The Demand-Driven Supply Chain
Making It Work and Delivering Results
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The Demand-Driven Supply Chain

Making It Work and Delivering Results

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AT A GLANCE

An unexpected spike or drop in demand can wreak havoc on production schedules, leading to stockouts, inventory pileups, and other problems. Now, these margin-sappers are increasingly avoidable as the demand-driven supply chain (DDSC) finally becomes a reality.

**WHAT IS A DDSC?**
A DDSC offers real-time information on demand and inventory levels to all supply-chain participants so that they can react quickly and effectively when unexpected changes arise.

**EVOLVING CAPABILITIES**
Dramatic improvements in processing speed and computing power can support the rapid, data-intensive processes underlying a DDSC. And storage capabilities are now virtually unlimited through external platforms and cloud-based systems.

**SIX SUCCESS FACTORS**
To succeed, companies must set up the right technology infrastructure, revisit data collection, rethink all aspects of their operations, align their metrics and incentives, manage the cost and service tradeoffs, and change the organization and employees’ behavior.
A true demand-driven supply chain (DDSC) has always been the Holy Grail of operations managers around the world. Even when forecasts are finely tuned, an unexpected spike or drop in demand can wreak havoc on production schedules, leading to problems such as stockouts and lost sales; inventory pileups, markdowns, and write-offs; poor capacity utilization; and declining service levels. Today, these margin-sappers are increasingly avoidable thanks to recent advances in technology that finally can make the DDSC a reality.

The advantages are substantial. According to recent research by The Boston Consulting Group, some companies with advanced DDSCs carry 33 percent less inventory, improve their delivery performance by 20 percent, and reduce supply chain costs dramatically.

But few companies wholly understand the profound changes they must make to their organizations to reap the full benefits of a supply chain that is truly driven by demand.

What Is a DDSC?

We define a DDSC as a system of coordinated technologies and processes that senses and reacts to real-time demand signals across a network of customers, suppliers, and employees.

Supply and demand are easily matched if demand is steady over time with no change in volume or mix. As soon as demand changes, however, a company must adjust the supply levels accordingly at each step of the supply chain. But given the lag time before changes in demand are detected at various points along the chain, their effects are often amplified when they hit, leading to inventory shortages or pileups. Product promotions—which are becoming increasingly important to retailers—further exacerbate the problem by altering demand. Companies then tend to overcompensate by slowing down or speeding up production lines, which can cause inventory levels to fluctuate wildly. This whipsaw effect is costly and inefficient for all participants.

In the past, matching supply and demand has been extremely difficult given the long reaction time of supply chains and the inherent challenges that arise from communicating across the various IT platforms in a company’s extended chain. A DDSC offers real-time information on current demand and inventory levels to all supply-chain participants so that they can react quickly and effectively—by revising forecasts given to their own suppliers, for instance, or by altering production or distribution plans—when unexpected changes arise. This allows companies to
optimize planning, procurement, production, inventory replenishment, and order delivery for better service, higher sales, and lower costs overall.

A DDSC stands on four key pillars:

- **Visibility.** Demand and inventory levels must be transparent across the supply chain.

- **Infrastructure.** A robust infrastructure allows supply chain players to adapt quickly to short-term changes in supply and demand.

- **Coordination.** Tight coordination among all players allows companies to execute flawlessly and cost-effectively.

- **Optimization.** By optimizing the overall supply-chain performance—and not trying to only reduce costs—companies can deliver the best customer service and still reap major financial benefits.

With a true DDSC, companies can become more responsive to changing market conditions, minimize stockouts and lost sales, maintain lower inventory levels, sharply reduce the costs of expediting orders, and make far better use of their operating assets.

The goal of a DDSC is to tightly align and coordinate all players across the supply chain—much like vertical integration but without the investment. Instead of buying individual suppliers or contract manufacturers, for instance, companies aim for “virtual” integration through a DDSC and gain many of the same benefits. This capability provides even small players with the advantages of vertical integration.

DDSCs are becoming even more critical as supply chains become more global and complex and as new challenges emerge.

**Evolving Capabilities**

The concept of a DDSC is not new, of course. (See Exhibit 1.) Toyota’s demand-driven *kanban* system was a key part of its just-in-time (JIT) production system as long ago as the late 1950s and during the 1960s. In the 1970s, the first electronic-data-interchange (EDI) system emerged, allowing multiple companies to connect and share information on a single network. The 1980s saw the first EDI network developed to connect companies in the transportation and financial services industries. By the 1990s, retailers had begun sharing point-of-sale (POS) data on inventory levels with their suppliers. And during the past decade, Procter & Gamble and other leading consumer-products companies raised the bar again by using DDSC strategies—such as actively using POS data in their planning processes—to overcome market challenges, such as SKU proliferation, low-cost competition, and complex global supply chains.

