As the recent global recession deepened, some industries saw sales decline by 40 percent or more. Cash-strapped companies struggled with order cancellations, inventory pile-ups and underused assets. The business headlines showed that many organizations were unable to survive those pressures.

Yet many have survived, and are on course to do well as the global economy picks up. The survivors were almost always better able to change course more quickly than their more sluggish peers, minimize losses and generate much-needed cash. On the whole, they benefited from more responsive, more agile supply chains, allowing them to quickly cut back on manufacturing shifts, change batch sizes, stop and start entire production lines, close plants, sell assets, and sharply
reduce inventory coming through the pipeline.

Although global recessions are rare, uncertainty and unpredictability are facts of life in today's business environment. Nobody can truly predict the future, no matter how complex or accurate a company's forecasting model is. And as supply chains become longer—reaching into low-cost countries for sourcing or manufacturing—it becomes increasingly clear that greater flexibility and the ability to react rapidly to changing market conditions are at least as important as forecasting skills when it comes to optimizing end-to-end operations.

These days, the prices of fuel and other commodities can shift overnight, customers demand increasing speed and customization, and port and road congestion add unwelcome variables to the supply chain. Other variability is self-inflicted—the result of needless complexity in products, portfolios and processes. This blend of complexity and unpredictability exacts a high cost. That's why it's critical for companies to create an agile, flexible supply chain that can react quickly to changes in conditions or demand and minimize the negative impact of uncertainty.

But flexibility often comes at an additional cost. Business leaders must wrestle with a range of strategic trade-offs: Should I build one massive manufacturing plant to optimize scale, or diversify my risk by staying closer to the customer and producing in multiple locations? Should I keep more warehouses in my network to make sure I can deliver products to my customers profitably even if diesel prices hit $10 per gallon? How much buffer inventory should I keep on hand?

Flexibility will be more critical in some areas than in others—when profit margins are high, for instance, or to gain access to strategic markets or customer accounts, or where unpredictability imposes particularly high costs. So it's important to know why you're making the decisions you're making, and to make them strategically and mindfully.

This article brings together eight proven practices for increasing flexibility and reducing risk. Although some of the themes are well understood by experienced supply chain professionals, it's likely that those leaders will not previously have been able to review or share all of the themes in an easily accessible form—a kind of "flexibility checklist," if you will.

**Weighing the Trade-offs**

Before we begin to address the eight practices, it’s important to recognize that companies can increase the flexibility of their supply chains while managing the associated costs, for greater benefits overall. One way to determine an overall inventory policy, for instance, is to balance the degree of demand volatility against the cost of a lost sale, as shown in Exhibit 1. Let’s say that both volatility and the cost of a lost sale are high; then companies must do everything they can to ensure product availability without incurring the costs of too-high inventory levels. Investments in tools and processes that enable tight integration with suppliers can help keep costs down, as can just-in-time (JIT) ordering and production, fast reorder, automatic replenishment, and make-to-order mechanisms. On the other hand, if volatility and the cost of a lost sale are both low, the best approach is to design and automate the supply chain to minimize inventory and ensure the target levels of availability.

However, determining true volatility and the actual cost of lost sales can be a challenge that requires a
detailed analysis. For instance, to see how volatile customer demand truly is, companies must first factor out all self-inflicted volatility from inefficiency and poor planning, which can magnify or distort demand signals up and down the supply chain. It’s also important to segment the product portfolio, since variability and the cost of a lost sale will vary among SKUs.

**Eight Ways to Increase Flexibility and Reduce Risk**

External sources of volatility such as changes in customer demand are difficult to control because they’re largely unpredictable. When customer demand is uncertain, companies should keep their options open wherever possible—by delaying final assembly, for instance, or warehousing inventory until demand signals are clearer. But other obstacles are internal. By simplifying and streamlining supply chain steps and processes, companies can remove these self-inflicted obstacles. The following eight actions address both internal and external obstacles to flexibility:

1. **Tighten Your Supply Chain**
   - As a rule of thumb, the more lengthy or complex your supply chain is, the greater the risk of profit-sapping variability. Companies that manufacture in China, India and other low-cost countries must always weigh the cost-saving benefits against the added transportation costs, risks and longer lead times, and lead-time variability. Delays caused by external factors such as bad weather or gridlock at ports can add days or weeks to shipping times. This can wreak havoc with production schedules and often lead to vicious cycles of stock-outs, missed sales, inventory back-ups, discounting, high carrying costs, and write-offs.

   It’s essential to make, and keep making, your supply chain as short, simple and flexible as it can be. Consider sourcing some products closer to home—in Mexico or South America, for instance, where labor costs are still relatively low. Where appropriate, build more regional warehouses to keep inventory closer to customers. For products with high margins and high volatility or minimal weight and bulk, consider different shipping options such as airfreight. The overall cost savings may offset the higher upfront costs.

