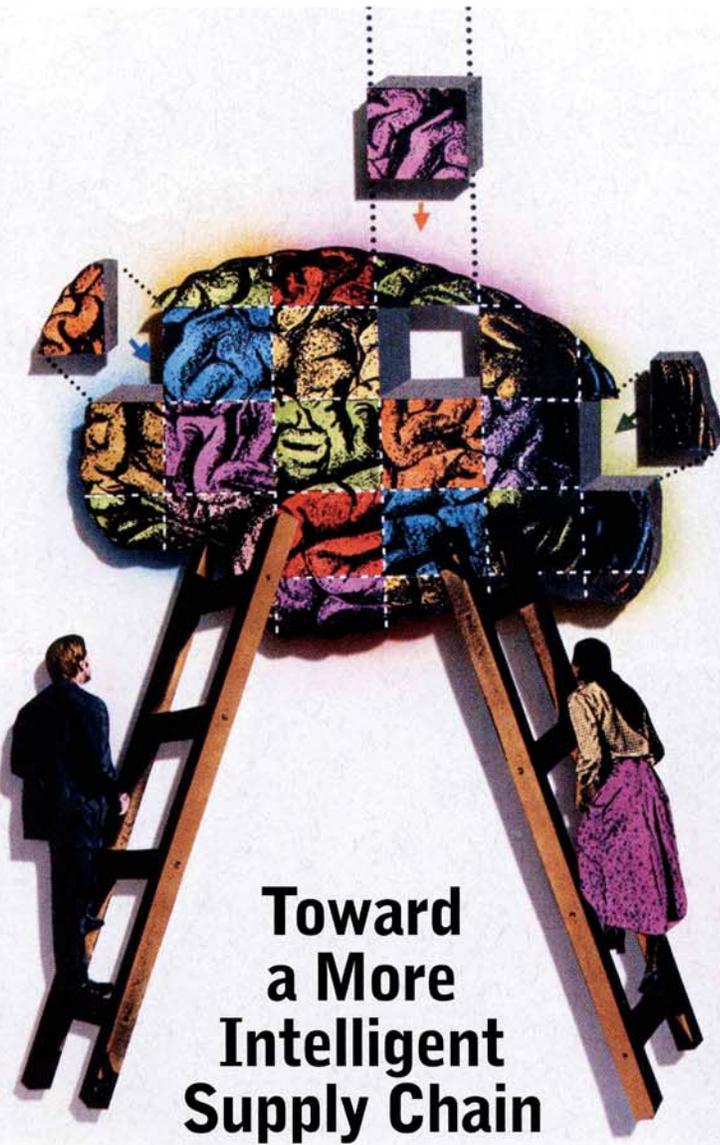


# SUPPLY CHAIN MANAGEMENT REVIEW®



**Toward  
a More  
Intelligent  
Supply Chain**

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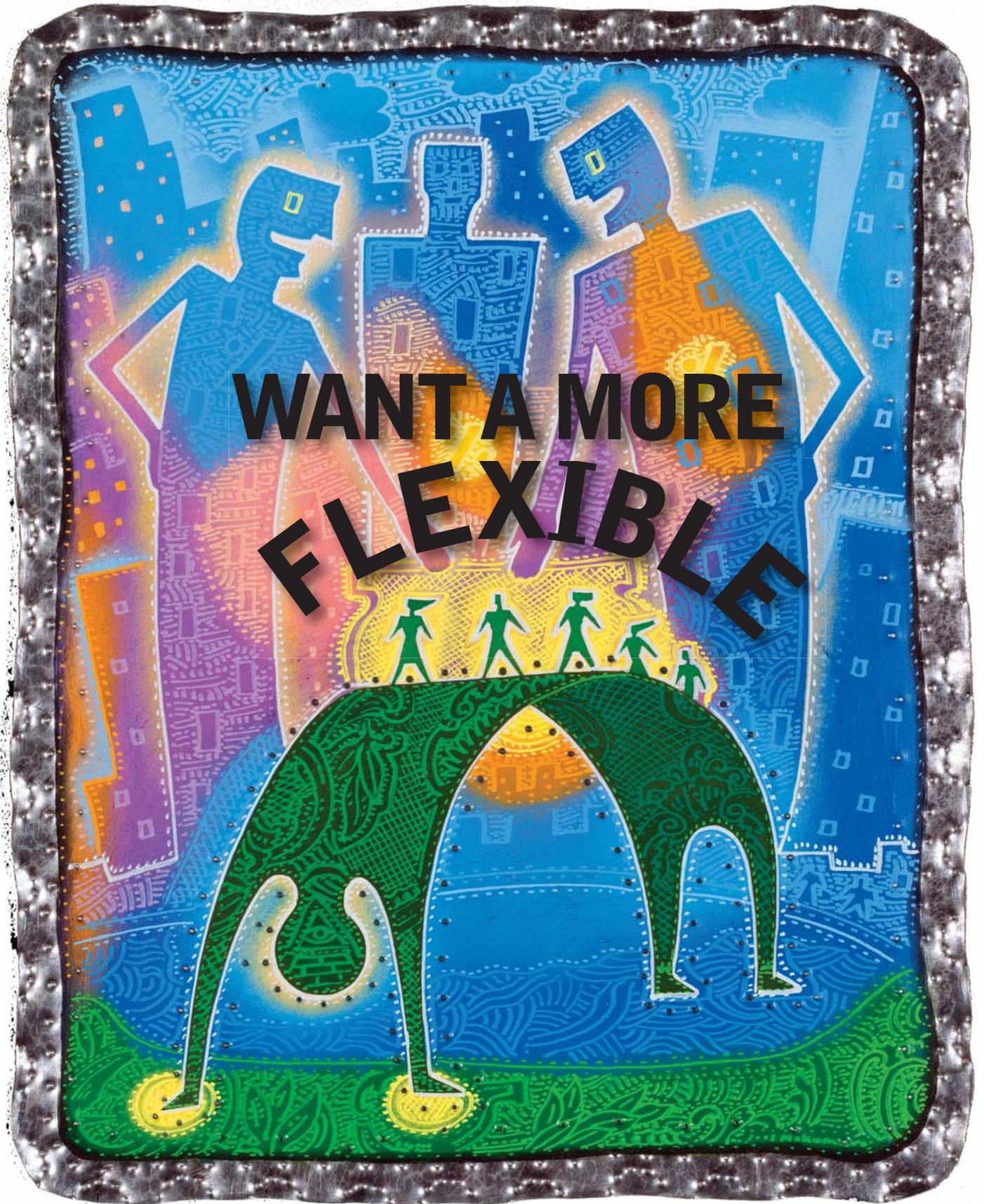
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**WANT A MORE  
FLEXIBLE**

**As complexity and demand for new products grow, companies are realizing that their supply chains need to be more flexible. Yet while they realize the importance of flexibility, they struggle with how to accomplish this difficult task. The key elements, according to an A.T. Kearney study, are reducing cycle time and implementing a pull-based replenishment process.**

**By Randy Garber and Suman Sarkar**

**D**uring World War II, Boeing reached a peak production of more than 1,000 bombers per month using simple equipment and without computers or a highly skilled workforce. Within four years, it introduced a large number of innovative designs—including the B-17 Flying Fortress, B-24 Liberator, B-25 Mitchell, and B-29 Superfortress. The company maintained its stride after the war, becoming one of the largest global manufacturers of commercial aircraft.

while Airbus struggles to make the A380 work. However, if Boeing does not master supply chain flexibility in the long run, it will be denied market advantage.

These problems are not unique to Boeing. In fact, they plague most innovation-driven industries and companies with changing customer requirements. Complexity and demand for new products continue to overwhelm supply chains. Globalization has done its part to increase complexity, as have new regulatory requirements to mitigate security risks. Retailers are also stoking the complexity fires by setting ever-higher standards for their suppliers. As customers become more demanding and companies struggle to please them with rapid introductions of new products, innovation-driven industries risk developing supply chains clogged with inefficiency, cost, and inventory.

