

## Benchmarking your Lean journey

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### Executive overview

The implementation of “Lean Principles” has enabled manufacturing firms across the globe to be more customer-focused, flexible and profitable. How close are U.S. companies to adopting a Lean supply chain that will improve efficiency and reduce costs?

Jones Lang LaSalle, in conjunction with the Association of Operations Management (APICS), *Logistics Management* magazine, Georgia Southern University and Supply Chain Visions, presents this report on a study of the development and adoption of Lean principles in supply chain management.

Tasked with reducing waste, increasing turns and building greater flexibility into their supply chain, some supply chain professionals the world over have attempted to identify the key Lean principles that can be applied to the supply chain, and determine how these principles should be adopted to build adaptive, flexible and collaborative supply chains.

This study is based on the results of a follow-up survey of Lean practices in the supply chain that was conducted in 2008 using the same questionnaire as the original 2005 survey. The report highlights contrasts and changes in the nature of the responses, and discusses what, if any, change in usage has developed during the three-year span between reports.

We are now seeing Lean tools being used to reduce wasteful activities across the supply chain. In 2008, the survey revealed, only 14 percent of companies are “Lean Adopters” in their supply chain effort. The trend, however, is positive: nearly 30 percent of the respondents, a category we call “Lean Movers,” are starting to adopt Lean supply chain principles.

The most encouraging findings:

- Since 2005, virtually every category has shown improvement
- More than 50 percent of Lean Adopters report improvement
- Non-Adopters are moving into the mid-tier and starting to adopt some, less mature, Lean practices

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Lean Adopters reported improved collaboration, an increased use of standards in processes and materials, reduced SKU counts and inventory levels, and a general reduction in cost of goods sold when compared with the Non-Adopters. A Lean supply chain is contributing to the bottom line.

### A call to action

While our study shows that progress in companies adopting Lean philosophies in the supply chain has been slow, the authors are excited about the upward movement we see in virtually all categories.

It is our hope that this report will foster continued interest in creating a better understanding of Lean supply chains, and will promote discussions and action among supply chain partners regarding the benefits of Lean practices.

## In this paper

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## Research methodology

This is the second in a series of reports on the Lean supply chain (LSC). The purpose of the original study was to benchmark the adoption level of Lean principles across the supply chain. The purpose of the follow-on study is to understand how the adoption of Lean practices has changed over time.

For the original research study, the survey team conducted a significant literature review regarding Lean principles and how these principles were being adopted in the supply chain. From that research, we identified six key attributes for the LSC that then formed the basis for the survey instrument.

APICS and Logistics Management e-mailed an invitation to their members and readers, asking them to participate in the second on-line survey. Four hundred and seventy-six invitees participated in the study. This large sample allowed the researchers to reach conclusions with a high level of confidence.

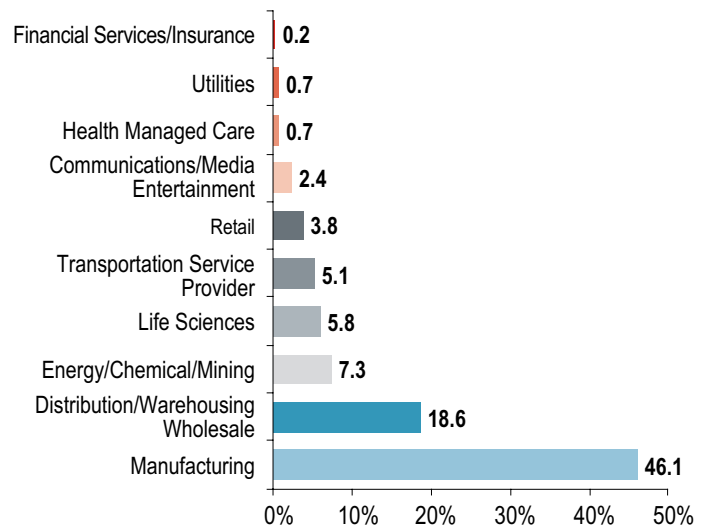
In addition, the research team reached out to select companies known to be progressive in implementing Lean practices and who were working to extend their Lean efforts to supply chain partners. We used interviews with these firms to expand on and confirm the survey results.

## The survey participants

### Type of industry

The largest segment of the respondents (more than 46 percent) work in manufacturing companies, as might be expected from APICS members. This percentage, however, is much lower than the 70 percent we saw in 2005, with a corresponding growth in those reporting as a part of the distribution/wholesale/warehousing/transportation segment (23.5 percent vs. only 2.9 percent in 2005). This shift may be due to the participation of *Logistics Management* magazine and to efforts by APICS to reach out to more supply chain professionals, as well as to APICS's sponsorship of the Certified Supply Chain Professional course and designation.

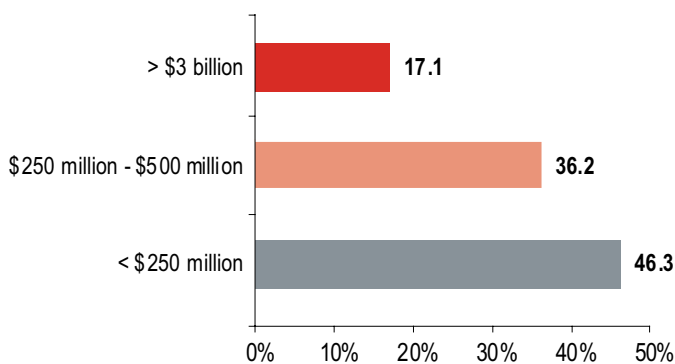
Figure 1 – Type of industry



## Company size

All sizes of businesses were represented in a balanced manner, with 29.3 percent having sales over \$1 billion, 24.3 percent having \$250 million to \$1 billion and the remaining responders having sales under \$250 million. Good distribution across company sizes enabled us to better understand whether size has an impact on a company's ability to implement Lean practices.

Figure 2 – Total annual sales of respondents



Understanding company size and industry allowed us to test whether the size and type of firm would have an impact on our results.

- Would large firms differ significantly from smaller firms?
- Would some industries be farther along in the Lean journey than others?

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*The concept of Lean originated in the 1920s, when Henry Ford applied the concept of “continuous flow” to the assembly-line process.*

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While we did find some differences, they were not as widespread as first imagined:

- No industry group appeared to be leading the race for a LSC
- Smaller and larger firms were adopting LSC principles at similar rates

These findings, the same as in 2005, allowed us to focus our attention on what we believe is a year-to-year change from 2005 to 2008, uninfluenced by demographics.

## Lean: a primer

### What is Lean?

Lean is a systematic approach to enhancing value to the customer by identifying and eliminating waste (of time, effort and materials) through continuous improvement, by flowing the product at the pull of the customer, in pursuit of perfection.

### The origins of Lean

The concept of Lean originated in the 1920s, when Henry Ford applied the concept of “continuous flow” to the assembly-line process. This practice focused on cost reduction by improving quality and throughput.

Ford's assembly line continued to be recognized as the most advanced manufacturing process until two Japanese executives at Toyota introduced the Toyota Production System (TPS), following a visit to Ford in the 1950s.

As Toyota soon realized, optimizing only a part of the process is not as beneficial as optimizing the whole. If real changes were to take place, they would have to include suppliers and customers. Without

### Five Lean principles

- 1** Value – Define value from the perspective of the customer
- 2** Flow – Understand the process and clear any obstacles that don't add value
- 3** Pull – Initiate work only when requested by the customer
- 4** Responsiveness – Be able to respond to change
- 5** Perfection – Continuously refine the process to improve efficiency, cycle time, costs and quality

all of the key players, the timing and quality of components from the supplier will continue to impede manufacturer performance. This was the birth of the Lean supply chain.

**Turning point: the 1980s**

During the 1980s, U.S. businesses were reintroduced to the importance of Total Quality Management (TQM). While TQM founder W. E. Deming was a visible player in this arena, he was not alone. Bill Smith, a senior engineer and scientist at Motorola, built upon these concepts and developed Six Sigma, a standardized method for counting defects in a process.