Recent industry and technology changes are driving the DDSC evolution forward. In the past, retailers were reluctant to share real-time POS data with their suppliers.
Now, many companies (including Wal-Mart) provide that information, because they recognize that partnering with suppliers can reduce stockouts, improve service levels, and boost overall sales and customer satisfaction.

Moreover, dramatic improvements in processing speed and computing power can support the rapid, data-intensive processes underlying a DDSC. External storage capabilities—once unavailable or cost-prohibitive—are now virtually unlimited through external platforms and cloud-based systems.

Taken together, these developments are making the DDSC a reality. Now, companies can share information more rapidly and frequently across the entire supply chain—and closely track the ongoing flow of information and products. (See Exhibit 2.)

Although retailers and consumer products companies are leading the way, other industries with complex products and logistical challenges will likely embrace DDSCs. For instance, manufacturers in the aerospace and defense industry need a high number of very specialized parts at the right time. Since ordering parts in advance and keeping high levels of inventory is costly, the companies must work closely with their suppliers to coordinate deliveries.

Real-time visibility into demand and supply levels allows for unprecedented supply-chain performance. Inventory can be reduced throughout the system without hurting service levels. In fact, by lowering costs and improving forecasting accuracy, DDSCs benefit all supply-chain participants: suppliers, manufacturers, retailers, and consumers. (See Exhibit 3.)
EXHIBIT 2 | DDSCs Enable Supply Chain Participants to Share Information More Rapidly and Frequently

The flow of information and products across a hypothetical supply chain

**Traditional supply chain**

- Demand spikes 250%
- 1–2 days to Retailer’s store
- 2–3 days to Retailer’s warehouse
- 1–2 days to Manufacturer’s warehouse
- 2–3 days to Manufacturer’s factory
- 1–2 days to Raw materials
- Total: 10–18 days

**Demand-driven supply chain**

- Demand spikes 250%
- 1–2 days to Retailer’s store
- 1–2 days to Retailer’s warehouse
- 1–2 days to Manufacturer’s warehouse
- 1–2 days to Manufacturer’s factory
- 1–2 days to Raw materials
- Total: 4–8 days

Real-time information—no delay in passing information across the supply chain

Sources: BCG analysis and case experience and expert interviews.

EXHIBIT 3 | DDSCs Have the Potential to Deliver Benefits to All Supply-Chain Participants

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Raw-material supplier</th>
<th>Manufacturer</th>
<th>Retailer</th>
<th>Consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing inventory</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Decreasing working capital</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Improving forecasting accuracy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reducing transportation costs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Optimizing infrastructure</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Decreasing order-expediting costs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reducing other operating costs (such as handling and warehousing)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reducing head count (such as planners and buyers)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Decreasing sales-planning and operations-planning time</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Reducing lost sales</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improving customer sell-through and satisfaction</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

= strong benefit  = partial benefit

Sources: BCG analysis and case experience and expert interviews.
Six Success Factors
Despite the advances in technology and the growing willingness among supply chain players to share information, creating a DDSC is far from a plug-and-play exercise. Old processes, structures, and behaviors can hinder true change and sharply limit results. Getting all supply-chain participants committed and involved is another challenge. Unfortunately, partial adoption leads to only partial benefits. By evaluating the experiences of leading companies that have implemented true DDSCs—and achieved major benefits—we’ve identified six critical success factors.

SET UP THE RIGHT TECHNOLOGY INFRASTRUCTURE
Information is integral to DDSCs. That’s why a fast data-exchange platform that can share inventory data in real time among all participants is the backbone of any implementation. Since sharing real-time data across a supply chain generates a high volume of information, a DDSC requires strong processing capabilities. A trusted source of data storage is the third component. Data must be stored in a common location where it can be analyzed and processed. But since this information is strategically critical to companies, all participants must have confidence in its security and reliability. To this end, mechanisms that restrict access to unauthorized parties must be in place. The system’s user interface must allow all participants to easily access and interact with the information. And the system must support operations; close coordination is needed between the IT and supply-chain functions to select and roll out the best tools.

The automation of key supply-chain processes can also help overcome behavioral roadblocks that impede DDSC improvements. For instance, a supplier with a DDSC correctly saw that a major retail customer was ordering the wrong volume of certain products. But the supplier’s order-fulfillment staff either didn’t believe the recommendations that the DDSC generated or were too risk-averse to push through product volumes that were different from those the retailer had specified. Automating the manual-fulfillment process allowed the system to bypass these human roadblocks and consistently deliver the optimal volume of products.