In an environment of global complexity, what companies need most is supply chain flexibility. The more flexible you are, the faster your supply chain can respond to the market, and the better your chances to capture competitive advantage.

# SUPPLY CHAIN?

Today, however, with far better equipment, computers, and a highly skilled workforce, Boeing struggles to produce one-tenth the number of aircraft it produced during World War II. It takes an average of two years to fill an aircraft order and several years to introduce a new aircraft design. The reasons are clear: Today's aircraft are more complex and are customized to meet the needs of each customer. Lead times are longer, and supply chains cannot stretch, or are not flexible enough, to keep up with demand. Further complicating the picture is bureaucracy. Boeing must make sure that its supply chain complies with a variety of procedures—some of which were introduced by the Federal Aviation Administration for safety reasons while others were introduced by the company to manage design changes.

In other words, Boeing today must deal with a more complex and rigid supply chain than it did in the past. Even Boeing's well-known "innovation edge" has become less of an advantage as competitors have learned how to ramp up production to follow quickly with their own new product introductions. Boeing may have received a short-term respite

while Airbus struggles to make the A380 work. However, if Boeing does not master supply chain flexibility in the long run, it will be denied market advantage.

## **Flexibility Defined**

What's the best way to achieve supply chain flexibility? In our experience, supply chain flexibility is achieved by reducing cycle time while implementing a pull-based replenishment process.

Think about it. By shortening cycle time, companies are in a better position to respond quickly to changing market requirements. (Of course, companies must still maintain reliability; short cycle times with high variability can quickly erode benefits.) A pull-based replenishment process will then increase that supply chain flexibility even more by using a signal process to synchronize production to demand. With pull-based replenishment, companies will not have to hang on to buffer inventory to meet market demand. Instead, by reducing cycle time and improving the connection between production and demand, they can make the supply chain more responsive.

Flexible supply chains are sometimes assumed to be inherently unstable, but they're not. Demand in most indus-

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tries is stable, and reducing cycle time will allow that stable demand to be communicated through the supply chain faster. In fact, instability is usually introduced into the supply chain because companies cannot accurately forecast short-term demand. So by reducing cycle time, companies can also reduce the forecast-related whiplash effect throughout the supply chain.

### The Struggle for Flexibility

Many companies have not yet proved successful at creating a flexible supply chain. This conclusion became apparent after reviewing the results of A.T. Kearney's global survey of executives at leading high-tech and communications-equipment manufacturing companies.

The goal of the study was twofold: to identify underlying supply chain problems in the industry and to gain a better understanding of what companies are doing to address these problems. Although the survey was focused on high-tech and communications companies, the results and recommendations are relevant to many other industries.

Almost all of the executives in our survey said they shared a similar goal—to build supply chain flexibility as a way to gain a competitive edge in the market. But they also admitted to not having the capabilities to achieve this goal. In fact, the techniques that most of them are using to determine and meet market demand—forecasting and holding inventory—actually severely limit supply chain flexibility. This is especially true in fast-changing markets where forecast accuracy decreases with each level of granularity. Using standard forecasting techniques to predict short-term demand and supply needs is fraught with error. Similarly, inventory-based approaches are becoming obsolete as they tie up capital, cannot completely eliminate uncertainty in the supply system, and, in some ways, increase supply chain risks by increasing the probability of being stuck with a pool of obsolete inventory. In fact, inventory-based systems often hide more prob-

lems than they solve.

It is time for companies to stop relying on standard demand forecasting approaches and instead focus on reducing supply chain cycle time and implementing effective pull-based replenishment processes. The following sections outline how to enable these two elements of supply chain flexibility.

### Reduce Cycle Time

From our survey findings, we identified four major elements that help improve cycle time and increase supply chain flexibility.

