proved to be among the capabilities most frequently transformed by respondents’ recent supply chain initiatives. Clearly, investments in these capabilities can help companies respond more effectively to changing market conditions, proactively control costs, and tighten relationships through greater information sharing and collaboration.



**Figure 8:** Survey respondents were asked to rank various operational performance drivers in order of importance to their company’s supply chain initiatives over the last three years.



**Figure 9:** Survey respondents were asked to identify the three supply chain capability areas that they believe provide the largest improvement opportunities.

## Winning Supply Chain Strategies

Every company has its own supply chain affinities and emphasis points. However, the interviews and surveys conducted by the research team show that virtually all winning business strategies have competitively advantaged supply chain strategies at their core (Research Note 2).

For example, Nokia's frequent and rapid product introductions—major contributors to fast revenue and profit growth—are supported by a very flexible and efficient global supply chain. In effect, Nokia has altered the playing field with rapid-response manufacturing, quick-ship logistics, and a "global supply web" that links Nokia suppliers and plants, and also supports vendor-managed inventory (VMI) and collaborative planning. These capabilities have contributed to 20 percent margins, a 35 percent market share, and an average cost to make and sell phones that is 18 percent lower than its rivals.

Another company the research team studied is Zara, a global clothing manufacturer/retailer whose supply chain strategy is to dictate industry standards for time to market, costs,

Supply chain planning and linkages with customers and suppliers are perceived to offer the greatest operational-improvement opportunities.

order fulfillment and customer satisfaction. Zara owns almost all of its 450 retail stores; its managers send customer feedback directly to the company's in-house designers via handheld devices. This keeps designers instantly abreast of fast-changing trends and demands, and gives Zara a jump on curtailing the sale of less-desirable merchandise. The result in both cases is better-managed inventories, tight linkages between demand and supply, and reduced obsolescence costs. Zara also acquires fabrics in only four colors and postpones dyeing and printing until close to manufacture, thus reducing waste and minimizing the need to clear unsold inventories.

## Research Note 2: Competitively Advantaged Supply Chain Strategies Are at the Core of Most Winning Business Strategies

### Strategies designed to significantly alter the competitive playing field

Nokia can quickly adapt to fast-changing consumer cell phone preferences using innovative design, supply, production and logistics strategies.

### Strategies that focus on setting industry standards for time to market, costs, order fulfillment and customer satisfaction

Zara employs creative sourcing and postponement strategies to beat rivals to market by months with new fashion products.

### Strategies that include performance-driven linkages to external supplier/customer partners to ensure maximum connectivity and information sharing

Taiwan Semiconductor Manufacturing Co. (TSMC), one of the world's largest semiconductor foundries, uses customer-responsive design and Web-based manufacturing collaboration tools to connect with customers from product concept to delivery.

## Many supply chain leaders adopt an integrated operating model to successfully balance supply and demand across internal operations and with supply chain partners.

With these supply chain innovations, Zara can deliver new styles in three to six weeks, compared to up to five months for competitors. It also helps explain why Zara has experienced 20 percent sales growth for more than a decade, along with consistent, industry-leading 10 percent profit margins.

A third supply chain strategy emphasizes performance-driven linkages to suppliers and customers. The research team noted that Taiwan Semiconductor Manufacturing Co. (TSMC) has extensive, Web-enabled linkages with suppliers (demand forecasts, production requirements and logistics data are available 24/7) and customers (many of which have electronic access to key TSMC design, planning and logistics tools). These connections have helped TSMC achieve the semiconductor industry's shortest manufacturing-cycle times from design to final product. TSMC also enjoys some of the industry's highest yields and highest levels of customer satisfaction.

### Supporting Winning Supply Chain Strategies with Integrated Operating Models

Most companies focus on defining high-level business strategies. But they don't spend enough time designing an integrated operating model before implementing detailed processes and capabilities to execute the strategy.

An integrated operating model often is the key to successfully balancing supply and demand across internal operations and with supply chain partners. Although they vary significantly by industry, integrated operating models always incorporate world-class business processes—particularly customer relations, supplier management, new product design and

core logistical operations. They also tend to be the product of a management culture that encourages supply chain excellence and insists that its people understand and flawlessly execute supply chain processes.

The research team identified three distinct approaches to defining an integrated operating model:

- **Out of the box:** These companies developed an industry-redefining operating model as a core component of their initial overall strategies. Dell, for example, pioneered the direct-to-customer supply chain model for personal computers, bypassing traditional, higher-cost distributor/retail channels and enabling consumers to customize their purchases and deliveries. The company also excels at adjusting prices in response to supply/demand conditions.
- **Later in life:** These companies transformed to an integrated operating model as their executives recognized the opportunity to enhance competitive advantage. Seven-Eleven Japan moved to eight store deliveries per day when it realized that custom assortments of key products that are oriented to time-of-day shopping could enhance revenues and profits.
- **Focused transformation:** To leapfrog the competition, these companies adopted an integrated operating model in a specific part of their business. General Electric and Home Depot worked together to develop a "buy one/make-and-ship one" model for home appliances. This approach minimizes inventory in retail stores and distribution channels, while providing consumers with more product options, customized deliveries and post-sale services.