Finally, a DDSC requires a scalable architecture that is flexible and robust enough to dynamically incorporate needed changes as they arise. In a world where supply chains are constantly evolving, this feature is critical to keep a network updated and to optimize the contribution of each supply-chain participant.

REVISIT DATA COLLECTION AND ANALYSIS
Most companies trying to implement a DDSC will need to collect and share data on inventory levels more frequently and increase the degree of data granularity they analyze. Effective DDSCs typically require information on levels of finished goods and work-in-process inventory at plants. These systems also require SKU-level detail on items in stores, on warehouse shelves, and in distribution centers. Since the exact volume of on-shelf SKUs are hard to measure in a non-DDSC environment, it may need to be deduced on the basis of shipments to a store minus customer sales. It also may be necessary to remap customer information to make it more usable. A major pain point for many consumer-products companies is that POS data are inconsistent from retailer to retailer. As a result, consumer goods companies may have to create a “shadow” replenishment system that captures and translates retailer data into the required format.
RETHINK OPERATIONS
The classic elements of flexible manufacturing—such as short changeover times, access to temporary labor and external capacity, and the ability to produce small batches cost-effectively—make it easier to respond quickly to spikes and dips in demand, a key aspect of DDSC success. Companies should analyze their production capabilities and remove any obstacles that hinder agility. Otherwise, they will find it necessary to maintain excess inventory as a cushion—even with perfect supply-chain visibility.

Flexible logistics are also critical. Companies need to rethink delivery planning and scheduling so that trucks can be rerouted quickly as needed and logistics are optimized overall. To lower its transportation costs, a food company switched from trucks to rail for much of its delivery. The increased visibility and lower costs of the DDSC allowed the company to consolidate loads and take a longer path to market. Other companies have found that shrinking loads and reducing truck sizes is the right path to follow. The key is to analyze your specific situation and delivery targets and capitalize on the greater visibility you have into inventory levels throughout the supply chain.

Procurement must change the way it operates, too, by finding flexible, highly responsive suppliers to work with and by rethinking inventory “safety cushions” and ordering habits. To get supplier discounts, for instance, procurement typically buys raw materials in bulk, and transport costs are bundled in the price. As a result, large shipments and high inventory levels are often the norm. Instead, companies should consider unbundling transport costs and assessing the tradeoff between smaller, more frequent just-in-time shipments (so as to lower the carrying costs of inventory) and the penalty associated with sacrificing the volume discount. Another food company realized that its distributors—often located in the company’s own distribution centers—kept excessive safety stock. By integrating this stock into its own inventory and then managing it centrally (on the basis of shared information about stock levels), the company reduced overall finished-goods inventory by ten days, freeing up working capital, cutting warehousing costs, and delivering fresher food to customers.

ALIGN METRICS AND INCENTIVES
The ultimate goal of a DDSC is to ensure the best service at the lowest cost. To this end, the performance targets and incentives of all supply-chain players must be aligned so that everyone is marching in the same direction. If retail customers are pushing suppliers to only reduce costs, then that’s what they will get. But if incentives to improve service levels are also in place—particularly during promotions—then suppliers will pay greater attention to this area. With the proper metrics, a company can constantly benchmark its supply-chain performance and identify gaps and inefficiencies that can be addressed in partnership with suppliers. The most common measurements of DDSC success are reductions in inventory levels and working capital, fewer stockouts, faster and more accurate order fulfillment, and higher rates of customer satisfaction. By working to balance all of these objectives in a coordinated manner, all supply-chain parties can reduce their costs, increase sales, and improve profitability. Negative incentives can also be effective. For instance, retailers that want higher order-fulfillment rates can penalize suppliers that fall short by applying fines and charging for lost margin.
Supplier contracts must be modified to guarantee that decisions made to improve the performance of the supply chain as a whole don’t hurt individual parties. For instance, if the demand for widgets exceeds the supply because of a successful promotion, the retailer will want the product manufacturer to boost production. But for the manufacturer, increasing output may not be profitable if it requires extra costs, such as additional labor or overtime. If analysis shows that the total incremental profit of selling more units is greater than the total loss for ramping up production, then producing more products is the right decision. But the manufacturer must somehow be compensated for operating at a loss, either through short-term payments or longer-term rewards. Only with transparency and common incentives can end-to-end economics be optimized.

**MANAGE THE COST AND SERVICE TRADEOFFS**

Before getting too lean, companies must be clear on the tradeoffs of maintaining lower inventory levels. (See the sidebar “Mitigating the Risks.”) Stockouts can lead to lost sales—a risk that may be unacceptable when gaining market share is a key strategic objective, when service is an important differentiator, or when the window of opportunity to earn a price premium is limited. High-tech companies with a first-mover advantage and pharmaceutical companies with a new blockbuster drug are examples of the latter.

