



# Integrating Demand and Supply Chain Management



By Venkatesh Shankar

Some companies concentrate on upgrading their supply chain operations. Others focus more on the demand side, seeking to improve the customer relationship processes. Yet the real key to market success is to effectively integrate the two initiatives. By doing so, you can offer customers a greatly enhanced value proposition. And this, in turn, leads to new

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*Venkatesh (Venky) Shankar is visiting associate professor of e-business and marketing at the Sloan School of Management, Massachusetts Institute of Technology, and a Ralph J. Tyser Fellow and associate professor of marketing and entrepreneurship at the University of Maryland's Robert H. Smith School of Business.*

**T**raditionally, supply chain management has focused on back-end operational functions, while marketing has addressed front-end, or customer-facing, functions. Indeed, companies typically have practiced these two functions separately. But in doing so, they have foreclosed on some important opportunities. By integrating the supply and demand chain activities, they can create competitive advantage while positioning themselves to take full advantage of the Internet's potential.

Before they can successfully integrate the demand and supply functions, however, companies need to better understand the relationship between marketing and supply chain management. This understanding will allow them to begin to plan and implement an integrated demand and supply chain management system—and begin to realize the competitive advantages.

## SCM and Marketing

Supply chain management (SCM) encompasses all of the activities associated with the flow and transformation of goods from the raw-materials stage through to the end user. SCM also encompasses the associated information and financial flows. Specific supply chain activities include sourcing and procurement, product design, production planning, materials handling, order processing, inventory management, transportation, warehousing, and customer service. Successful supply chain management involves the coordination and integration of all these activities among the various supply chain partners—for example, suppliers, distributors, transportation carriers, third-party logistics companies, and information systems providers.

Traditionally, supply chain management has focused primarily on operations, as evidenced by such initiatives as just-in-time (JIT), electronic data interchange (EDI), efficient consumer response (ECR), quick response (QR), and continuous replenishment (CR).<sup>1</sup> However, with the rapid and widespread adoption of the Internet, the customer-facing functions play an increasingly important role in supply chain management. And with the Internet, companies now have a common technology that can cost effectively integrate customer-facing and supply chain activities.

Linking the two activities is logical because the goals of marketing and supply chain management are closely related. The supply chain management process concentrates on meeting the demands of the end consumer. Marketing strives to understand these consumer needs, satisfy them, and continuously add value. Indeed, many companies are quickly accepting customer relationship management (CRM) as a critical aspect of marketing because the continuous creation of customer value enhances shareholder value.

CRM is a business process that enables companies to continually create, enhance, and manage customer equity—that is, the value of customers to the organization—by interacting with customers through multiple touch points. These touch points can include the Web, e-mail, phone, and direct sales. CRM helps companies improve customer retention and loyalty, cross-sell and up-sell, reduce operating costs, and increase sales and revenue. CRM—and marketing in general—are critical in setting up an efficient demand chain. Not much of the CRM function, however, is integrated into supply chain management.

Many companies have worked to improve either their supply chain or their customer relationship processes; few, however, have actually integrated the two. Going forward, the most successful companies will be those that leverage both CRM and SCM capabilities to optimize the entire demand and supply chain and differentiate themselves from the competition. Integration should be done in real time as a response to individual customers based on their lifetime value (that is, their financial value to your company over the life of the relationship), their requirements, and the total supply chain cost to serve them.

Companies can approach truly integrated demand and

supply management in two ways: (1) by developing simultaneous excellence in SCM and CRM or (2) by pursuing new value propositions in the demand-supply chain. Though these two approaches are complementary, most organizations will find it difficult to focus on both at once. Companies should choose the approach that seems best suited to their businesses. The following discussion explains the two main approaches for integrating demand and supply management.

## Achieving Simultaneous Excellence in CRM and SCM

In striving for excellence in both SCM and CRM, companies first need to identify their existing capabilities in both areas. The CRM/SCM analysis grid shown in Exhibit 1 can help in this effort. Depending on their capabilities in each area, companies typically fall into one of the four categories on the grid:

- *Status quo-ers* are not strong in either CRM or SCM.
  - *Relationship experts* excel in CRM but are weak in SCM.
  - *Supply chain collaborators* have achieved high levels of supply chain management but have yet to build strong customer relationships.
  - *Integrated value providers* excel in both SCM and CRM.
- In other words, they have achieved a high level of customer loyalty and have integrated closely with their suppliers, distributors, retailers, and customers.