   Another way to shorten cycle times and increase flexibility is to rethink distribution logistics. A major European retailer used to wait four to six months to get general merchandise from China. That’s how long it took for the suppliers to receive orders, get raw materials from their vendors, make and ship the products, and for the products to make it to the store shelves. Unwiling to wait that long, the retailer rented a warehouse next to the port in China and

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**EXHIBIT 2**

**Shorter Lead Times Decrease Safety Stock Requirements**

<table>
<thead>
<tr>
<th>With 2 weeks lead time, about 8 weeks of safety stock is needed.</th>
<th>With 1 week lead time, safety stock needs drop by ~25% to six weeks.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safety Stock for Sample Set of 7,500 SKUs, LT = 2 Weeks</strong></td>
<td><strong>Safety Stock for Sample Set of 7,500 SKUs, LT = 1 Week</strong></td>
</tr>
<tr>
<td><img src="image" alt="Graph of Safety Stock" /></td>
<td><img src="image" alt="Graph of Safety Stock" /></td>
</tr>
</tbody>
</table>

(1) Rounded overstock represents items with less than one unit of demand per week. By rounding the SS calculation to 1, the store-SKU data point is over the calculated safety stock level. Recommended safety stock levels (6 or 8 weeks) do not apply to these rounded items.

Note: SKUs selected were very similar to fall pilot SKUs. Analysis was carried out using actual demand variability and service level goal of 95%. Analysis assumes normally distributed demand and might thus underestimate safety stock required for some very peaky items.

Source: Sample of ~7,500 store-SKU combinations for periods 8-12 from FY03.

Source: The Boston Consulting Group
Supply chain problems can hinder product flows and lead to a distorted view of customer demand, so factories often end up making too much or too little stock. As a rule, inventory levels are driven by manufacturing or replenishment lead times and demand variability. Supply chains often distort demand as each stocking point orders more than is needed to avoid stock-outs—leading to the notorious bullwhip effect where demand is artificially amplified. Lean tools such as kanban or JIT response systems can minimize inventory levels by aligning production with true customer demand.

Other valuable moves include shifting from make-to-stock to make-to-order wherever possible, reducing production lead times, and optimizing batch sizes. Recalculate and strictly adhere to target stock levels, safety stock and replenishment quantities. This requires a thorough analysis of customer demand patterns, customer forecast quality, production throughput time and variability, and supplier lead times (often the most important driver of safety-stock levels, as shown in Exhibit 2). By assessing these factors, companies can often sharply reduce inventory levels throughout the supply chain.

Following the lead of the automakers, some major retailers have begun to favor smaller, more frequent deliveries designed to cover only a few days’ or even a few hours’ worth of customer purchases. This can result in a more continuous flow of goods from suppliers to retailers and lower levels of inventory throughout the supply chain, which can keep costs low—provided transportation and logistics are done in a cost-effective manner. In the auto industry, original equipment manufacturers (OEMs) have long integrated with their suppliers, creating transparent, interconnected systems that support JIT production and virtually eliminate downtime. Suppliers take responsibility for stock replenishment, and have a clear view into what parts are needed for the day’s production schedules. Since they may make multiple deliveries in a day, suppliers minimize transportation costs by locating their plants near the OEMs, using smaller trucks and optimizing capacity.

Companies can also reduce inventory levels without hurting customer satisfaction by creating consistent “rules” for product availability, based on demand patterns. To this end, a major retailer defined three product categories, based on speed of turnover and cost of inventory. As shown in Exhibit 3, fast-moving, low- to mid-cost products were made available in all stores at all times, because shoppers always expected to find these items. Very slow moving items were available on a special-order basis, but with exceptionally reliable “available by” dates. And high-cost products—even if they were slow movers—were guaranteed to be available at all stores within 24 hours. Consistent execution of these availability rules led to lower inventory levels, fewer markdowns and greater customer satisfaction.
3. **Simplify and Standardize Wherever Possible**

Self-inflicted complexity in products, processes and customer portfolios can hinder flexibility. A vast portfolio of complex products results in frequent changeovers, ramp-ups and ramp-downs in production lines and can involve inflexible assets that must be dedicated to specific products. With less complex operations, companies can respond more quickly to changes in demand. During the recent downturn, a global manufacturer saw a 30 percent drop in customer orders. Drastic measures were needed to survive. An analysis of the product portfolio revealed that many of the company’s offerings weren’t strategically necessary and added very little to the bottom line after factoring in the added costs of their manufacturing complexity. By phasing out these products, the company was able to shut down one plant and improve the adaptability of its network of fixed assets.