#### 1. Improve network design

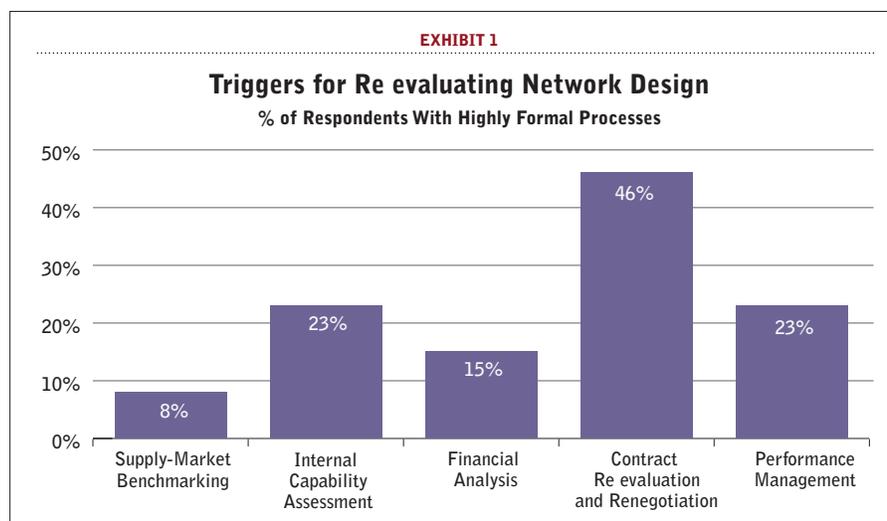
The design of a company's supply chain network plays an important role in how fast goods move from one point to the next. To ensure that goods are moving as quickly as possible, every company should periodically redesign its supply chain based on its strategic objectives and changes in the business environment.

In spite of this need, our survey findings reveal that few companies have formal processes in place to reevaluate their supply chain networks. Some executives blame this on "organizational latency," meaning that their companies are simply not inclined to root out and fix their supply chain problems. Others say there is a "lack of willpower" to make changes to an already running operation.

A good example of the impact of organizational latency comes from a global telecommunications-equipment manufacturer. The company moved its manufacturing base to Southeast Asia to cut costs but kept its main global distribution point in the United States. Meanwhile, demand moved from the United States to Europe and Asia, with 60 percent of orders arriving from customers outside the United States. Despite this major change in demand pattern, the company never reworked its network design, even after complaints from its top 10 customers about long lead times and poor delivery performance. Today, the company is in trouble as many of its customers are switching manufacturers or using intermediaries to reduce cycle time.

Reviewing the network design every few years will ensure that the supply chain is structured to meet all business expectations. Our survey findings reveal that most network-design reviews are triggered by internal and external supply market factors (see Exhibit 1). Companies that consider customer- and demand-related changes when performing a review could differentiate themselves by becoming more responsive to demand.

A good network design optimizes



supply chain costs, throughput, and cycle time based on demand and supply characteristics. Designing such a network starts with modeling the supply chain while considering all related factors, including geographic locations, costs, capacity and utilization, throughput, facility characteristics, mobility of assets, and taxes. The design should also account for decisions about opening or closing warehouses and plants

### **Supply chain flexibility is achieved** by reducing cycle time while implementing a pull-based replenishment process.

and determine the most appropriate transportation modes and distribution channels. When done well, the supply chain network will accommodate the need for flexibility rather than hold to rigid inputs and static assumptions of demand, cost, and service requirements.

#### **2. Create more flexible supplier relationships**

With globalization, external providers are playing more critical roles in companies' supply chains. Companies have outsourced a substantial portion of their supply chains to external providers such as contract manufacturers and third-party logistics providers (3PLs). Indeed, 40 to 50 percent of supply chain cycle time is typically attributed to suppliers. What effect has outsourcing had on supply chain flexibility?