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*Lean manufacturing leverages TQM, Six Sigma and TOC to reduce excesses throughout the manufacturing processes.*

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Six Sigma's goal is to define processes and manage those processes to obtain the lowest possible level of error. Not limited to manufacturing, Six Sigma can be applied to virtually any process. It is well regarded in quality settings, and its adopters are frequent winners of the prestigious Malcolm Baldrige National Quality Award, which recognizes quality and business achievements of U.S. organizations and promotes quality awareness. Because of its emphasis on quality, Six Sigma is often implemented together with Lean in the manufacturing environment.

In 1986, Eliyahu M. Goldratt published "The Goal" to describe the Theory of Constraints (TOC). TOC focuses on processes with the goal of understanding bottlenecks that govern the true rate of production. It recognizes that overall costs and service levels are more important than those of a single business unit or department.

**Evolution of Lean: the 1990s**

Another landmark event occurred in 1991: the conclusion of a five-year study of TPS by the Massachusetts Institute of Technology. One of its results was the renaming and repositioning of TPS as "Lean Manufacturing." The term "Lean" is derived from the system's advantages over traditional mass-production systems, including less effort, less space, fewer defects, less throughput time, lower volume

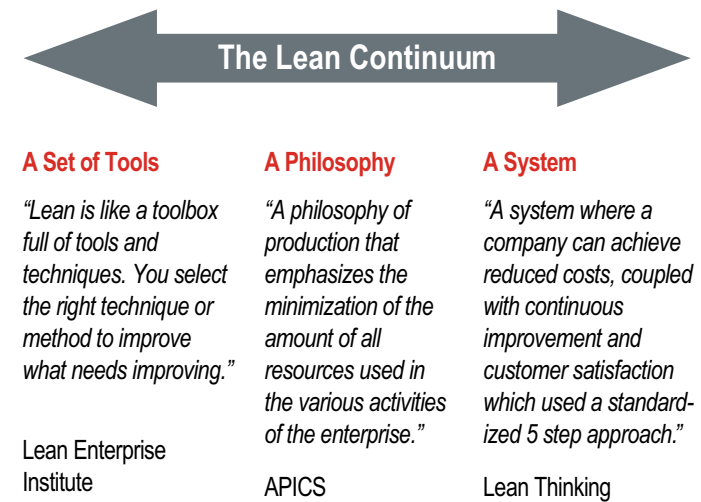
requirements and more. The system is "Lean" because it can do more with less.

Lean manufacturing leverages TQM, Six Sigma and TOC to reduce excesses throughout the manufacturing processes. This focus on eliminating excesses brings to light many wasteful processes and practices, allowing for cost reductions and quality improvements. When coupled with a customer first policy, it enhances customer satisfaction.

**Lean is three in one**

There appears to be some contention as to how Lean manufacturing should be classified. Some think of it as a set of tools, and others as a system whereby a company can reduce costs while at the same time increases customer satisfaction. A third group views Lean more as a philosophy that emphasizes the minimization of the resources used in an enterprise.

Figure 3



**Lean is all of the above. Success depends on how a company best implements the principles to achieve its needs.**

Which view of Lean is right? From our perspective, all three have value:

- Lean does provide a set of tools that will enable firms to remove waste

- It is useful to view Lean as a system, in that it helps firm focus on processes that impact the final customer
- And it is helpful to view Lean as a unifying philosophy that is not limited to the manufacturing process

The greatest benefit of Lean will come by identifying its key attributes and applying them across functional boundaries, as well as the boundaries of other firms.

**Supply chain management: a primer**

Where does Lean fit into the world of logistics and supply chain management? Perhaps the best way to start is to define our terms.

Logistics is defined by the Council of Supply Chain Management Professionals as “encompassing the activities involved in the forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption.”

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*For Lean to be truly effective, it must focus not only on the manufacturing process, but on the entire supply chain.*

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Supply chain management is much broader, in that it “encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.”<sup>1</sup>

These activities take place within most businesses; logistics is focused on these activities within a single firm. A supply chain consists of the same processes, but views these processes

over multiple firms. The former is internally focused; the latter externally focused. As noted in the table below, there are several areas of overlap between the two areas.

Figure 4

Comparing Lean production and supply chain management	
Lean Production/Manufacturing	Supply Chain Management
Focus to reduce waste and non-value-add activities	Goal is reduced lead times/cost through various methods
Traditional focus and success primarily with optimizing shop floor	Focus to optimize across supply chain partners
Uses a set of structured tools	Applies Lean tools as well as leverages other tools (Six Sigma, TQM, TOC, etc.)
Emphasis on no inventory through “continuous flow”	Emphasis on minimizing inventory through various techniques

For Lean to be truly effective and to take cost/waste out of processes, it must focus not only on the manufacturing process, but on the entire supply chain. Optimizing the components of a single process does not necessarily mean that the entire supply chain will be optimized; many firms have a tendency to focus on the areas over which they can exercise direct control. Doing it right by examining and improving end-to-end processes can have an advantage.

**The benefits of Lean manufacturing and distribution**

Much has been written about the benefits of Lean manufacturing and distribution. The following points are a good summary:

- Reduced cycle times
- The ability to deliver every time at the same cost to the business
- Predictable throughput times from better labor utilization
- Improved working capital positions from reduced inventory
- Lower warranty and customer service costs from improved quality<sup>2</sup>

<sup>1</sup>The Council of supply chain Management Professionals

<sup>2</sup>Lean & mean, Bob Trebilcock Modern Material Handling – 3/1/2004

## Defining the Lean supply chain

For our purposes, we have defined the Lean supply chain as “a set of organizations directly linked by upstream and downstream flows of products, services, finances and information that collaboratively work to reduce cost and waste by efficiently and effectively pulling what is required to meet the needs of the individual customer.” But:

- What does it mean to be effective and efficient?
- What are the areas of overlap between Lean manufacturing and supply chain management?
- How should manufacturing and supply chain professionals respond to the challenge?
- On what do they focus?
- In which areas can firms partner with their suppliers and customers, and what is the best way to approach a shared Lean strategy?
- And, finally, what makes a Lean supply chain different from any other supply chain?

Let us begin by defining what differentiates a Lean supply chain. Virtually all products involve a supply chain. If you could look through a telescope from the point of consumer purchase and see all of the upstream entities and activities involved, all of the way back to the

### ***A Lean supply chain defined***

*A set of organizations directly linked by upstream and downstream flows of products, services, finances and information that collaboratively work to reduce cost and waste by efficiently and effectively pulling what is needed to meet the needs of the individual customer.*

point of obtaining raw materials, you could visualize the end-to-end supply chain. You would also most likely see a group of entities and activities that are completely independent of one another. These autonomous functions create waste, the kind of waste that costs money and time, and may in some cases even disrupt the ecology of the planet. Lean adopter firms work together to identify and eliminate the waste wherever it exists in order to bring greater value.

## Driving the change to Lean supply chains

More than at any other time in history, today’s business environment is in a constant state of change. Changing customer requirements, product portfolios, marketplace demographics and geographies are in constant evolution and are impacting the way business is conducted.

Companies need methods, tools and trading partner relationships that allow them to be more flexible and adapt more quickly to these changes. In part, the need for flexibility has led many traditional manufacturers to shed their plants and rely on domestic and international contract manufacturers, or to move production to low-cost countries, causing a longer and more complex supply chain.

Organizations today tend to be “horizontally integrated,” with internal locations performing only the “core” function and all other needs outsourced. The remaining company facilities are typically occupied in a manner that reduces the impact on working capital and provides the flexibility to shift geographically as the marketplace changes.

- How can a company deal with the scope of a global marketplace and its supply chain, while retaining speed and flexibility?
- How can we eliminate wasted time, effort and materials from all points in the supply chain?
- How can a company meet the needs of a global marketplace without creating excessive work in process or inventory held along the way?