### Key Finding 3 of 4: Leading supply chain companies build innovation into their operating models, particularly with respect to outsourcing, internal/external integration, and matching supply and demand.

Innovation is an important term that is often made meaningless by overuse or inappropriate use. However, most of the world's top companies understand that the basis of competitive differentiation is new—that is, innovative—ways to improve operating performance. The research team identified three distinct capabilities that foster or reflect innovation and supply chain leadership:

- Matching supply and demand
- Next-generation efficiency gains
- Organizational integration

### Matching Supply and Demand

Supply chain leaders' core operating principle and most critical supply chain process is balancing market needs with available supply. Researchers identified several best practices associated with this capability, including ultrahigh-frequency deliveries (as practiced by Seven-Eleven Japan) and dynamic pricing coupled with customized assembly (as practiced by Dell).

Collaborative forecasting and inventory management is another important demonstration of supply/demand matching. Consider the collaborative planning, forecasting and replenishment (CPFR)<sup>1</sup> initiative undertaken by Henkel (a multinational manufacturer of consumer and industrial products), Condis (a Spanish supermarket chain) and several packaging suppliers. This group established a CPFR process for laundry and home care products that involves daily data interchange for key items, coordinated business planning (e.g., combined promotions and collaborative forecasts) and jointly defined and measured key performance indicators (KPIs).

<sup>1</sup> CPFR is a registered trademark of the VIC (Voluntary Interindustry Commerce Standards) organization.

## Research Note 3: Rethinking Supply Chain Relationships and Integrating Technology Can Result in Next-Generation Efficiency Gains

### Outsourcing key supply chain activities

By outsourcing non-core activities, Thames Water (the world's third-largest water company) quickly reduced costs and improved service levels in a regulated environment. Inventory levels dropped 50 percent and material availability now exceeds 99 percent.

### Technology-enabled, global procurement management

PolyOne, the world's largest polymer service company, created an integrated, end-to-end network to reduce inventory within the supply chain and improve customer service.

### Vertically integrated and owned supply chains

Esquel, a Far East apparel supplier, ensures quality by owning up-channel material sources, including cotton farms. Control over supply helps it provide unique product solutions; maintain consistent, corporatewide, supply chain metrics; and attain significantly higher margins than competitors.

## By inserting RFID tags into razor packages, Gillette can now track razors and blades from point-of-manufacture to point-of-sale.

### Next-Generation Efficiency Gains

To minimize operating costs and employed assets, supply chain leaders are more likely than most to consider and implement leading-edge operating strategies and technologies. Some of the top food companies, for example, have implemented collaborative transportation-management approaches, while innovative retailers such as Staples and Wal-Mart combine cross-docking and advanced warehouse management to raise the bar in distribution. The research team identified numerous examples of next-generation efficiency gains:

- **Redefining procurement with advanced supplier relationships and technologies, such as eMarkets and electronic (reverse) auctions:** Ahold Netherlands sources highly perishable products directly from farmers, thus ensuring better quality and on-shelf availability through multiyear deals. Ahold also works to cement its relationships by agreeing to buy all production offered and, in some circumstances, guaranteeing farmers' income even if crops fail.
- **Applying selective approaches to outsourcing:** When it comes to outsourcing and collaboration, supply chain leaders think outside the box. As shown in Research Note 3, this may involve seemingly opposing approaches. Thames Water achieved world-class efficiency by outsourcing select supply chain activities. But decision makers at Esquel concluded that the only way to ensure maximum-quality cotton and yarn supply was to own key upstream processes. In effect, "selective" means making an informed choice about whether to actually engage in an activity: to outsource or not to outsource.

- **Partnering for collaborative benefit:** Radio frequency identification (RFID) tags are being attached to Gillette products that are shipped to Tesco stores. These tags enable both companies to track inventories down to the item level, thus reducing channel volume and enhancing forecasting and planning capabilities. In addition, Gillette now can track razors and blades from point-of-manufacture to point-of-sale, and Tesco can restock shelves and replenish inventory with greater speed and efficiency.

In another example of innovative partnering, Coca-Cola now markets and distributes Groupe Danone bottled water in the United States, using a shared-assets strategy to reduce costs. Danone contributes brand and manufacturing sites, while Coca-Cola provides marketing and distribution expertise. Already, the arrangement has increased both sides' volume and margin potential, while reducing supply chain costs through additional product efficiencies.