Contract manufacturers can help reduce cycle time and cost by moving manufacturing closer to the source of raw materials or to customer plants. For example, many of the electronics manufacturing services (EMS) suppliers have moved manufacturing to China to be closer to their sources of electronic components. They have implemented just-in-time manufacturing, produced smaller batch sizes, and synchronized their production with component manufacturers to respond quickly to any changes in the market. Because the EMS suppliers ship directly to customer warehouses, they reduce the length of the supply chain and eliminate wait time and in-process cycle time. Additionally, EMS suppliers are installing labs closer to their customers' R&D centers to develop and roll out new designs faster.

Our survey findings reveal that most executives do incorporate flexibility terms into their supply contracts with EMS suppliers. These flexibility terms may include capacity increases to accommodate peak-season buildups, such as the Christmas holiday season. Flexibility terms may also assure changes in production capacity in case a new product sells faster or slower than expected. The bottom line is that when both parties recognize from the beginning the potential flexibility needs and understand the cost/benefit equations for

meeting those needs, contracts can be structured to dramatically reduce supply chain risk. Companies obtain flexibility from incumbent suppliers upfront rather than scrambling to add capacity in real time in a dynamic marketplace.

Contracts with logistics providers, on the other hand, typically do not include flexibility terms because companies often assume that 3PLs, in their role as intermediaries, bring built-in flexibility. Yet 3PLs mostly focus on reducing customer involvement, and unless flexibility is written into the contract, they do not try to reduce supply chain cycle time. Among our survey respondents, only 20 to 30 percent require flexibility from logistics providers, while more than 50 percent require flexibility from their contract manufacturers.

Smart companies will demand more flexibility from their 3PLs just as they do from their contract manufacturers. Flexibility terms for 3PLs could include: guaranteed supply availability, target inventory turns, cycle time requirements, conditions for excess-material holding requirements, and, in general, recognition of which party is best positioned to deal with specific supply chain risks.

#### **3. Simplify transactions processing**

Another way to reduce cycle time is to simplify transaction processing. The processing of transactions, such as requisitions and purchase orders (PO), before they go to suppliers sometimes takes 50 percent of overall supply chain cycle time. Ordering processes have become especially cumbersome with complicated requisition requirements, multiple approvals (even for low-value items), and complex links to internal budget processes. The requisition process is particularly crazy because it can vary by legacy system, business unit, region, type of product, and type of spend. Although requisition processes reduce risk and ensure budget requirements are met, they significantly increase cycle times for ordering.

Some companies are addressing the problems associated with the requisition process by creating a catalog of frequently ordered items from approved suppliers. These catalogs are used for office supplies as well as for direct spend and high-value materials. Cataloging ensures that the procurement organization has verified the prices and helps to free up buyers' time to focus on strategic issues instead of managing each transaction. Many companies are also simplifying the approval process for items in the catalog by linking budgeting tools with the procurement system.

A global outsourcing firm reduced its PO processing time from 30 days to less than one day by implementing catalogs. The company accomplished this by simplifying the requisition and approval processes and by linking the budget system with the procurement system. Now only a small percentage of orders are made outside of catalogs and require manual intervention. In fact, the percentage of POs requiring manual intervention

dropped from 90 percent to less than 5 percent. Exhibit 2 shows that the decrease in manual intervention has had dramatic benefits, especially in reducing PO processing time.

Developing catalogs takes a certain amount of upfront work in terms of gathering and cleansing supplier data, ensuring price validity, and synchronizing supplier ordering systems with the company's procurement system. However, once catalogs are populated, they help streamline the entire procurement process. The cost to create and maintain a catalog on an ongoing basis is miniscule, while the savings that can be generated from compliance and lower transaction-processing costs is significant.

Some companies are further reducing manual efforts by linking their sales catalogs with their buy-side catalogs. Once a sales order is placed, it automatically triggers an order to a supplier if the items are not available in stock. The effort of cataloging items has been shown to improve supply chain flexibility and customer satisfaction, as customers can now order seamlessly, track an order, and receive an item much faster than before.