And how can we use the answers to these questions in a way that addresses the issue of shrinking profit margins?

To address these issues, today’s organizations can leverage a variety of tools and business philosophies to drive improvements across their business. Three of the most widely used philosophies are TQM, Six Sigma and Lean.

The researchers wanted to understand if Lean was being used more or less than these other popular philosophies. Respondents were asked if TQM, Six Sigma or Lean had been applied in various functional areas within their firm. Respondents could check each area multiple times; interestingly, respondents typically checked more than one philosophy for each area.

Figure 5 – Key philosophies implemented today

Area	2008 Study			2005 Study
	Number of Responses	TQM	Six Sigma	Lean 2005
Raw materials inventory	330	22.12%	18.79%	59.09%
Warehousing	399	22.31%	20.55%	57.14%
Finished goods inventory	364	25.00%	18.96%	56.04%
Forecasting	209	27.27%	23.44%	49.28%
Transportation – inbound	287	28.92%	22.65%	48.43%
Order management	305	30.82%	21.31%	47.87%
Transportation – outbound	310	31.94%	20.65%	47.10%
Manufacturing	515	26.41%	26.60%	46.99%
Customer management	247	39.68%	28.34%	31.98%

Within the survey group, manufacturing has the highest rate of application of all three of the philosophies in aggregate, followed by warehousing (up by two ranks from 2005) and finished goods inventory. Forecasting, customer management and transportation areas saw the least adoption across any of the three philosophies.

#### Which business philosophy is gaining the most traction?

Across the board, Lean was the most popular philosophy being deployed across all of the functions by a wide margin. As seen in Figure 5, responses in three of the nine supply-chain-related

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functional areas indicated the adoption of Lean principles by greater than 50 percent of respondents, with eight of the nine functional areas showing an adoption rate greater than 45 percent. Furthermore, seven out of nine areas show higher rates of Lean adoption than we saw in 2005.

The authors are pleased to see Lean being adopted at such high rates. It is clear that Lean philosophies have broken the bounds of manufacturing and are expanding to other supply-chain-related functions. While “white-collar” functions such as customer management and demand forecasting are lagging behind traditional operational functions, they still show a sizable adoption rate of higher than 30 percent.

Not only is Lean the most widely used philosophy, but it is also growing in popularity, being used across most of the major supply-chain functions. Six of the nine areas show growth in usage of Lean over the last three years. Lean manufacturing principals, once seen as only applicable to plant operations, are now being leveraged across companies and their supply chains. While it may be impossible to create a straight line of flow among all of the points of contact in a supply chain, the principals of Lean can reduce the impact.

#### Why extend Lean to the supply chain?

In addition to defining the attributes of Lean, the research team segmented the sample into three groups, based on levels of Lean integration: Non-Adopters, Lean Movers and Lean Adopters, defined in Figure 6 (next page).

Figure 6 – Implementation of Lean

Early Lean/Non-Adopters				Lean Movers		Lean Adopters			
2005 12.7%	2008 5.6%	2005 47.4%	2008 50.7%	2005 25.3%	2008 29.5%	2005 9.0%	2008 4.9%	2005 5.7%	2008 9.3%
Implemented one or two Lean tools to learn more about impact on the company		Some Lean tools are implemented sporadically across the organization  No formal integrated implementation approach		A formal, integrated approach to implementation has been developed and is being rolled out  Awareness training is being performed at the operator level		Entire product flow is integrated, product flows smoothly through the facility  Supply chain partner companies are becoming involved in joint Lean practices		Lean production is standard procedure  Continuous improvement activities are driven by the operators with management support	

On the lower end of the scale are those respondents who either did not implement Lean or had no formal, integrated approach to Lean. This group, which we refer to as the “Non-Adopter” or “Early Lean” group, consisted of approximately 57 percent of the sample.

We call the upper group “Lean Adopters”—approximately 14 percent of the respondents. These companies had integrated their product flow and were working with supply-chain partners to become more Lean.

The third group, “Lean Movers,” is in the middle. They are the companies that are moving from an internal focus on Lean to extending this approach with suppliers and customers.

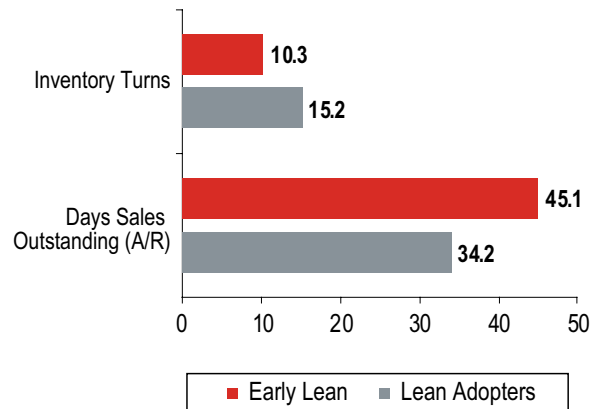
*Lean processes focus on generating more customer value.*

At first glance, the Non-Adopter and Adopter groups do not seem to have changed much since 2005. However, we see a positive and orderly progression upward in regards to Lean implementation, with more growth at the highest maturity level and a lower percentage in the bottom level, as compared with 2005.

Comparisons were made between Lean Adopters and the Early Lean group for each survey question. In many cases, significant differences in financial metrics were found between Early Lean and Lean Adopters.

Most important were the differences between how companies in the Lean Adopters group performed versus the other two groups on key metrics such as inventory turns and A/R days outstanding. As seen in Figure 7, Lean Adopters statistically had significantly lower inventory to support a day’s sales activity, as well as fewer days required to collect revenue from those sales. These differences not only reduce the cost of goods sold; they also dramatically impact a firm’s ability to be responsive to changes in the overall supply chain, as they do not carry excessive levels of inventory or have cash tied up in unpaid customer invoices.

Figure 7 – Benefits of a Lean supply chain



An improvement in Inventory Turnover from 10.3 to 15.2 yields a fairly remarkable actual percentage improvement, in the turn rate of nearly 48 percent. A company with \$100 million in annual COGS (Cost of Goods Sold) would carry roughly \$9,708,700 in inventory at

10.3 turns. One with a turn of 15.2 would carry only \$6,578,900, a reduction of more than \$3 million, with all of the benefits associated with lower inventories.

Days Sales Outstanding (A/R) is considered to be a gauge of customer satisfaction, as reflected in prompt payment of invoices. Lean processes focus on generating more customer value. When customers sense high value, they tend to be satisfied, and satisfied customers tend to pay their invoices more quickly.

## The six attributes of the Lean supply chain

Building and maintaining a Lean supply chain revolves around six key attributes. Mastering the six attributes will lead to a Lean—and effective—supply chain. They are:



Each attribute is defined and benchmarked in this section of the report.

### 1. Improved demand management



One of the key principles of Lean is to move to a pull system, in which products or services are pulled (work initiated, services performed, products delivered) only when requested by the final customer.

In its purest form, such a system would be developed using data from the point of sale and conveyed upstream to all members of the supply chain, from point to point, without a change in the volume. End user requirements for the finished product, however, would typically be meaningless to an upstream supplier, who may provide only a fraction of the materials included and most probably does not understand how their materials contribute to the end-product structure.

#### ***Demand management defined***

*Providing products and services when requested (pulled) by the customer*

Therefore, suppliers at each level of the process must receive their downstream customer's demand signal and convert it to something usable (part number and quantity) to their upstream partners. This can be difficult to accomplish, especially when choosing to work in a virtually real-time manner. How can the demand signal be communicated, from the end customer all of the way back through the supply chain, in a meaningful way?

The consequences of not managing the demand signal are clearly documented. We often refer to the resultant problem as the “bullwhip effect,” where forecast units are added to the original demand signal as the signal moves farther upstream. For example, an order may grow by 10 percent at each node as it moves from the retailer to the distributor, then to the manufacturer, its tier-one supplier and the manufacturer’s suppliers.

This minimizes the need to forecast demand, relying instead on the actual demand for the product.