### Organizational Integration

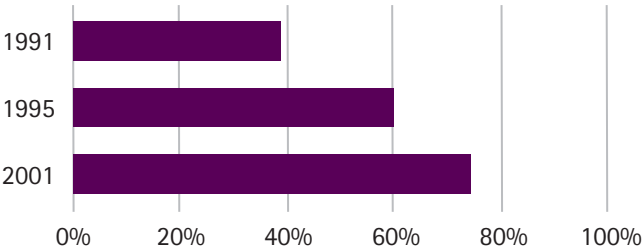
Supply chain leaders align internal and external organizations to maximize product life cycle revenues from customers. To achieve this, they use value-analysis tools, shared metrics, and innovations in post-sale support and management. The best example identified by the research team is Saturn. Since its formation in the mid-1980s, the company has emphasized total life cycle ownership value by providing low prices and exceptionally high levels of after-sale service. By pooling retailer inventories, buying original equipment manufacturer (OEM) parts and spares through the GMC procurement network, and linking demand data with external parts suppliers to support production planning, Saturn enjoys:

- Retail inventory turns that are 50 percent above the industry average.
- The automobile industry's highest percentage of OEM customer loyalty.
- Off-the-shelf parts availability in excess of 92 percent, compared to less than 80 percent in the rest of the industry.

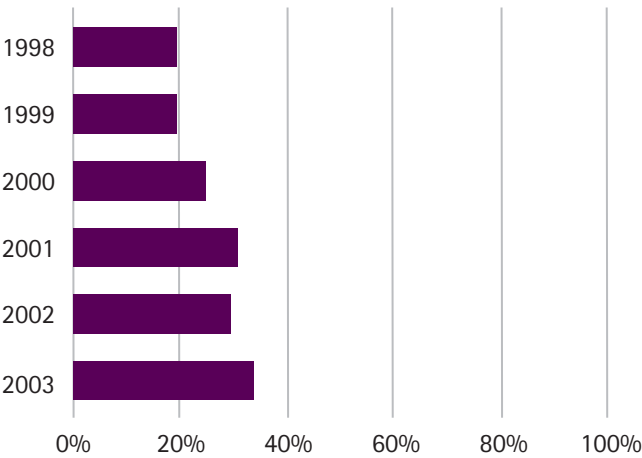
### Research Note 4: The Rise of Outsourcing

Researchers identified the outsourcing of select supply chain processes as a particularly potent capability. Supporting this observation, survey findings revealed that the number of companies using third-party logistics providers has doubled over the past decade. As shown below, researchers also learned that responding companies expect to increase the third-party logistics portion of their supply chain budgets to 34 percent in 2003. Respondents noted that outbound/inbound

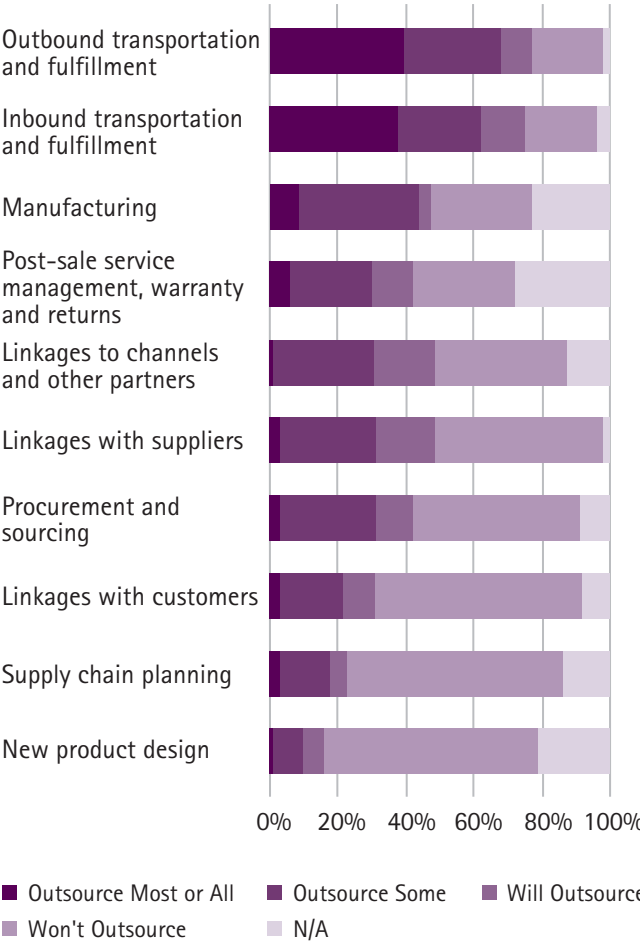
transportation and fulfillment generally command the greatest outsourcing attention. But they also make it clear that numerous other supply chain functions are being embraced.