Wherever possible, it’s invaluable to standardize products and components to minimize costly variances and manufacturing complexity. At the same time, look for ways to standardize manufacturing processes, plants and equipment so that products can be produced across the asset network. If demand for your products is volatile, design production lines with shorter changeover and ramp-up times. And whenever possible, delay assembly or regional customization until demand patterns are clear.

Consider optimizing your product mix by reducing the number of offerings in your company’s portfolio, simplifying their design, and using the same components or platforms where you can. As demonstrated in Exhibit 4, SKU proliferation can sharply increase complexity throughout the supply chain. At one manufacturer, regional sales offices had a history of requesting product variants to meet local market needs. The result was a large, complex portfolio with too many small items tying up production capacity. The company was able to streamline its portfolio from 56 small items to 14, cutting fixed costs by 15 percent and boosting production output by 30 percent.

It’s important to analyze the true profitability of products, too. Low-margin offerings that require the same amount of support and resources as high-margin ones may not be worth carrying if price increases aren’t an option. At the same time, prioritize production so that goods with the highest margins and most volatile demand are those that are handled the most promptly. Finally, you should prune slow-turning SKUs—unless they’re for premium customers or bundled with other high-margin product offerings.

4. **Tailor Service Levels to Specific Customer Segments**

You may be providing costly levels of service to the wrong customers—and missing the opportunity to use service to differentiate yourself with the customers that matter most. Companies can focus their capabilities, minimize overall costs, and increase the flexibility of their supply chains by varying service levels based on customer value. Best-practice companies analyze account profitability and create priority service rules for certain customers, although these behind-the-scenes differences are not always advertised.

Differentiated service levels require knowing two things: who your premium customers are, and what service elements matter most to them. This approach calls for business leaders to segment customers based on account volume, total cost to serve and overall profitability. Higher-margin, high-volume customers are the ones you should go out of your way for. But first you need to figure out what they really value. For instance, if prompt delivery is critical to premium customers, direct their orders to “fast-lane” processing or keep buffer inventory in stock. And move high-value customers to the top of the back-order list.

Creating different supply chains for different customer segments can work well, too, since the requirements are usually very different. For instance, a large contact lens manufacturer has decoupled its low-cost and high-cost lenses, and fashion retailers have long had separate sup-

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**EXHIBIT 4**

**SKU Breadth Adds to Supply Chain Complexity**

<table>
<thead>
<tr>
<th>SKU Concentration Curve, Ranked by Sales, Left (High) to Right (Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of SKU</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>10%</td>
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<tr>
<td>20%</td>
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<td>80%</td>
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<tr>
<td>90%</td>
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<tr>
<td>100%</td>
</tr>
</tbody>
</table>

Why Complexity Matters

- Lower space productivity
- More complex shopping experience and potential customer confusion
- More handling and transactions
- More warehoused inventory
- Greater fragmentation of routing
- Possible reduction in supplier purchasing power

Source: The Boston Consulting Group
Supply chains for their basic and high-fashion lines. Clothing retailer Zara made a name in the industry by manufacturing everything locally, which gave it enormous agility in the fickle world of high fashion. But the company came to realize it had more flexibility than it needed, which came at a cost. Now, Zara has begun to segment its customers and does some of its manufacturing in China.

5. **Focus on Core Capabilities; Outsource or Collaborate for the Rest**
Many companies try to do too much. The smart approach is to rethink your company's business model, looking for non-strategic tasks that could be offloaded. For these activities, or when an advantage is simply not achievable, look for opportunities to gain the needed capabilities through a partnership or by outsourcing. Look, too, for underused assets. If capacity utilization is low, a better option may be to sell or repurpose the assets and find an external service provider to pick up the slack. For this reason, many companies outsource asset-intense activities such as transportation, warehouse operations or manufacturing.

External partners or contractors can often offer services more effectively and cheaply due to the expertise and scale that come from having a large customer base. Partnerships can also be a fast, low-risk and flexible way to try out new markets without fully committing the resources or developing the needed capabilities. Contracts can often be structured to allow volume to ramp up or down in response to economic downturns or expansion. Finally, partnerships or third-party providers can provide quicker access to or share the cost of high-cost assets, capabilities or technologies.

Although outsourcing can pay major dividends in flexibility, it should be used strategically. Be sure to retain control of your supply chains and the critical customer-facing, brand-building activities. For instance, a book publisher may be smart to outsource fulfillment—the distribution of books to bookstores—to a logistics expert. But order-taking is an important customer touch-point that may be better kept in-house. The conversations that come with order-taking can help deepen relationships with bookstore owners and provide insights into market trends and readers’ needs. Companies that lack the needed capabilities often make the mistake of outsourcing key strategic activities. Instead, they should build the capabilities in-house.