**State of the Lean supply chain—demand management**

In order to understand the state of the Lean supply chain, different facets of each of the attributes were tested. In the case of the demand management, four different facets were benchmarked:

1. Demand signal
2. Demand collaboration
3. Sales and operations planning
4. Inventory management practices

As seen in Figure 8, 39.5 percent of the respondents in this year’s study indicated that product was being “pulled” through the downstream chain by actual usage, and of those, 20.2 percent indicated they perform a “real time” exchange of actual usage data with their customers. Forty-seven percent of the current study group said they generate their demand signals from actual usage history or on projected sales based on actual usage.

This reflects a significant improvement over 2005, when the bottom two “Internally Focused” quintiles totaled nearly 55 percent, and the top two, those who indicated product is “pulled,” were only 33 percent. This shows a definite shift toward adoption of Lean Demand Management practices.

**On partnerships**

*“First, you have to have a trusting business relationship with your counterpart before you’ll get very far in collaboration and, specifically, in establishing jointly managed processes. Secondly, you need senior management support in beginning to work with your trading partner in new ways that have a mutual benefit. Collaborative Planning, Forecasting and Replenishment [CPFR] is a great example of a process that dramatically changes the trading relationship between two companies.”*

– Ralph Drayer, Former Executive  
Procter & Gamble

A Lean supply chain will work to have products pulled through the channel using customer demand from the point of sale in real time.

Figure 8 – Managing the demand signal

Internally Focused				% of All Respondents		Supply Chain Focused			
2005	2008	2005	2008	2005	2008	2005	2008	2005	2008
14.2%	12.0%	30.0%	35.0%	13.6%	13.5%	18.5%	19.3%	14.8%	20.2%
Product is “pushed” through the channel based on forecasts		Demand forecasts are created based on actual usage of product (current stock levels, or min/max levels, or order points) and projected sales		Downstream supply chain partners provide periodic forecasts to make the immediate upstream partner aware of requirements		Product is “pulled” through the channel based on actual usage data from upstream supply chain partners		Product is “pulled” through the channel using consumer demand from point of sale systems in near real time	

### The meaning of managing the demand signal

Managing the demand signal will provide the greatest opportunity by far for those firms that want to compete “supply chain to supply chain.” The upper two quintiles—what we call “Supply Chain Focused”—saw a net increase of six percentage points, or 18 percent, from 2005 to 2008. But before we begin to exhibit “irrational exuberance,” we need to note that the fact that this group still only encompasses 39.5 percent of the total, suggesting that there is still significant room for improvement.

The level of interest in improved demand management that the research team found during the interviews was outstanding. While many interviewees were going through a period where they had an internal focus on Lean implementation, the interest in improvement was not related to any negligence regarding demand management; rather, it was seen as part of a strategic plan.

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*The more progressive companies are actively working with their customers to improve demand collaboration efforts.*

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### Walk before you run

As companies begin their Lean journey, most realize that it will be a challenge to understand, and assess the impact of the changes to

business processes and relationships that will be involved. Many of those interviewed, like Greg Goodman, president of Hytrol Conveyor Company, said that they choose to focus early efforts on internal processes, which can be manipulated more easily. They would then use those efforts to develop a strategy for a second wave related to suppliers, and finally move on to implementing Lean processes with their customers.

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*Managing the demand signal will provide the greatest opportunity to compete “supply chain to supply chain.”*

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Ideally, given the customer value and flow-based principles of Lean management, it would seem that all efforts should be focused on demand coming from the customer. However, when your goal is to soar with the eagles, it is always best to learn how to walk first.

### The meaning of demand collaboration

How well firms manage the demand signal is reflected in how they view collaboration. Again, the study found impressive gains since 2005. Three years ago, very few responses (5.1 percent) indicated that there was any level of “real-time” collaboration regarding demand. This segment has grown to 11.2 percent, while the total for the supply-chain-focused group grew from 23.6 percent to 27.8 percent. Those who indicated that they collect demand data from their customers only “regularly” or not at all dropped from over 46 percent to just below 45 percent.

Figure 9 – State of demand collaboration

2005 12.6%	2008 14.2%	2005 33.9%	2008 30.4%	2005 29.8%	2008 27.6%	2005 18.5%	2008 16.6%	2005 5.1%	2008 11.2%
Supply chain partners do not work together to share real or anticipated demand		Some discussions between key supply chain (2 or 3) partners to get better view of products and markets		Key supply chain partners (2 or 3) maintain regular communication regarding products and sales statistics		Most supply chain partners (3 or more) exchange product and sales data electronically, typically not real time		Demand is conveyed upstream to partners in real time from point of sale  Partners jointly participate in analyzing demand	

The supply-chain-focused group increased by 4.2 points (18 percent) from 2005 to 2008—probably owing to the awareness generated by the volumes of articles written about the benefits of collaboration.

The groups that reported little or no collaboration, although a smaller number than in 2005, still approach 45 percent. Interviews conducted made it clear that, in some cases, management still believes that a higher level of collaboration and sharing of data could be harmful, and is not jumping onboard the collaboration trend.

- Collaboration must begin through management’s understanding and acceptance of the concept, followed by a clear conveyance of this approval and of the need for collaboration to the workforce
- This understanding must then be promoted through the use of periodic meetings, discussions and exchanges of information between supply chain partners
- Supply chain partners, including the upstream suppliers and downstream customers, can then work together as a team to provide value to the end user customer

**Demand collaboration:  
Procter & Gamble and Wal-Mart**

*In the fast-moving area of consumer goods, Procter & Gamble (P&G) has developed a strong collaborative relationship with Wal-Mart stores dating back to the 1980s.*

*The two partners have developed processes and software that allow for satellite linkages between Wal-Mart stores and distribution centers that enable notification to P&G if a Wal-Mart site is running low on products. In a classic example of Collaborative Planning, Forecasting and Replenishment (CPFR), P&G receives direct feedback from Wal-Mart stores whenever a product is scanned at a sales register or ships out of a Wal-Mart distribution center.*

*This kind of collaboration eliminates much of the need for maintaining large, just-in-case inventories in the supply chain.*

*Billing for products shipped from P&G and payments for shipments from Wal-Mart are also automated. P&G sends an Advanced Shipment Notification (ASN) and invoice to Wal-Mart as soon as the products ship. Wal-Mart acknowledges receipt via receiving-dock processing against the ASN, accompanied by payment using a pay-on-receipt method.*

The more progressive companies are actively working with their customers to improve demand collaboration efforts despite the customers’ lack of sophistication.

A recent study of supply chain megatrends by Dr. J. Paul Dittmann of the University of Tennessee indicated that collaboration is one of the key trends observed.

**2. Cost and waste reduction**



Sometimes, the elimination of waste and cost may appear to be the singular focus of Lean management. But this is true only to the extent that it does not have a negative impact on customer value equations. Certainly, the elimination of waste is one of the key tenets of Lean manufacturing.

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In the broadest sense, waste can be of time, materials, process redundancy or even digital waste. To achieve a Lean supply chain, partners have to work, together and individually, to eliminate wasteful processes and excess inventory across the channel. In general, a reduction in waste will result in a reduction in cost for the supply chain.

This is not to say that costs are going to decrease in all areas. It is possible that some costs for suppliers may go up; for example, a supplier may hold inventory (vendor-managed inventory) for a client, which would cause that supplier's costs to increase. These increases, however, should be offset by reductions in other areas of the value chain, ultimately resulting in a decrease in customer costs. If properly managed, the supplier should be compensated appropriately to cover the increase.

### **The seven wastes of Lean manufacturing**

1. *Over-production ahead of demand*
2. *Waiting for the next processing step*
3. *Unnecessary transport*
4. *Over-processing of parts*
5. *Inventory more than the absolute minimum*
6. *Unnecessary movement*
7. *Defective parts*

The emphasis of Lean is placed on reducing waste, and not cost. This is not a matter of semantics, but one of philosophy. A preoccupation with reducing costs may lead a firm down a suboptimal path; not all waste can be easily tied to costs, yet waste will still have a significant impact.