Percentage of surveyed manufacturers reporting use of third-party logistics services



Actual and projected outsourcing-focused percentage of respondents' supply chain operations budgets (year-to-year)



More than 40 percent of survey respondents outsource some or all of their manufacturing operations. Additionally, complete or partial outsourcing of procurement and post-sale service management activities is approaching 30 percent.

## Key Finding 4 of 4: Leading supply chain companies rigorously execute against their strategies and capabilities, and constantly adapt them to changing market needs.

Simply put, leading supply chain companies “do the basics well” by ensuring that processes are designed to be easily executed and that strict performance standards are met. The research team identified three critical actions associated with this characteristic:

1. **Drive end-to-end process excellence across the operating model.** Nokia was cited as a leader in this area, because it reengineers processes from the customer back through internal functions, thus ensuring market-driven processes.
2. **Develop corporatewide, high-level metrics.** Driven by well-designed and strongly enforced product- and customer-specific performance measures, all of Esquel's operating units work collaboratively to improve supply chain performance.

3. **Foster process-oriented, collaborative cultures within and across organizations.** A leading practitioner is Sun Microsystems, whose customers receive consistent service and quality across the globe from Sun employees with instant access to all account, ordering and delivery information through integrated regional databases.

Supply chain leaders also understand that successful execution is a journey that combines focused completion of everyday tasks with continual supply chain innovations. Put another way, they recognize the importance of continuous improvement and innovation, but never at the expense of smooth, ongoing execution. Research Note 5 showcases three companies that are particularly adept at introducing new initiatives without upsetting day-to-day operations.

## Research Note 5: Leading Supply Chain Companies Generally Excel in the Deployment of Partnering and Outsourcing Strategies

### Use third parties to develop and operate new distribution networks

Microsoft used an extensive network of contract manufacturers and logistics providers to successfully launch its Xbox game machine.

### Make customers an integral part of the supply chain process

DuPont's retail customers take responsibility for mixing final colors and ensuring paint quality, thus reducing DuPont's supply chain costs significantly.

### Have suppliers assume primary responsibility for product quality

Grainger, the leading industrial distributor of facilities maintenance products, uses a four-step approach to supplier quality management: 1) educate, 2) establish objectives, 3) continually improve processes, and 4) ensure tight and frequent communication.

# Transforming the Supply Chain: Insights and Guidelines

Each of the key findings in the previous section are the product of multiple research streams: statistical analyses of corporate data; consultations with business executives, analysts and academics; extensive reviews of business and technical literature; and a multicountry survey of leading executives' supply chain insights and experiences.

Taken together, however, the information collected by Accenture, INSEAD and Stanford also makes several clear implications. For example, three supply chain management strategies can be inferred as common to most business leaders, regardless of industry:

1. **Relentlessly shorten the overall supply chain to reduce costs and enhance profits.** A prime practitioner in this area is Zara, which is able to bring 11,000 new fashions to market each year—generally with a three-week lead time.
2. **Flawlessly execute supply chain capabilities internally and with partners.** Dell, for example, has eliminated inventory echelons and reduced supply chain costs by fostering broad partnerships with suppliers.
3. **Continuously evolve strategies and operating models in anticipation of new market conditions.** As discussed earlier, Seven-Eleven Japan makes ultra-frequent deliveries to match consumer desires that shift during the day. Those deliveries are coupled with new product and service offerings that build on efficient supply chain models.

The importance of these three strategies is their ubiquity: They are the strategic cornerstones of virtually any company's supply chain transformation agenda. Of course, no two companies will follow an identical transition path. But the ones that succeed most completely are certain to have constructed short, tight supply chains that are flexible and fundamentally collaborative.

The actual process that a company chooses to map its transformation is far more subjective—dictated by market conditions, financial circumstances, corporate culture and the nature of the transition itself. However, from the research, interviews and survey, the team identified these basic supply chain transformation methodologies:

- **Big Bang** speaks to a complex change effort, with many interrelated parts that are planned well in advance and executed during a yearlong or multiyear initiative. Many companies use Big Bang when implementing enterprise resource planning (ERP) systems. Given the effort required from many stakeholders, however, it is often a response to perceived urgency. The research team identified British Airways as a prime example: Responding to a major industry downturn, the airline launched flat-bed seating in Club World Class in record time using innovative design and procurement strategies.
- **Crawl-Walk-Run** takes a more phased approach to supply chain transformation. Generally, the overall initiative is conceptualized, and limited parts are implemented to pilot-test assumptions. If the pilot is successful, the initiative then is scaled up throughout the organization. This technique was used at Whirlpool, where problems with a prior ERP initiative motivated managers to take a more cautious, step-by-step approach to significant technology implementations.