6. **Improve Data Transparency—and Get Closer to Demand Signals**
Supply chain flexibility requires good end-to-end information. Inaccurate or missing data can lead to errors and poor execution. The most successful companies use integrated, global IT systems for greater visibility and network governance, and make decisions based on a high-level, cross-enterprise perspective. They set up integrated systems designed to track inventory, monitor capacity utilization, enable flexible production, and minimize the variability of global supply chains.

Good information starts with master data that is current and consistent among systems—and ideally upstream with suppliers and downstream with customers. For instance, a product should have the same SKU or reference information in every system, such as the best by/sell by dates on perishable products. At the same time, it’s necessary to keep information updated and consistent by using global data synchronization (GDS) tools and techniques.

Rich data exchange is also critical. Information related to sales, inventory, changes in demand, orders, shipping notices, delivery notices, and invoices should be transmitted electronically—in a real dialog among systems. Besides saving time and labor, this detailed, dynamic exchange ensures that all information is up to date. Wal-Mart’s RetailLink is an excellent example. The system provides a bridge to the retailer’s suppliers, giving them data on sales and inventory levels and allowing them to download purchase orders. By integrating more closely with key customers such as Wal-Mart, suppliers get a better sense of true demand, which can reduce inven-

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**The 8 Ways to Enhance Agility**

1. Tighten Your Supply Chain
2. Rethink Inventory Management
3. Simplify and Standardize Wherever Possible
4. Tailor Service Levels to Specific Customer Segments
5. Focus on Core Capabilities; Outsource or Collaborate for the Rest
6. Improve Data Transparency—and Get Closer to Demand Signals
7. Create the Right Metrics and Incentives
8. Develop “Favored Status” with Key Suppliers

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It’s important to recognize that companies can increase the flexibility of their supply chains while managing the associated costs, for greater benefits overall.
tory levels throughout the supply chain. Systems such as these build greater trust and cooperation as well.

With correct, near-real-time information in every system, companies can begin to leverage decision-making software and automate many aspects of their supply chains. With powerful software such as forecasting algorithms, manufacturing solutions, pricing tools and sophisticated supply-chain software, much of the flow can be switched to “autopilot”—freeing managers to focus on higher value-added tasks.

7 Create the Right Metrics and Incentives

Few companies have taken the time and effort to develop metrics that track and measure speed, efficiency and flexibility. Metrics that track reductions in lead times, improvements in on-time delivery and cycle times, response time to changes in demand, lower stock-out rates, days inventory in different locations—these are pertinent measures of flexibility. Setting metrics and then tracking trend lines can help you diagnose problems and determine where to focus your improvement efforts. Metrics should also measure end-to-end results instead of just addressing a small step of the supply chain with limited business and customer relevance. Make sure that metrics are visible and regularly monitored, and that they link to incentives for business-unit and individual performance.

By linking incentives to the end-to-end metrics, companies reward people for supporting these efforts, making smart decisions, and adding value to the business as a whole—not simply optimizing a functional silo or small fiefdom. Companies can also create incentives to improve suppliers’ performance and reliability by linking payment terms to their performance in areas such as delivery accuracy, complaint ratios, and order lead times.

8 Develop “Favored Status” with Key Suppliers

If you have strong relationships with a few key suppliers, you may gain priority status in times of shortages. Start by reviewing your purchases across the company, looking for ways to consolidate buying so you can give more volume to fewer suppliers—especially those that provide key inputs. Companies can also benefit by creating true partnerships with their vendors. Rather than always pushing for lower prices, ask suppliers for their input on how to improve products, processes and logistics. Such outside perspectives, and suppliers’ insights into how other companies operate, can generate new ideas that deliver cost savings throughout the supply chain. Strengthen the partnership by sharing those savings with your valued suppliers. When your business is critical to the supplier, each of you will have a stake in strengthening the relationship, which can pay dividends when times are tough.

As a rule of thumb, the more lengthy or complex your supply chain is, the greater the risk of profit-sapping variability.

Where are you losing sales because the wrong inventory is in the wrong location? Where are profits eroding because of a spike in fuel costs or unfavorable currency swings? Where are lead times unacceptably long? Where are low-value customers getting equal or better service than premium ones? Where is excess complexity, lengthy cycle times or a lack of responsiveness hurting business and adding costs?

The root causes of problems aren’t always immediately apparent, so it’s vital to take an end-to-end perspective. For instance, overly complex product designs can lead to longer changeover times and ripple effects along the supply chain. Or pricing, as set by the sales group, may be too high to draw buyers to standardized products that are faster and cheaper to make. And the root cause of excess buffer stock may be poor delivery reliability rather than problems with inventory management. A simple analysis can often reveal these broken links.

The key is to identify where flexibility is critical—and where the lack of flexibility imposes the stiffer penalties. Those are the areas to prioritize. Since all of the levers are interconnected, changing one will ripple through the whole supply chain. You may be surprised by how far-reaching the benefits of this exercise can be.
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