This focus on waste and not cost also makes the conversation with suppliers and customers less threatening. If the goal is to reduce waste, most parties are more willing to discuss their processes with one another. An initiative to reduce cost is typically viewed as an approach to reduce cost—and profitability. Ideally, the benefits of a Lean supply chain will be shared equitably across all participating supply chain partners.

The emphasis on waste and cost reduction is holistic, and should not be limited to a single partner in the supply chain. With a joint goal of reducing waste, supply chain partners can work together to modify any of those policies that produce or encourage it.

### **How companies can reduce waste**

Typically, waste across the supply chain will manifest in excess inventory. Reducing inventory can be aided by introducing postponement and customization strategies, which push the final assembly of a completed product to the last practical point in the chain.

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*The emphasis of Lean is placed on reducing waste, and not cost.*

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Waste will also take the form of non-value-added processes and tasks. In many cases these involve operations that are duplicated by various partners such as inspections, packaging, validation of information, etc. A good, end-to-end value stream mapping process that includes all partners will help to uncover these wastes.

Figure 10 – Waste reduction efforts

2005 20.7%	2008 20.8%	2005 30.8%	2008 25.4%	2005 28.6%	2008 28.7%	2005 16.1%	2008 14.9%	2005 3.8%	2008 10.1%
Waste reduction is focused at the functional areas within the company		Company analyzes internal processes to minimize waste		Some supply chain partners are waste-conscious but most focus on cost reduction and profit improvement		Some supply chain partners begin working together to eliminate waste		All supply chain partners understand end-to-end processes and work together to eliminate waste throughout the supply chain	

According to the 2008 survey, 25 percent of the respondents are working with their supply chain partners on waste elimination, a substantial increase of 25 percent over the 20 percent reported in 2005. This is an encouraging change, but this is clearly an area where there is still room for much improvement. The internal focus on waste (46 percent), as reported, will result in cost reductions that can be recognized internally, but it may cause companies to overlook the larger reduction of waste that can be achieved through joint efforts among supply chain partners.

The opposite of a waste-and-cost focus is a focus on value-added activities. The respondents who are moved to reduce waste and cost are likely to have a better understanding of which activities actually add value for their customers.

In practice, various supply chain partners often unknowingly duplicate activities. Our survey results show that 39 percent of the respondents firms are working with their partners to maximize the value of activities by rationalizing them across the supply chain and eliminating non-value-added activities. This means that 61 percent of the firms surveyed are not collaborating to eliminate redundant activities—a big improvement over the 75 percent noted in 2005, but still too internally focused.

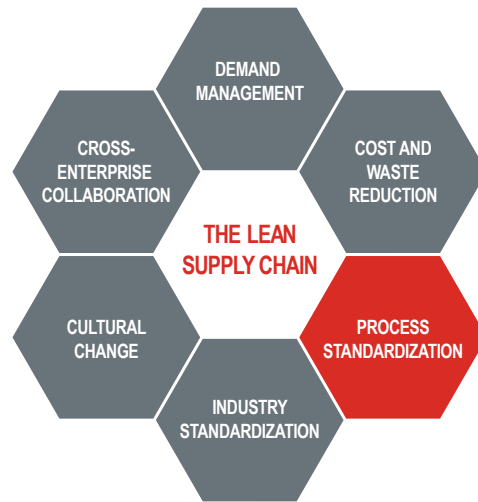
Jones Lang LaSalle recently had an opportunity to help a client Lean out its supply chain through a redesigned and consolidated supply chain strategy that identified \$650,000 per year in savings.

Twenty-seven percent of the Lean Adopters indicated that they work with supply chain partners to eliminate non-value-added activities,

while nearly 72 percent of the Early Lean group either do not understand the concept of value-add, or are not actively working with their partners to eliminate non-value-added activities.

This shows an improvement over the 2005 results of 25 percent and 75 percent, but not nearly as great as expected, based on the responses in Demand Signal and Collaboration. This may demonstrate that talking is generally easier than doing, or that it is difficult to understand sharing value chain improvements.

### 3. Process standardization



The third attribute of a Lean supply chain is process standardization, one of the components of the “5 S” methodology associated with Lean. Process standardization enables continuous flow to occur in the company, a major tenet of Lean manufacturing.

Figure 11 – Value-added activities

2005 12.5%	2008 15.1%	2005 28.2%	2008 24.2%	2005 34.2%	2008 33.0%	2005 21.5%	2008 19.0%	2005 3.6%	2008 8.7%
No clear distinction between value-added and non-value-added activities		Individual supply chain aware of value add, but have not actively worked to eliminate non-value-added activities		Individual supply chain members focused on eliminating non-value-adding operations within their own businesses		Collaborative practices are being explored with supply chain suppliers or customers to eliminate non-value-added activities		Collaborative practices are actively being performed with both suppliers and customers to eliminate non-value-added activities	

Flow is the uninterrupted movement of product or service through the system to the customer. Major inhibitors of flow are work in queue, batch processing and transportation. These roadblocks slow the time from product or service initiation to delivery.<sup>3</sup>

The “flow” or “value stream” perspective represents a shift from vertical to horizontal thinking. Horizontal thinking looks across the traditional vertical (siloed) functional structures to identify interconnected activities in the stream of the value flowing from suppliers, through the organization and on to customers. Concentrating on overall flow focuses on system efficiency, not only on the efficiency of individual elements in an organization.<sup>4</sup> Flow is enabled when materials and processes are standardized across the supply chain to reduce complexity.

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*Planning and production process standardization for the supply-chain-focused group improved by 48 percent from 2005 to 2008.*

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These efficiencies can only be gained through collaboration across the supply chain, and by developing standardized processes for use in providing products and services that add value and eliminate wasted or duplicated steps.

A thorough understanding of the supply chain processes will help partners work towards standardizing important processes and shifting work to the most efficient point in the chain.

Figure 12 – Planning & production process standardization

2005 6.8%	2008 7.6%	2005 32.7%	2008 26.9%	2005 41.3%	2008 37.1%	2005 12.8%	2008 16.4%	2005 6.4%	2008 12.0%
No attempts are made to standardize processes internally or externally		Processes may be documented by the operator but may be considered “proprietary” and are not shared with supply chain partners		Processes are documented and general process understanding exists across the supply chain		Processes used by the various supply chain partners are well understood by all, though not standardized		Planning, production and stock management processes are defined and standardized across the supply chain	

One important process that transcends firms is planning and production; see findings in Figure 12.

Planning and production process standardization for the supply-chain-focused group improved by 48 percent from 2005 to 2008. This standardization, coupled with the increased emphasis on demand planning, forms the foundation for real and worthwhile improvements in Lean supply chain operations.

*John Naso, Vice President of Logistics at OfficeMax, reports that, in an effort to maintain associate awareness, the company had created a periodic newsletter for employees called The TIMWOOD TIMES which focuses on the “Seven Deadly Wastes.” (TIMWOOD is a popular “acroname” associated with waste in **T**ransportation, **I**nventory, **M**otions, **W**aiting, **O**verproduction, **O**ver-processing and **D**efects.)*

As businesses become more collaborative, they tend to see areas where they are performing the same or linked tasks, which could be accomplished more efficiently if each partner performs its task in a standardized manner. Identifying them through value stream mapping provides an opportunity to eliminate the waste associated with these processes and to improve value delivery.

Benefits can be derived not only from standardizing products, but also the processes used in the manufacturing or assembly of goods, by sharing sub-components across product lines. Thus, fewer unique components are needed, reducing manufacturing, warehousing and development costs.