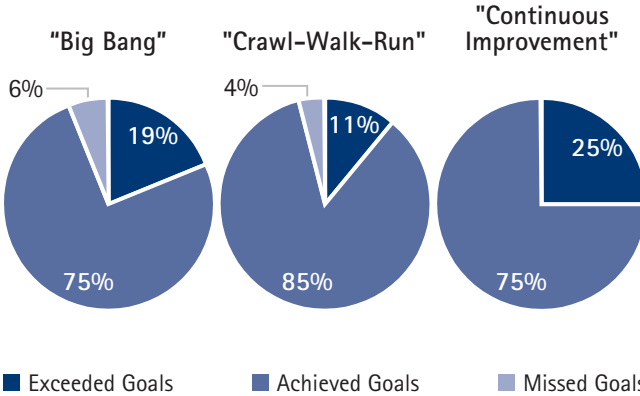
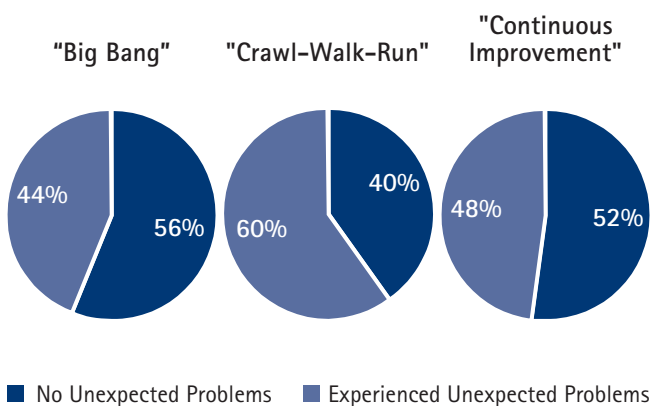


Figure 10: Using input from the Web-based survey, improvement program success rates were gleaned for each of three supply chain transformation approaches.

- **Continuous Improvement** involves converting large-scale efforts into shorter-cycle projects that are evaluated and modified to accommodate changing business conditions every 90 to 180 days. The research team found that this approach is most prevalent in high-technology, fast-changing industries, since 90-day to 180-day cycles with clear outcomes are especially useful in environments where rapid change is the norm. For example, Cisco Systems breaks its supply chain initiatives into 90-day efforts, with evaluation and corrections decided before the next phase. It should be noted, however, that transformation via Continuous Improvement can be difficult to implement: Some companies find it challenging to reconcile 90-day initiatives with their annual budget cycles.

As shown in Figure 10, all three methods tend to be similarly successful. Each method also entails comparable levels of unforeseen risk and unexpected problems during implementation (Figure 11). The clear implication is that companies have the potential to successfully plan and implement their supply chain transformation initiatives using any one of the three approaches. The key is identifying the approach that best fits each company's industry conditions, corporate culture, and specific operational and financial needs.



**Figure 11: Problems encountered during respondents' most recent supply chain initiatives.**

## What to Embrace: Best Practices in Supply Chain Transformation

A distinction must be made between the operational strategies of supply chain leaders (flawlessly execute, continuously evolve, etc.) and the guidelines those companies use to actually transform their supply chains. For example, leading supply chain companies achieve and sustain competitive advantage by continuously incorporating new supply chain innovations. In effect, they are in a permanent state of transformation—constantly scanning the supply chain environment (marketplace, partners, competitors) for new ideas and opportunities. Tesco, for instance, made the decision to pick and pack Web orders from its retail stores after observing mistakes made by other online, warehouse-based grocers. Several other best practices and best practitioners in supply chain transformation were identified by the research team (Research Note 6).

In addition to the best-practice inferences drawn by the research team, surveyed executives made several other transformation suggestions, drawn largely from their own experiences:

- Constantly challenge employees to bring forward new ideas.
- Speak frequently with customers and vendors to gauge new opportunities.
- Monitor competitors' actions closely and look to other industries for guidance.
- Avoid ranking projects using overly simplistic cost/benefit models.
- Evaluate and adjust priorities frequently, depending on market/competitor conditions.

## What to Be Wary of: Transformation Challenges and Pitfalls

Almost all of the companies that were interviewed, researched or surveyed have undergone a supply chain transformation of one sort or another. Most of the transformations were successful to some degree. However, as shown in Figure 11, slightly more than half of the interviewees encountered unexpected problems during the initiative, including internal and external resistance to change, overly complex and difficult-to-execute business process designs, and inadequate

technology. Most respondents noted that it is unrealistic to assume that nothing of major import will go awry. They underscored that caveat by identifying a number of supply chain transformation's most formidable challenges:

- **Making the technology work as promised:** The preeminent problem identified by executives in the interviews and survey involved over-promising and under-delivering by third-party technology and supply chain vendors.
- **Controlling project costs and meeting service targets:** Respondents emphasized the need to avoid losing the original vision and scope among the inevitable clamor for additional activities and scope changes.
- **Maintaining consistency with business strategies:** Survey results point to the importance of keeping senior executives in agreement with supply chain strategies, while carefully adapting those strategies to market- or competitor-driven shifts in operating requirements.
- **Managing change internally and externally:** Responses point to the criticality of sharing the vision and benefits with all constituents, as well as anticipating possible issues and objections.