EXHIBIT 1  
SCM/CRM Analysis Grid

Supply Chain Management	Customer Relationship Management	
	Low	High
Low	Status Quo-er	Relationship Expert
High	Supply Chain Collaborator	Integrated Value Provider

Becoming an integrated value partner requires tight integration between the supply chain and customer relationship activities. To illustrate, a company that customizes its offerings to delight a customer with high potential lifetime value must also ensure that its supply chain management processes seamlessly feed into its CRM process for that customer. This forms the basis of an integrated demand and supply chain management system.

Research proves that companies that do integrate demand and supply chain management systems are more successful than their counterparts. A study by Deloitte Research, based on interviews with more than 850 manufacturers worldwide, shows that companies that combine a customer relationship focus with excellence in supply chain collaboration are better positioned for success in the new economy.<sup>2</sup> Yet the study noted that relatively few organizations had reached this level of competency.

Those that have successfully integrated their CRM and SCM activities tend to perform better than their competitors. Specifically, these companies gain a competitive advantage by (1) collaborating both internally and externally with supply chain partners, such as suppliers, distributors/retailers, and customers, and (2) measuring and exceeding their goals for customer loyalty and retention for each customer and segment. They often are aided by new Internet technologies, which help them improve supply chain collaboration and build relationships across a network of suppliers and cus-

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tomers. This, in turn, allows them to differentiate the way they create value for every customer and segment.

With these emerging e-business technologies that can seamlessly link manufacturers, suppliers, distributors, and customers, companies, in theory, can swiftly orchestrate resources to respond to each customer's needs. But in reality, this is virtually impossible to do. Companies simply do not have the resources to simultaneously respond in real time, reduce manufacturing costs, keep zero inventories, and provide excellent service for each and every customer. So instead of trying to satisfy every customer perfectly, they need to learn how to dynamically balance customer value and supply chain costs to build the right customer relationships.

Companies can achieve this balance by leveraging Internet technologies (for example, Web-based collaboration systems, extranets, and online business intelligence systems) to create digitally integrated demand and supply systems. Such systems would provide real-time, differentiated responses to customers according to their loyalty, lifetime value, requirements, and servicing costs. By focusing on maximizing the entire value creation process, rather than on just specific CRM or SCM activities, companies will begin to reap the real benefits of the new digital economy.

Heineken and Cisco Systems are examples of companies that are leveraging the Internet to enhance collaboration with customers, distributors, and suppliers. Heineken has focused on CRM (being a relationship expert), while Cisco has emphasized SCM (being a supply chain collaborator). Heineken has developed a Web-based system to share information with distributors on forecasts, marketing and promotions, and order fulfillment. The system has doubled Heineken's customer satisfaction ratings. Cisco, a leader in networking equipment for telecommunications and the Internet, has created electronic links with key suppliers across its entire product line to give it unprecedented supply chain flexibility. The links enable suppliers to ship more than 65 percent of Cisco's orders directly to the final customer without physical intervention from Cisco. The result is a sig-

nificant reduction in the time it takes to ramp up production of new products. Although both of these companies are innovators, neither one has developed a truly integrated demand-supply chain that depends on simultaneous excellence in both SCM and CRM.

Other leaders are leveraging the Web in different ways. Companies like Herman Miller and Dell Computer, for example, have discovered that excellence in products, service, and production alone is not enough to compete in the future. They recognize that they must become integrated value providers.

Herman Miller, a leading furniture manufacturer, is creating tailored Web pages that will not only streamline manufacturing, inventory, and order information flows to and from its 500-plus suppliers around the world but also sell to and service its most important customers. Leveraging the Internet in this way will help Herman Miller differentiate products, service, and delivery for customers according to the value they bring to the company.

Similarly, Dell continually resegments its customer base and measures the lifetime value of customers. The computer maker then manages its interaction with customers through tailored Web pages that offer each customer the most profitable customer service level. Dell also has an online supplier portal that handles 90 percent of purchases from the 33 most important suppliers. This feature helps Dell and its suppliers share key data and measurements on shipment accuracy, quality, and demand forecasts.

As companies like Dell succeed in integrating customer and supply chain systems, they can further reduce inventories, improve customer responsiveness, and increase customer loyalty and shareholder value. Just by taking the early steps toward achieving excellence in CRM and SCM, companies can begin to boost their business performance while erecting formidable barriers to the competition. Competitors will find it increasingly difficult to mimic the value offered by these "integrated value providers."