<sup>3</sup>Dave Nave, How to Compare Six Sigma, Lean and Theory of Constraints, Quality Progress, March 2002

<sup>4</sup>Mike Rother, What are We Learning Since We Started Learning to See, LEI website

As seen in Figure 13, more than 83 percent of respondents were making some efforts to standardize products internally, about the same as reported in 2005. Also unchanged: 37 percent are actively involved in processes used to establish and use internal product standardization. This stability may be indicative of the effect product innovation has on standards—it is difficult to standardize something that did not previously exist.

can share intellectual property, metrics and best practices for many activities, and use metrics to drive standardization. Greg Goodner stated that Hytrol has been able to reduce part number counts considerably, by employing product standards that examine small, unnecessary differences between some conveyor model frames.

Figure 13 – Company product standards

2005 11.8%	2008 16.8%	2005 29.5%	2008 22.8%	2005 19.4%	2008 23.5%	2005 27.7%	2008 25.9%	2005 11.6%	2008 11.1%
Products are non-standard No shared components		Internal parties attempt to impose standardization of product components		Internal parties agrees to standardize product components		Actively look for opportunities to share components during new product development		Products developed have a high proportion of shared parts from other product lines	

Standardization helps reduce the number of different components and suppliers. Standardization of components and subassemblies can support postponement efforts to reduce inventory levels of finished goods. Standardization can also create benefits for upstream suppliers, who can further stabilize their own product lines.

In both studies, interviews indicated that even large conglomerates with varied and multi-faceted businesses have benefited from the sharing of processes and product standards. Today, different sites

4. Adoption of industry standards



Product and process standardization among trading partners can still lead to waste, especially when common components are not as standardized as they could be. For example, plugging a telephone into a wall outlet is the same in all 50 states because an industry standard was developed and accepted. When that does not happen, as in Europe, multiple standards, as well as multiple products to meet those standards, need to be developed and maintained.

Standardization of products benefits customers using the products and enhances serviceability. However, industry standardization also decreases the proprietary nature of a product, making other competitive factors, such as an efficient supply chain, more important.

**A company-wide standards strategy**

*The Boeing Company has two primary divisions, Commercial Aviation and Integrated Defense Systems. Within these divisions are a variety of disparate operations focused on various industry segments.*

*Boeing has mandated a high level of standardization in processes and materials across its different entities. The company works continually to fine-tune the “Boeing Way”; it uses centralized systems to describe work processes and a formal change-management approach, which includes Kaizen process improvement teams.*

Figure 14 – Industry product standards

2005 16.5%	2008 19.3%	2005 13.9%	2008 16.0%	2005 42.9%	2008 33.3%	2005 14.1%	2008 17.1%	2005 12.7%	2008 14.2%
No industry standards and products are considered to be “proprietary”		Individual supply chain partners attempt to set their own standards outside of industry standards groups		Partners make partial use of industry standards in development of new products		Partners agree to standardize products based on standards set by outside groups		Partners participate in industry standards bodies Partners use industry standards in development and manufacture of products	

In 2008 and in 2005, 65 to 70 percent of respondents indicated that they make use of industry standards when developing new products. In 2008, however, 31 percent of respondents indicated that their supply chain partners agreed on standards to be used in products—an impressive gain compared to the 27 percent in 2005. At the other end of the scale, the percentage grew from 30 percent to 35 percent, apparently the result of companies trying to differentiate themselves through the introduction of unique, proprietary products.

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*As companies increase their supply chain systems capabilities, they increase the amount of data to organize, understand and leverage.*

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Figure 15 – Data standards

2005 20.9%	2008 24.1%	2005 41.9%	2008 31.6%	2005 19.3%	2008 16.9%	2005 15.3%	2008 20.0%	2005 2.6%	2008 7.5%
Data is considered to be proprietary and is not shared		Individual Supply Chain partners make information available to key partners but make no attempt to assist in data conversions		Key supply chain partners (2 or 3) jointly develop data mapping to convert each other’s proprietary formats		Key supply chain partners (2 or 3) use standardized data formats for information exchange		All supply chain partners exchange product, availability and sales related data using global and/or industry standard data formats	

Twenty-eight percent of respondents indicated that their firms are using standardized formats for exchange of information among supply chain partners, a 54 percent improvement over 2005. An improved 32 percent simply make the data available with no attempt to assist their partners in making use of it. However, 24 percent consider their data to be proprietary and make no attempt to share it with their partners (see Figure 15).

A Lean supply chain needs information to be freely exchanged and available in a standardized format. Since sharing of data is a key component of supply chain collaboration, the improvement in this area may be a harbinger of things to come.

Standardization is not limited to products, but can also entail how information is shared across the supply chain. As companies increase their supply chain systems capabilities, they increase the amount of data to organize, understand and leverage. Add in RFID capabilities, POS data and collaboration with trading partners, and the data increases exponentially.

How big is the problem of faulty data? A Gartner survey of 600 executives conducted in November 2005 found that more than 25 percent of critical data within business is inaccurate or incomplete. Yet employees are asked to trust data as accurate. It is time for data quality to get more respect across the entire extent of the supply chain.

The first step is to measure data quality in an objective way at the user level. How do companies assess data quality? Many do not have a formal method for tracking data quality, basing their assessments on samples or on gut feelings.

In 2006, a Data Warehouse Institute (TDWI) survey asked, “Has your company suffered losses, problems or costs because of poor data quality?” An astounding 83 percent of those surveyed said yes. Nearly 50 percent of respondents believed their organization’s data was “worse than everyone thinks.”<sup>5</sup> The problem could be much larger than the boardroom believes.

The survey respondents understood the value of “good” data, and 54 percent believed it could improve a company’s profitability, while 82 percent pointed out that accurate data could reduce costs.

Many surveys indicate that data quality management or improvement programs are taking a back seat to other more visible issues. The Data Warehouse Institute (TDWI) estimates that poor quality data

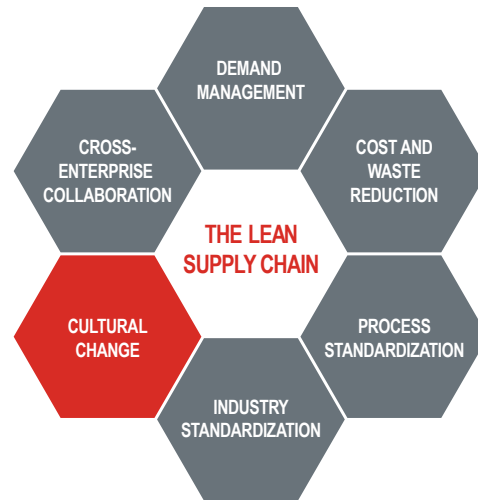
**Beware of digital waste**

*As data increases, so, too, does the risk of digital waste, defined as information that is not related to or supportive of defined goals and metrics. If data cannot be tied to specific objectives and therefore be germane to decision-making processes, it is worthless to the organization. Worse, digital waste can unnecessarily cloud and congest decision-making.*

*Agreeing to data standards that will enable the free flow of information can minimize digital waste.*

costs business in the United States as much as \$611 billion in extra costs.<sup>6</sup> The real cost may be even higher when incorrect data causes lost sales or reduced market share.

**5. Cultural change**



Supply chain partners, from upstream suppliers to downstream customers, must collaborate as a team to provide value to the end-user.

Collaboration must begin with management’s understanding and acceptance of the concept and its clear communication to the workforce of the necessity of collaboration. Its promotion must continue through the use of periodic meetings, discussions and exchange of information among supply chain partners.

The application of Lean concepts depends upon people. The successful implementation of Lean may require a change in a company’s entire culture. One of the biggest challenges in getting Lean is that people who are still doing things the old way, and have been for a long time, have a vested interest in maintaining the status quo.

**Assessing the organization**

How do our respondents view the people in their organizations? Are employees expendable, or are they seen as a valuable asset that enables the company to put formal improvement processes in place?

<sup>5</sup>Russom, Philip, Master Data Management: Consensus-Driven Data Definitions for Cross-Application Consistency, The Data Management Institute, October 2006

<sup>6</sup>Eckerson, Wayne, Data Quality and the Bottom Line, TDWI Report Series, The Data Warehouse 2002.