As shown in Research Note 7, executives also emphasized the need to avoid key pitfalls that undermine supply chain transformations.

## Research Note 6: Supply Chain Transformation Best Practices and Best Practitioners

### Choose the right initiatives

Dell uses a staged approach to choosing supply chain initiatives. First, it tackles high-payoff areas, such as shared facilities and transport among suppliers. Then it uses the savings and goodwill created to solve tougher challenges (e.g., new forecasting and inventory management tools). Plus, Dell constantly reviews priorities to help it adapt to business changes and keep implementation stages short.

### Prioritize supply chain investments

Nokia uses steering groups (including senior executives) to evaluate and finalize supply chain investments. Balancing supply and demand is always the top decision factor in choosing new projects; however, internal benchmarks and audits are used to compare investment priorities with high-tech competitors. Measurable impacts on end-to-end supply chain metrics are required to justify investments.

### Ensure that initiatives do not conflict with everyday supply chain operations

Seven-Eleven Japan makes extensive use of vendor distribution systems to deliver multiple shipments per day to stores. This helps avoid (potentially conflicting) in-house distribution systems, while supporting highly varied product selection. Seven-Eleven Japan focuses in-house delivery operations on strict performance metrics, and it outsources activities that might adversely affect costs or service.

### Develop a cross-supply-chain-optimization mentality

Wal-Mart focuses on how to take costs out of the entire supply chain—from producer to consumer. Key objectives are lowering prices to the consumer and achieving higher sales and inventory velocity.

## Research Note 7: Pitfalls That Can Undermine Supply Chain Transformation (Cited by Surveyed Executives)

### Top-management commitment wanes

Supply chain transformations are often expensive, complex and time-consuming; there is always a chance that strategies and/or executive priorities will change. To mitigate this risk, Nokia places top executives on its supply chain project steering committees. At Dell, supply chain executives meet regularly with top officers for strategy and project reviews.

### Technology solutions fail to meet standards

This is a common problem, as evidenced by supply chain problems at Kmart, Nike and others. TSMC addresses it by using a small-project, staged approach: making sure that one system works well before starting on another. Intel's method is to install the same technology in all plants, thus reducing errors and minimizing training barriers.

### Change requirements exceed management/culture limits

The level of strategic change often conflicts with daily operational requirements, thus intensifying organizational stress. Seven-Eleven Japan's solution is to use suppliers to design and operate "experimental" store deliveries for new products. Groupe Danone partnered with Coca-Cola to distribute Evian water in North America, thus avoiding the time, cost and trauma of making and managing significant supply chain investments.

### Collaborative partners do not deliver

Ensuring that everyone does their part is a major challenge. To minimize the problem, Wal-Mart holds frequent meetings with suppliers—clearly detailing requirements and how performance will be measured. The manufacturing group at smart (a subsidiary of DaimlerChrysler AG) co-locates suppliers near or within final assembly operations, setting up joint management committees to oversee compliance.

## What to Look for: Metrics and Success Factors Associated with Supply Chain Transformation

Successful benchmarking and metrics development often require that an actual program be put in place to capture and analyze supply chain information. In the case of supply chain transformation, there is a need for data that span the enterprise, so metrics management ideally will be led by a corporate-level organization that can see the "big picture." Efforts undertaken at the departmental level (one business unit leading the charge) are seldom effective, unless that department's energy and enthusiasm can be amplified to produce a coordinated, enterprisewide program.

Supply chain executives involved in the research effort consistently cited the five metrics below as key to assessing the value of their supply chain transformations. Each of the five is conceptually simple. But it is much more difficult to understand exactly what the measurement parameters entail. That is why a formal program with executive-level involvement is so important.

- **Efficiency/cost savings goals met:** Did documented goals hit targets at the time specified, and did the CFO accept the results?
- **Enhanced customer service:** Do surveys (both formal and informal) confirm that customers find it easier and less expensive to do business with the company?
- **Top-management involvement:** Do senior executives understand how supply chain initiatives will improve the business, and do they agree on the impacts?
- **Technology works as promised:** Did software packages, and the integration projects supporting the initiatives, meet their objectives and timelines?
- **Change goes smoothly:** Did the company anticipate problems and deal with them quickly and without crises? Did contingency plans work, if needed?