### Creating New Value Propositions

Creating new value propositions is the second approach to integrating demand and supply. This entails modifying the demand-supply chain design to create a mutually beneficial supply chain system for both the company and the customer.<sup>3</sup> To do this, companies must change the point in the supply chain at which they allocate goods while simultaneously altering the point at which they fulfill demand.

The idea that suppliers should work much more closely with customers to give them better value is not new. Yet close partnerships are still not common largely because, until recently, integrating the information systems of two or more companies was a lengthy, expensive, and technically difficult process. The recent widespread adoption of Web-based enterprise resource planning (ERP) systems and the rise of the Internet, however, have made it much easier and cheaper for customers and suppliers to integrate and exchange data.

And yet, disconnects still occur. In reality, most of the changes that suppliers implement do not add much value from the customer's point of view. A supplier, for example, might typically cut its inventory by reducing product variety—which is not very helpful for the customer or for the customer's customer. By tweaking the demand-supply chain, however, suppliers can design mutually beneficial supply chain systems for particular customers. These systems will offer customers completely new value propositions while improving the supplier's own operations.

To effect a mutually beneficial supply chain design, companies must focus on the customer's demand chain, which transfers demand from the market to the supplier. A retailer's demand chain, for example, would consist of assortment planning (deciding what to sell), inventory management (deciding the quantity of supplies needed), and procurement (deciding the other details of the actual purchase). This demand chain joins with the supply chain to form the demand-supply chain. The chains link together in two places—the supply-fulfillment point (SFP) and the demand-offering point (DOP).

The SFP is the place in the supply chain where the supplier allocates the goods ordered by the customer. Goods might, for instance, be produced after orders come in (“make to order”) or be allocated from a warehouse once the orders have been received (“ship to order”). Each supply-fulfillment point has different costs and benefits for the supplier and its customer. When the supplier allocates orders from its distribution center, it can deliver them quickly if they are in stock. Speedy delivery (a benefit for the customer), therefore, depends on holding a large inventory (a cost for the supplier). Of course, the wider the product range, the bigger the inventory. In such cases, the supplier either incurs large inventory costs to minimize delivery times or cuts inventory and risks delays in fulfilling orders.

It is possible to move the SFP back to packaging or assembly—the point at which goods are turned into finished products. In the case of shampoo, for instance, this is the point at which the liquid is poured into containers and sealed. This approach (“pack to order”) gives the supplier the benefit of lower inventory expenses, but the customer must wait for the goods to be packaged (a cost). To reduce that delay (a benefit for the customer), the supplier must bear the cost of additional packaging capacity. Moving the SFP back still further to “manufacturing on demand” makes it possible for the supplier to meet the specifications of individual customers (a benefit for them). But the delivery time rises (a cost for them), and the supplier's process efficiency declines each time a customized design replaces a standard one (a cost for the supplier and the customer alike).

To summarize, the further back in the supply chain the supplier moves the SFP, the more steps there are to complete without disruption—and the more difficult it becomes to fulfill orders promptly. The advantage of this approach to the supplier depends on the cost savings it can achieve from

lower inventory, on the one hand, compared with the possible reduction in sales from longer delivery times and higher total costs for the customers, on the other. Customers and suppliers do not benefit equally.

The demand-offering point (DOP)—the second place at which the demand and supply chains meet—is where the supplier fulfills demand in the customer's demand chain. Moving the DOP back in the demand chain largely benefits the customer and requires more work from the supplier. There are four major DOPs, as follows:

1. *Offer to purchase* In the conventional, arm's length buyer-seller relationship, the DOP is the purchasing department, which accepts an “offer to purchase” by choosing the supplier and deciding when goods are needed.

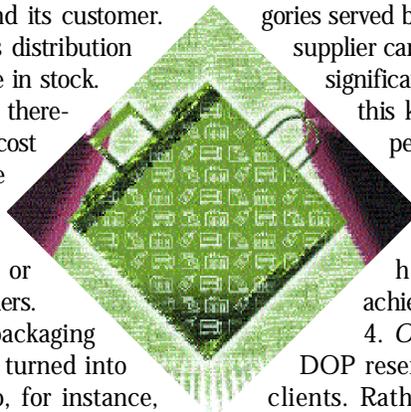
2. *Offer to manage* Here, the DOP moves further back in the demand chain. By carefully monitoring the customer's inventory levels, a supplier can cut down on stock that is unlikely to sell and ensure that the customer never runs out of goods that move briskly. These benefits, however, mean more work for the supplier because it must now have a separate inventory control process for each customer.