Figure 16 – People

2005 9.4%	2008 10.2%	2005 21.9%	2008 19.0%	2005 27.3%	2008 27.2%	2005 26.3%	2008 27.2%	2005 15.1%	2008 16.3%
Employees are viewed as being expendable Most training is limited to on-the-job training		Managers concerned about employees, but little institutional support or resources		Managers actively work to manage employee turnover Some support for employee development		Resources made available for employee development Continuous improvement culture in place in most departments		Employees believe that they are a valued asset Formal improvement processes in place	

The results of the study do not show much change in respondents' perception of their firms' relationships with their employees. In 2005, just under 69 percent of the respondents reported that an active process was in place to enhance employee development and reduce turnover. In 2008, the same response rose to just under 71 percent. The responses indicate that little institutional support existed for training, or that employees are perceived as expendable, fell slightly, from approximately 31 percent to 29 percent. While not a large change, it is nonetheless encouraging, because an investment in training to help employees improve is a necessary first step for any Lean implementation project. People can enable change or stand as a roadblock to it.

### **Five steps to implement lean**

- *Specify value: Identify which features create value. Define value from the final customer*
- *Map: Identify the sequence of activities called the value stream*
- *Flow: Make the activities flow continuously through the remaining, value-created steps. Eliminate barriers and develop product-focused organizations that dramatically improve lead time.*
- *Pull: Let the customer pull product or service through the process, eliminating the need for a sales forecast*
- *Perfect the process: Manage the process so that the number of steps and the amount of time and information needed to serve the customer continually fall*

Figure 17 – Continuous improvement/change culture

2005 3.4%	2008 4.1%	2005 20.4%	2008 23.3%	2005 32.1%	2008 26.1%	2005 27.0%	2008 25.4%	2005 17.1%	2008 21.1%
No continuous improvement programs in place		Informal improvement projects in place		The need to change/improve has been identified and communicated to the workforce by top management		Operational level "change leaders" have been identified and are being educated on the need to change and how to effect change		Management has a well-developed published vision for all facilities and has operating objectives that fully support the vision A continuous improvement culture exists across the supply chain	

Improvement of more than 12 points was reported in the two combined upper quintiles, from 34.1 percent in 2005 to 46.5 percent in 2008. This is great news, but it is tempered somewhat by the knowledge that the lower two quintiles also saw growth of 3.5 points.

It is hard to understand why any company would not have implemented some sort of continuous improvement strategy. However, as seen in the Figure 17 on the previous page, roughly 30 percent have not yet seen the light. In this case, we must simply take comfort in the knowledge that more 70 percent have. A list of suggestions for implementing changes is in the box on page 19.

Leaders in Lean adoption that we interviewed emphasized the importance of Lean and TQM training as part of their new employees' training. Over time, these priorities become ingrained in the way they do business. One manager remarked, "Unlike some businesses that see it as an enabler, we think of it as a strategy."

### People will make Lean succeed

"I think that companies get it wrong when they put too much attention on the tools such as Lean Six Sigma, and not on the people," offered interviewee Andy Taylor, Chief Operating Officer

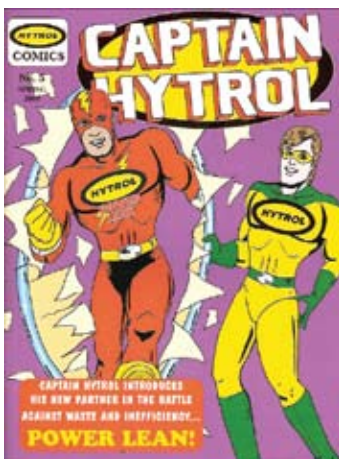
at Turtle Wax. "For the process to be successful, people must be true believers that they work for a great company, with great people, who are trying to do great things. When you get a critical mass of true believers, tools such as Lean Six Sigma will enable them to get to where they want to be."

*"The effects of EDI and standardized price ticketing were really to transform retail distribution centers. What you saw was a shift from maybe a one- or two-week process to replenish SKUs at the store level, to a one- to two-hour period. Our standards have really helped push significant reductions in total lead times and logistics costs."*

*Joe Andraski,  
President & CEO, Voluntary Interindustry Commerce Solutions*

John Naso of OfficeMax believes that the company's Lean strategy is becoming an "operational part of their culture". As part of their effort to grow understanding and acceptance, OfficeMax has developed educational training exercises that focus on training associates to see operations differently.

### Superheroes of Lean



*Many teachers strive to make learning fun. But is there a way to make Lean manufacturing fun?*

*Hytrol Conveyor Co. Inc. is giving it a shot with a comic book that explores the adventures of "Captain Hytrol," as well as his friends "Power Lean" and "Safety Lady."*

*According to Hytrol President Greg Goodner, "We saw that Lean was going to create the biggest change that this company had seen in the 25 years I have been here, and we needed a way to convey our need for Lean to the employees in a positive way."*

*"Our goal was not to teach people how to implement Lean but to make people aware of what and why things were happening, and how they affected our operation and, ultimately, our end-user customers."*

*Staff and management worked together to identify the key attributes for understanding Lean and create a 56-page book to help the organization understand the "remarkable journey of Lean manufacturing."*

6. Cross-enterprise collaboration



One enabler of cross-enterprise collaboration is the use of teams. In a Lean supply chain, these teams are not functionally oriented or focused on their organization. They have a broader perspective and consider what is right for the supply chain.

Supply chain partners leverage the Lean principles of defining value and understanding the value stream to maximize the added value delivered to the customer.

Added services, regardless of the perceived value to the supply chain partners, are only of true value if they are understood and desired by the customer.

With respect to people, the survey results were positive in that nearly 90 percent of the responding firms have implemented some form of cross-functional teams, with a 48 percent occurrence of cross-supply chain teams. Supply chain partners should focus on development of cross-partner teams to improve their working relationships and provide a foundation for any Lean supply chain activities.

Tools for team building

Interviews revealed that a number of companies found that newsletters that discuss Lean initiatives and supply chain activities—both internal and directed to suppliers and customers—were a good tool for maintaining a team atmosphere and positive awareness.

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*“If our suppliers aren’t on board, we’re not really doing Lean.”*

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Boeing takes its role of teaching suppliers to be Lean very seriously. Rick Behrens, Boeing’s senior manager of supplier development, emphasized the importance of building close relationships with suppliers at several levels, from the implementation team to the executive team. The company is especially committed to disseminating Lean business techniques. “If our suppliers aren’t on board, we’re not really doing Lean,” Behrens explained.

Figure 18 – View of teams

2005 10.3%	2008 12.2%	2005 46.0%	2008 39.4%	2005 19.2%	2008 18.3%	2005 20.8%	2008 23.3%	2005 3.8%	2008 6.8%
Little or no use of process improvement teams	Teams work within a functional department only	Some use of cross functional teams within a company		Team members at individual supply chain member companies actively work together for internal processes only	“What’s In It For Me” (WIIFM) has been addressed at all levels and is understood and accepted	Cross-company supply chain teams exist to develop an understanding of how process improvement practices can be implemented across supply chain partners		Cross-company supply chain teams proactively recognize opportunities and enact positive change for the benefit of the entire supply chain, even if it means less revenue on behalf of their individual company	

### Teaching Lean

Boeing uses a “Supplier Lean Enterprise Assessment Tool” to help obtain a baseline for understanding a supplier’s maturity level. From there, the company can determine which are the best resources and educational efforts to improve the identified leverage areas for that supplier.

For suppliers just starting out with Lean, for example, Behrens’ team will teach them the basics—what Lean is, why it is important, and how it will help both the supplier and Boeing grow the business. The team will then train the supplier on how to run a Kaizen (continuous improvement) event that will improve a specific process.

If the supplier already has some knowledge of Lean, Boeing’s supplier development team may go to the supplier’s site to help facilitate the running of a complex Kaizen event. If the supplier is advanced in Lean, Boeing may go and look for gaps to help the company improve its Lean processes.