# Looking Ahead

The purpose of this research effort was not to prescribe a specific regimen of transformation actions or behaviors. Doing so would be neither constructive nor realistic. After all, the methodology used to change, expand, enhance or otherwise transform the supply chain is not only company-specific, but also situation-specific: Large differences in an organization's transformation approach can result from its economic circumstances, competitive situation, technology status and the extent to which it collaborates (or desires to collaborate) with business partners. For this reason, a more valuable way to conclude this report is to focus on three big-picture areas.

The first of these is a general supply chain transformation framework—a template companies can use to develop, customize and execute their own unique transformation initiatives. As shown in Figure 12, supply chain transformation programs generally involve these distinct phases:

1. **Develop a supply chain strategy:** Companies develop a business case, define and refine their integrated operating model, and develop an implementation plan.
2. **Design and deploy:** Companies design and specify the supply chain technology infrastructure that will support the new or revised operating model. They also work to

define business processes, procedures, operating metrics and the organizational infrastructure.

3. **Operate and sustain:** New organizational roles, technology and metrics are in place, and a tangible benefit stream has been tapped.

The second big-picture area is key success factors that—according to researchers, interviewees and survey respondents—are common to all supply chain transformation efforts. This group identified the following big-picture factors:

1. **Assume an active and aggressive focus on making change work for—not against—the initiative:** Zara, for example, includes store-level employees and managers in decisions involving new fashion introductions and prospective efficiency improvements, thereby securing needed buy-in to support change and minimize problems during implementation.
2. **Jointly define KPIs:** Internal and external collaboration with supply chain constituents is needed to set performance goals. Researchers noted that Henkel set specific, mutually acceptable KPIs with Condis at both the pilot and rollout stages of their CPFR project.

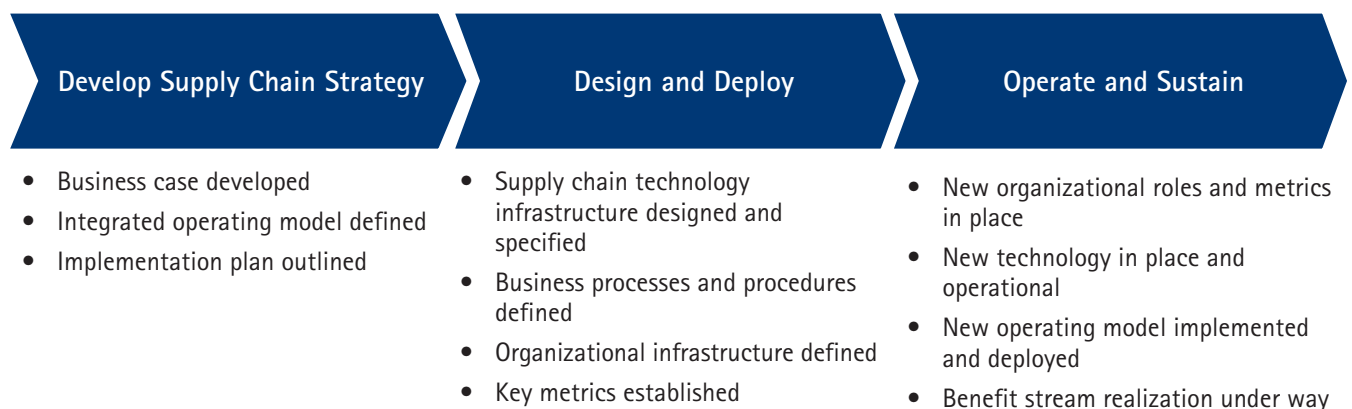


Figure 12: Important activities must be completed during each of a supply chain transformation's three stages.

## Supply chain transformations become casualties when leaders lose faith in the strategy or process.

3. **Exhibit unwavering leadership:** Supply chain transformations become casualties when leaders lose faith in the strategy or process. Texas Instruments had multiple, senior-level champions behind a global project to reengineer planning and forecasting. This helped TI overcome obstacles and stay focused.

The third area is predictive: broadly projecting the influence of supply chain transformation on the overall business landscape. The following forecasts hone in on supply chain transformation:

1. **The best will get better: Supply chain leaders will remain dominant, as long as they continuously raise the bar for performance, innovation and transformation.**
  - World-class supply chains will be “productized” and reap financial rewards. The Dell/EMC go-to-market partnership combines EMC's storage products and brand leadership with Dell's business model, enabling EMC to share in Dell's supply chain efficiencies and sourcing leverage.
  - Leaders will focus on the total product life cycle and overall consumer experience as the defining factors of their operating models. Recently named number one in both sales and customer satisfaction by J.D. Power and Associates, Saturn aggressively sells overall ownership experience rather than just an automobile.
  - Leaders will be early adopters of the most innovative supply chain technology, thereby realizing enhanced performance and efficiency gains much earlier than competitors. Tesco and Gillette are piloting a supply chain productivity tool (RFID) to monitor and track razor and blade product flows from plant to consumer.