Segmenting products according to specific characteristics can help companies determine the categories in which the benefits of a DDSC would offset the added costs. These categories typically include high-margin products, high-tech or other products with a high cost of obsolescence, food or other perishables for which freshness is critical, products with highly variable demand (such as consumer durables), and products with rapid inventory turnover (such as fast-moving consumer goods). Segmenting customer accounts on the basis of purchase volume and profitability can also reveal where higher service levels could pay off.

The key is being able to quantify the end-to-end costs and benefits of supply chain decisions. Because companies often lack the ability to perform these complex analytics, many default to pure cost reductions without considering the potentially negative impact on revenue or service. A DDSC promotes greater visibility into the bottom-line impact of higher service levels, greater manufacturing flexibility, and lower inventory levels across the supply chain.

**CHANGE THE ORGANIZATION AND EMPLOYEES’ BEHAVIOR**

To work, DDSCs require major organizational and behavioral changes. Most companies are reactive order takers: when a retailer orders five cases of soda, that’s what the supplier sends. With a DDSC, the supplier’s employees can take a more proactive role, suggesting a larger or smaller order if consumption data show the need—or even contacting the retailer before an order has been placed if POS data show that inventory is getting low. Convincing workers to move from a manual order-and-delivery management process to an automated one is another challenge. As a transition tool, a consumer products company used “deployment adoption reports” to gauge whether employees were following the guidelines of the new DDSC system that had been put in place. By explicitly measuring adoption rates, the company made it clear that the new system was a priority.
A DDSC also requires cross-functional coordination within a company. For instance, to eliminate “hidden” supply-chain costs such as expedited deliveries or excess inventory, various functions such as sales, procurement, manufacturing, and order fulfillment must work together and share responsibility for results. Silo-based decision-making rarely considers the end-to-end impact of various actions. Similarly, financial and performance metrics across the company must be realigned to encourage close collaboration across functions.

**MITIGATING THE RISKS**

Many companies often cite the following three risks as the reasons they are reluctant to fully commit to a DDSC. However, these risks can usually be offset.

- **When inventory is too lean, we have no safety stock to address supply shortages or unexpected spikes in demand.** In fact, when all supply-chain players are connected to the same DDSC, better visibility combined with the network effect can improve overall supply-chain performance.

  The network effect allows you to work with multiple suppliers to address any shortages, and the DDSC gives suppliers greater visibility into your real-time needs, so they can react more quickly. And if your suppliers are all part of the same DDSC, their own suppliers will also see what inventory is needed where, so reaction times throughout the network improve. As a result, the risk of stockouts is greatly mitigated.

- **We don’t want our proprietary data getting into the wrong hands.** Although making sensitive information visible to other nodes on the supply chain can create potential points of vulnerability and conflicts of interest, there are ways to increase security. That’s why a trusted source of data storage is critical. Since the information of supply chain participants is often strategic, mechanisms that restrict access to unauthorized parties must be in place. Also important are robust contracts to protect the various participants and discourage wrongdoing.

- **If we constantly react to short-term changes in supply and demand, we’ll lose our focus and incur added costs.** To make a DDSC work, companies need very clear product, marketing, and operational strategies to help establish priorities and provide a compass for making decisions. These guidelines help ensure that employees don’t mindlessly fulfill every unexpected customer order no matter what the cost.

  The various areas of the company must also communicate and work together to proactively shape demand instead of simply reacting to changes in the marketplace. For instance, manufacturing and procurement must be notified if a sales campaign is about to be launched. Finally, to truly reap the benefits of a DDSC requires that companies make sure their operational processes are as agile as possible.
Perhaps the greatest behavioral challenge for all DDSC participants is learning to trust one another. In the consumer goods industry, for example, retailers must be willing to share their data and trust that suppliers will deliver the right merchandise at the right time. Consumer goods manufacturers must trust that retail buyers will reward their performance—and that closer alignment will lead to greater benefits for all.

With their enhanced processes, tight coordination, advanced technology, and end-to-end visibility, DDSCs have the potential to revolutionize a wide variety of industries, including retail, consumer products, automotive, and aerospace and defense. By providing real-time information about demand and inventory levels to all supply-chain participants, a DDSC allows companies to optimize planning, procurement, production, inventory replenishment, and order delivery for better service, higher sales, and lower costs overall.

But only companies that truly understand the profound changes they must make to their organizations will reap the full benefits of a DDSC—and achieve a sustainable advantage in today’s fiercely competitive global economy. As a first step toward realizing this advantage, we recommend that companies engage in an open dialogue with their supply-chain partners about the data they’ll need to exchange, the processes they’ll need to optimize, and the potential benefits of true partnership.
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