#### 4. Improve supply chain connectivity

A company's IT and information systems can play an important role in determining how flexible a company's supply chain is. Many companies have invested in expensive enterprise resource planning (ERP) systems to streamline their financial and human-resource reporting systems but have not extended these systems to their supply chain partners. While today's "enterprise" may be inextricably linked to its supply chain partners, ERP systems continue to define the enterprise as being principally focused on internal transactions, decisions, visibility, and reporting. This view can limit the supply chain's flexibility.

Additionally, most survey respondents still use phone, fax, and e-mail to exchange data with supply chain partners. These methods not only slow down the supply chain but also introduce an element of error and uncertainty. Clearly, there are far better ways to connect with suppliers, such as through Web interfaces, supplier networks, and point-to-point links. These new state-of-the-art technologies allow almost limitless visibility into sales-order data and inventory levels. Furthermore, the cost to make these connections has gone down significantly in recent years.

The benefits of such a system can be seen in examples such as a global telecommunications company, which replaced its costly manual reporting structure with state-of-the-art technology that allowed it to manage an end-to-end

supply chain and respond faster to market demand. The new IT system is expected to reduce costs by more than 30 percent by removing manual labor and duplication of effort. Still, the biggest benefits have come from removing information gaps. The new visibility has allowed the company to reduce inventory by five days and has helped to create a true extended enterprise.

#### Move to Pull-Based Replenishment

The other part of the flexibility equation is to implement a system of pull-based replenishment. Pull-based replenishment can improve supply chain flexibility by synchronizing production processes with market demand. It requires replenishing the buffer inventory in different stock points and stopping production and shipment once buffer inventory levels are reached. This process requires discipline—moving to smaller batch sizes, stopping overproduction, increasing inventory accuracy throughout the supply chain, and developing pull-signaling processes. Many companies find this difficult to do because a pull-based network assumes optimization at the supply chain level and not at a plant or unit

level. A different set of metrics—for example, total inventory numbers, stock-out percentage, and customer satisfaction percentages—is required to measure overall supply chain performance.

A pull-based replenishment process ensures that the right products are produced based on actual market demand. It frees up both production and logistics from managing products that are not demanded by the customers and therefore allows

supply chain managers to respond faster to real changes in demand.

A consumer goods company improved supply chain flexibility by implementing a pull-based replenishment system in its facility in India. This facility covers hundreds of stocking points and multiple distribution channels for both urban and rural areas. Although the implementation was difficult, the company managed to stabilize the system within six months. Once executives got beyond the major challenges—determining stocking levels, changing incentive systems for dealers and distributors, and developing a disciplined planning process—throughput increased by 10 percent, inventory dropped from 90 days to less than 20 days, and customer satisfaction scores rose to 98 percent. The company's achievement was all the more impressive given India's relatively poor transportation and telecommunications infrastructures.

#### Where to Start?

We have discussed the various elements of supply chain flex-

**EXHIBIT 2**

**Catalog Benefits Example—  
Large Outsourcing Company**

Measure	Pre-Catalog	Post-Catalog
Electronic Catalogs	0	-500
Electronic Purchases	0%	95%
PO Processing Time	30 Days	< 1 Day
Compliance	40–50%	90–95%
Customer Satisfaction	40%	75%
Back-end Systems	Multiple systems that are not linked	Integrated ERP system with spend visibility

ibility: reducing cycle time, improving network design, building partner collaboration, simplifying transaction processing, increasing connectivity, and implementing pull-based replenishment. Our findings suggest that while many companies have successfully implemented some of these elements, few have mastered all of them. To determine where your company stands in terms of supply chain flexibility, we recommend the following three-step evaluation:

**Step 1: Define the future supply chain operating model.** Defining a supply chain model requires determining first what it takes to meet current customer needs, and then what degree of flexibility is necessary to meet future needs. This modeling effort requires understanding the expectations of your supply chain customers and stakeholders, gathering performance feedback from customers, and understanding customers' product/service strategies and the resulting supply chain implications. Armed with this information, you can then define your supply chain requirements and determine the necessary tradeoffs.