2. **Competition among supply chains will accelerate, with a new generation of supply chain transformers poised to challenge leader supremacy. Examples include apparel makers such as Benetton, Gap, H&M and Mango—all of which have emulated Zara by introducing profitable supply chain innovations of their own.**
  - Third-party providers now offer fast-track approaches and best-of-breed capabilities to transformers seeking world-class supply chains. Li & Fung, through its worldwide supply base of 2,700 partners, can offer companies apparel sourcing, manufacturing, logistics, design collaboration and information systems. This helps clients custom-design highly competitive supply chains.
  - Transformers focus on adopting innovations and technologies with immediate, positive impact. Cisco Systems is becoming more of a real-time enterprise by closing its books on a daily basis, thereby enabling rapid financial analysis of changes in supply chain operations.
  - Transformers are able to promote supply chain change in the organization through value-enhancing innovations. Zara routinely includes store managers and employees in product-design and supply-chain-efficiency decisions, thus enhancing buy-in on proposed changes.
3. **Change-averse companies with inflexible operating models will fall further behind: Companies that fail to upgrade substandard supply chains will suffer lower market valuations.**
  - Savvy investors know that inefficient supply chain operating models can significantly reduce overall profit performance. Despite numerous public announcements and major investments in logistics and technology, Kmart still lags industry leaders in supply chain inventory and cost performance, thus depressing returns to investors.
  - Companies with older, more-rigid operating models may share numerous, problematic supply chain behaviors:

- *Too many assets:* Significant ownership of manufacturing, logistics and inventories when third parties could provide the same capabilities less expensively.
  - *Poor collaboration skills:* Inability to work closely with suppliers and/or customers to collectively improve supply chain performance and efficiency.
  - *Ineffective information systems:* Technology geared to managing what happened in the past, rather than what should happen in the future.
- Such companies also tend to be trapped by financial reporting systems that inhibit innovation.
    - Inability to write off obsolete inventory or assets keeps stock prices artificially high.
    - Cost-only management focus fails to consider customer service implications.
    - No credit is given to the supply chain for revenue-enhancing innovations.

## Companies that can quickly adopt strategic supply chain approaches will pull further ahead of those that cannot.

Lastly, several broad conclusions about the supply chain's role in tomorrow's success stories can be drawn from the insights of interviewees and survey respondents. Based on those contributions and the statistical analyses, five broad predictions come to light:

1. **The front end of the supply chain will become as important as the back end in maximizing total economic yield.** Because demand now manifests itself in many more ways—via the Web, through online marketplaces or in conjunction with partnerships—smart companies will increase their emphasis on the supply chain's ability to enhance sales, marketing and service-focused relationships.

2. **As companies migrate from internal-only to extended supply chains, collaboration will become the most strategic capability.** Supply chains are fast becoming too complex for any one entity to manage effectively. Thus, tomorrow's winners will be the companies that conduct the orchestra, not those that play all the instruments.
3. **Assets and functions not core to value delivery will be divested to specialists that can make more money on them.** In their quest for new and advantageous business models, more companies will seek shared-profit arrangements with third parties. This approach—converting supply chain costs from fixed to variable—reduces expenses and makes it possible to serve customers more flexibly.
4. **The greatest margin potential will occur after a product ships, as service and support become as important as the product itself.** Tomorrow's supply chain winners often will be those that bundle great products with strong service offerings, thus maximizing long-term customer profitability and catering to customers' increased emphasis on total cost of ownership.
5. **The ability to integrate new and innovative capabilities with corporate business models will drive higher levels of value creation.** In the near future, a company's ability to adapt and change itself will become even more critical. For example, rapid and "virtual" partnering will be key to new supply chain management strategies, as the best integrators work together to attain the biggest prizes.

Across all of the above predictions and observations, the common denominators are flexibility and innovation. As supply chains contribute more directly to revenue and profit growth, companies that can quickly adopt strategic supply chain approaches will pull further ahead of those that cannot.

## Acknowledgements

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The **INSEAD Global Supply Chain Forum**, headed by Dr. Luk N. Van Wassenhove, is a leading research institute in partnership with industry. The forum is part of INSEAD's Center for International Manufacturing and Service Operations. The forum's mission is to collaborate with global businesses to advance state-of-the-art supply chain management theory and practice, and to define supply chains of the future. Current key research projects involve closed-loop supply chains, disaster logistics, risk management in global supply chains and linking supply chain management to the bottom line through supply chain metrics.

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