3. *Offer to plan* With “offer to plan,” the DOP moves back to merchandising (in the case of retailing) or production (for example, in the automotive and computing industries). In other words, by joining forces to analyze the consumer demand categories served by products from the supplier, both retailer and supplier can avoid new products or promotions that lack a significant market. Suppliers also are expected to use this kind of collaboration to improve their delivery performance. The intended result is a more profitable use of retail space by retailers. Unless suppliers can charge a premium or increase their sales through this kind of collaboration, however, the intended result will not be achieved.

4. *Offer to end use* Still largely unexplored, this DOP resembles Dell's direct sales model for business clients. Rather than fulfill orders from wholesalers (an offer to purchase), Dell went all the way back in the demand chain to the end consumer by fulfilling orders for customized PCs—complete with software and network configuration. All the customer's employees have to do is turn on their machines.

Although moving the demand-offering point back in the demand chain is largely in the customer's interest, the supplier can benefit as well if it simultaneously moves the SFP back. Ordinarily, moving the SFP benefits one party at the expense of the other. But by coordinating movements in both the demand and the supply chains, suppliers can enhance their customers' performance while improving the efficiency of their own operations.

A manufacturer may be interested in moving the DOP back to inventory management to help a customer reduce its lost sales and obsolescence costs. But to do so, it must assume the high expense of integration. In fact, managing the customer's



inventory gives the manufacturer much earlier access to information about that customer's demand. Such access permits the manufacturer to cut its own inventory costs by packaging products to order rather than stocking all of its products at a distribution center. Importantly, none of these benefits comes at the expense of the customer's delivery times.

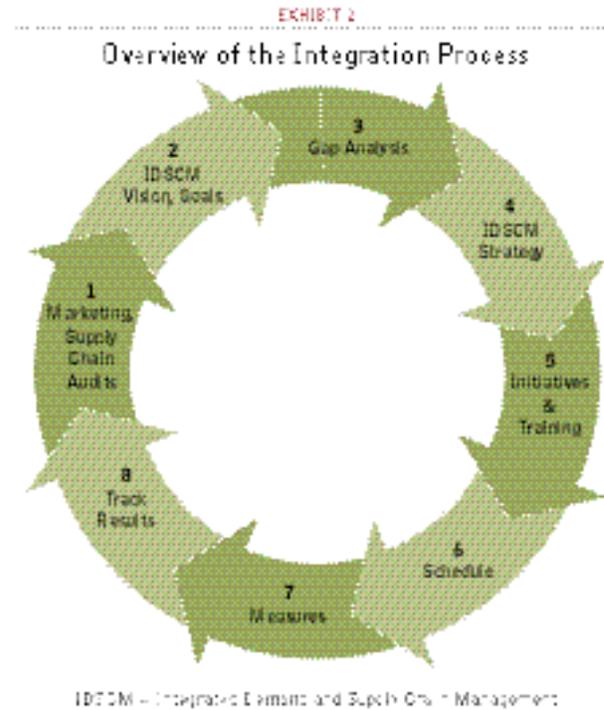
Dell can profitably offer excellent service to end users—by pushing the DOP all the way back to them—only because it has pushed the SFP back in the supply chain by assembling PCs to order. Because Dell receives early information about customer demand, it can reduce the time required to assemble PCs from the front end of the process as opposed to the back end, where it would delay deliveries to customers. Dell also has eliminated inventory costs and can buy components later than its conventional competitors do, thus taking advantage of continually falling prices.

Consider another example of how a new value proposition was created. A typical university bookstore decides which books to sell (assortment planning), estimates how many of them it needs (inventory management), and then places orders with publishers (purchase). Each publisher's DOP is thus a straightforward offer to purchase, and the ship-to-order SFP is the publisher's warehouse or distribution center. Though this system may seem to work nicely for bookstores, it is less desirable for students. Books are expensive and some of the cost is unnecessary, since teachers often assign only parts of books. If the bookstore underestimates demand, some students must wait for the publisher to make extra shipments. How should a publisher enable its customers (the bookstores) to help their customers (the students)?