Defining requirements can begin with these questions:

- What type of network design is best for the company?
- What portion of the supply chain should be retained?

What portion should be outsourced?

- What flexibility terms should be written into contracts with supply chain partners?

Determining tradeoffs is a little more complicated. In any network design, there are always tradeoffs between cost and flexibility, so it is important to determine those tradeoffs based on your company's strategic objectives. For instance, high-tech companies that have to respond quickly to changing market requirements will make flexibility an important component of their supply chain design even if it means that supply chain costs are higher. In other industries, cost might be more important than customer service or market demand requirements; however, flexibility may still be important to reduce inventory and related costs. Whatever the tradeoffs are, the new operating model should provide a step change in supply chain performance—cost, cycle time, and inventory.

**Step 2: Evaluate the current operating model, and identify gaps between it and future operating models.** Not all processes in the current supply chain must be fixed in order to reach the future operating model. Instead, it is important to identify gaps and prioritize areas of opportunity. This begins by creating a baseline for current supply chain operations and practices. The baseline should then be compared with the future operating model to identify gaps. Action plans to address the gaps should be prioritized based on size of opportunity and ease of implementation.

The next step is to establish appropriate metrics and align incentives to highlight improvement opportunities that will lead to a flexible supply chain. We can use an example of a high-tech company to illustrate the importance of appropriate metrics. The company's market share depended on quick

introductions of new designs, but its contract with its manufacturer specified that cost competitiveness was the most important metric. So, instead of freeing up manufacturing capacity to quickly develop new designs, the contract manufacturer was solely focused on maximizing utilization. As a result, there was little capacity left for designing new products. Revisiting the contract terms increased the company's supply chain flexibility.

**Step 3: Test feasibility of the new model.** A new supply chain operating model may look good on paper but not work well in real life. To reduce the risk of failure, we recommend performing a test case. For example, a computer model can be used to evaluate the design and performance of the network, showing how the supply chain will react in different conditions. "What-if" scenarios, such as overload, demand spike, and supply uncertainty, can provide good insights into the model's robustness and feasibility.

However, computer simulations might be difficult to use if you are changing multiple elements of the supply chain. In these situations, a pilot restricted to a geographic location or business unit will work better as long as it tests the end-to-end ramifications of different conditions. The pilot will allow the supply chain team to evaluate new operating-model capabilities and ensure they meet the company's requirements. From these test cases, design teams often get ideas for making further improvements. For instance, a consumer goods company, while testing its future operating-model design, realized that it could close two of its four DCs and co-locate one of the DCs with a manufacturing plant.

Finally, it is important to use defined metrics, such as cycle time improvement, inventory reduction, and cost, to compare the performance of the new operating model with the current one.

### Supply Chain Flexibility is Not a Myth

The flexible supply chain is not a myth or an unattainable goal. Instead, it is becoming a necessity as customers become more demanding.

Consider the case of an online book retailer striving to meet customer demand but hindered by a faulty distributor relationship. Despite the books being available and the company's possessing a powerful product catalog, the time to dispatch an order was unacceptably long and customers were complaining—or worse, switching to competitors' Web sites. The retailer fixed the problem by incorporating flexibility terms into its contracts with distributors and improving IT linkages to feed them real-time demand information.

Today, more companies can achieve this type of supply chain flexibility by working on the areas discussed in this article. Although it can be a time-consuming endeavor that requires the efforts of the entire company, the result—faster movement of goods through the supply chain—will be well worth the effort.



A.T. Kearney is a global strategic management consulting firm known for helping clients gain lasting results through a unique combination of strategic insight and collaborative working style. The firm was established in 1926 to provide management advice concerning issues on the CEO's agenda. Today, we serve the largest global clients in all major industries. A.T. Kearney's offices are located in major business centers in 32 countries.

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