Another fundamental of the program is to build trust on both sides, often beginning at the executive level with a focus on aligning the two companies’ goals and objectives. The participants work toward alignment on strategic goals and then set timelines for joint work toward those goals.

## Summary conclusions

The research team suggests that four significant findings emerged from this study research:

- The overwhelming fact is that companies are starting to implement and practice Lean concepts in the supply chain
- The obstacles to implementing a Lean supply chain continue, but have been reduced as compared with 2005
- Lean has the ability to be a cultural change agent and, in fact, is dependent on cultural change for success
- Proven financial gains are a result of implementing Lean supply strategies

### 1. Adoption rates of Lean concepts are on the rise

The biggest takeaway from the 2008 study is the overwhelming fact that companies are starting to implement and practice Lean concepts across the supply chain. Virtually every category has shown improvement; some, among Lean Adopters, by greater than 50 percent. Equally encouraging, Non-Adopters are moving into the mid-tier and are starting to adopt some, less mature, Lean practices as compared with 2005.

Figure 19 – Rate of adoption

Attribute	Percent of respondents by year		
	2005	2008	% Change
Data standards adoption	17.90%	27.50%	53.63%
Process standardization	19.20%	28.40%	47.92%
Waste reduction efforts	19.90%	25.00%	25.60%
View of teams	24.60%	30.10%	22.40%
Managing the demand signal	33.30%	39.50%	18.60%
State of demand collaboration	23.60%	27.80%	17.80%
Industry product standards	26.80%	31.30%	16.80%

Overall, the research team is enthusiastic about the results. We recognize that some of the improvement shown may be due to a slightly different audience of respondents, with the addition of readers of *Logistics Management* magazine. However, we also recognize the likelihood of improvements in thought processes and management strategies coming about through APICS’s focus on supply chain and professional certification programs.

## 2. Obstacles to Lean are real, but not insurmountable

Respondents were asked to indicate all recognized obstacles to implementing Lean initiatives that applied to the situations in their firms. Below are the percentages based on the total number of responses:

Figure 20 - Obstacles to implementing Lean initiatives

Lack of training	24.8%	25.7 %
Lack of resources	22.8%	27.2%
Top management commitment	19.6%	21.2%
Hard to apply in my industry	12.4%	8.5%
No clear benefit of Lean	7.51%	6.3%
Involvement in other activities (Six Sigma, TQM)	8.6%	11.0%

**Note: multiple responses were allowed; percentage based on total of all responses.**

As in 2005, lack of resources and training (in first place) in 2008 were again cited as the principal obstacles to implementing Lean practices, with commitment of top management following closely behind. With the exception of industry applicability and clearly understood benefits, all obstacles were viewed to be less of an issue than in 2005.

We believe these results reflect an increased interest in Lean, with the related increased commitment and availability of resources. As companies begin in earnest to examine Lean, they may well find that they have questions, previously unconsidered, regarding applicability and benefit. We also believe that, with effort, these companies will work through these obstacles.

Interestingly, commitment of top management—less of an obstacle in 2008 than in 2005—was not the most significant obstacle in either study. Management clearly understands that there are benefits to Lean. The results regarding training and resources are a by-product.

As in 2005, most respondents who have started a Lean implementation project indicated that the process started with top management. The second most dominant starting point was plant management; the third-ranked source was a company's logistics/supply chain group.

## 3. Lean as a cultural change agent

A key benefit of Lean is its ability to provide a framework for change. In order for Lean to bring about cultural change, however, the environment must be conducive to change. Change must begin internally, and then involve significant and relevant partners.

Resistance to change exists in almost any situation. For cultural change to be effective, it must start at the top. Understanding that a Lean business strategy is highly visible to management can help to motivate management and staff to ensure its success. It will be helpful, too, if each affected employee within each supply chain partner firm understands the benefit that will accrue to them through the effective implementation of Lean.

There is a significant difference, however, between cultural change and the starting point for most firms: the effort to improve the bottom line. Too often, firms focus too much on costs and not enough on outcomes. This tends to force employees and managers to look for short-term fixes to long-term problems.

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*Resistance to change exists in almost any situation. For cultural change to be effective, it must start at the top.*

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Lean provides a set of tools and an operating philosophy that provides a structure for thinking beyond the short term. Changing the culture to enable greater sharing of data—and trust—is critical.

## 4. The benefits of Lean are real, and impact the bottom line

One of the most striking findings in this study is that, statistically, Lean Adopters had significantly less inventory to support a day's sales activity, and fewer days were required to collect revenue from those sales. These differences not only reduce costs; they also dramatically impact the firm's ability to be responsive to changes in the overall supply chain, because they do not carry excessive levels of inventory or have cash tied up in unpaid customer invoices.

### Keys to success

The research team strongly believes that, in order for companies to succeed:

- We must promote a better understanding of the value of Lean within the supply chain
- Lean education and training must be expanded outside of the traditional manufacturing area
- Management and practitioners must step up efforts to improve collaboration and partnership throughout the supply chain
- There must be a set of metrics and benchmarks for validating the benefits of Lean
- All firms involved must monitor and report on performance

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*Lean Adopters had a significantly smaller amount of inventory to support a day's sales activity, and fewer days were required to collect revenue from those sales.*

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### A priority: Manage the demand signal

If you can focus on only one attribute and only one improvement in your supply chain, it would be to improve the management of the demand signal across your organization and communicate it to your suppliers. That will lead to better supply chain performance.

For an analogy, suppose for a moment that an inactive, non-athletic person decides to become a marathon runner. Clearly, the runner's body would undergo some dramatic changes, such as loss of weight, improvement of muscle tone, increases in energy and a lower resting heart rate, just to name a few. All of these lead to a more healthy body. Yet the goal was not to become healthier, but to be a marathon runner.

In the same way, a firm's goals have an impact on the entire company. When firms work to understand how they manage their demand signal, many of the other attributes that they have been working on take on new meaning. Accomplishing the goal of managing the demand signal requires the support of other key attributes within the company.

How do you focus on the demand signal? One helpful tool that is relevant is a process map, or value map. It is the first step in showing how the signal is communicated across the supply chain. Next, look for improvements in the process by answering questions like the following:

- How can the signal's velocity be increased?
- What are the benefits of increased velocity?
- Who benefits from increased velocity or visibility of the signal?
- Who sees the signal now, but doesn't use it?
- Who doesn't see the signal, but could benefit from it?
- What are the roadblocks that hinder the signal?
- What support or training is needed?
- What metrics need to be put in place to measure and encourage changes?
- What compensation/bonus plans are in place that may run counter to this initiative?

### Conclusion

Managing the Lean supply chain is not easy. Much like Lean manufacturing, it is not a destination that one can reach, but is rather a journey to embark upon. It is a journey of awareness, introspection and improvement.

The big question is always asked before the journey begins: Will it be worth it? Our data—both qualitative and quantitative—indicates that firms can achieve significant improvements by working on these attributes. This journey is based on facts and not just faith. Working with others, we wish you the best on your journey toward a Lean supply chain.

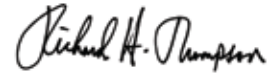
## A special thanks

This research and resulting report would not be possible without the continued support of the study's participants. We would like to thank these professionals for taking time out of their busy schedules to share with all of us their expertise and insights.

We hope our readers will find this report helpful as they continue to devise, review and improve supply chain management initiatives within their companies. Each initiative should be evaluated against the end goal of an adaptive cross-enterprise supply chain whose efficiency is matched only by its effectiveness.

Sincerely,

  
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Located in Statesboro, Georgia, Georgia Southern University offers a growing, nationally recognized logistics program. Its College of Business is the site of the Southern Center for Logistics and Intermodal Transportation.

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Supply Chain Visions is a specialized consulting firm dedicated to helping companies with supply chain strategy, education, thought leadership and visionary solutions. ARC Research named supply Chain Visions one of "The Top 10 Coolest SCM Boutique Consulting Companies."

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*Please contact the authors for more information on how to address the challenges and opportunities discussed in this report, or to obtain additional copies of this publication.*