The publisher can start by analyzing the whole demand-supply chain. Although the retailer's assortment-planning process appears to respond to student demand, it is really shaped by instructors, who choose the reading lists for courses. One publisher, McGraw-Hill, has moved its DOP back to instructors, offering to tailor collections of reading materials for each of them. This was accomplished by moving the SFP out of the warehouse and forward to the retailer. McGraw-Hill's Primis electronic-publishing system allows instructors to choose standard McGraw-Hill textbook chapters from a database and to add complementary materials (such as old test questions, and teaching cases) from a variety of sources. All of the readings are then combined into a single package that is printed and bound in the bookstore.

This assemble-on-demand system benefits bookstores, students, and publishers in several ways. Even if a bookstore has the syllabus for a course well before the first day of classes, the manager can't know precisely how many students will enroll in the course that year. The new model largely eliminates this problem, and the bookstore also saves display and storage space.

As for students, most tailored textbooks are cheaper than their standard mass-produced counterparts because they include only the readings instructors actually require. Furthermore, on-campus print technology makes the publisher's unit costs independent of batch sizes, so print runs don't



have to reach a certain minimum. Finally, the publisher can avoid the crushing cost of returns, which can amount to 30 percent of sales. McGraw-Hill has used this new demand offering to win over teachers on more than 1,000 U.S. college campuses. Several competitors are now following the company's lead.

These examples show that suppliers, by modifying the demand and supply chains, can offer their customers completely new value propositions and improve their supply chains. The means to this end are the repositioning of the demand offering point at the customer's end of the supply chain and the exploitation of better information about customer demand.

### Steps for a Successful Integration

After deciding which approach to take, a company needs to focus on creating a systematic procedure for implementing an integrated demand-supply chain management (IDSCM) system. These eight steps will help to ensure a successful implementation. (Exhibit 2 gives an overview of the process.)

1. *Perform a marketing and supply chain audit*In this step, the company seeks to understand its customer value drivers, customer requirements, customer relationship management process, supply chain infrastructure, and the points of linkage and disconnect between SCM and CRM.

2. *Set vision and goals*. The company then needs to set the long-term and intermediate goals for integrated demand-supply chain management, making certain that they are linked to the overall financial goals.

3. *Do a gap analysis and identify the gaps*In this step, the company should perform a thorough analysis of the gaps between the IDSCM goals and the existing state as revealed by the marketing and supply chain audits. As it develops the integrated strategy, the company needs to focus intensely on

the gaps identified.

4. *Formulate an IDSCM strategy.* This critical step determines the company's approach to integration (either excellence in SCM-CRM or new value proposition) and sets up the road map for implementation. The overarching objective of the strategy should be to synchronize supply and demand.

5. *Design IDSCM initiatives and plan training.* After the strategy has been set, the company can identify the initiatives needed to implement it. These initiatives, which may range from systems integration to the development of a new inventory planning system, help build the demand-supply chain infrastructure. Because training is key to successful implementation, it should be given top priority.

6. *Develop an implementation schedule.* The company should prioritize the initiatives and set a logical sequence for implementation. Note that some actions can be undertaken in parallel such as identifying the value propositions along both supply and demand chains.

7. *Develop metrics.* This is a critical aspect of implementing the integrated system. Unless the right measures are developed and tracked, a company cannot evaluate its investment in the system. Metric development is an ongoing process that should be improved continually. (The sidebar on this page gives some sample metrics for key performance criteria.)

8. *Track results and revise goals.* Actual performances must be tracked against certain benchmarks. These could be based on either the company's IDSCM goals or its competitors' measures—or both. Based on the results of the benchmarking, the company should revise its goals accordingly.

### Surviving in an Uncertain Future

Looking ahead, the projected growth in e-marketplaces or B2B exchanges promises to make the integration of demand and supply chain management even more important. e-Marketplaces are likely to evolve from the primarily procurement exchanges in use today to an internetworked exchange ecosystem in the long term.<sup>4</sup> This evolution will be driven by two key factors: (1) the business orientation of companies and exchanges and (2) the degree of interconnectiveness among different vertical or horizontal exchanges.

The business orientation can either be to reduce costs or to add value; the interrelationship can be low or high. Thus, four



## Demand-Supply Chain Metrics

Metrics are key to developing and managing the integrated demand and supply chain system. Typical metrics appropriate for key performance

Value maximization	Customer value perceptions
Customer satisfaction	Customer ratings, complaints
Speed to market	Market cycle time (product introduction to purchase)
Order fulfillment	Relative delivery time
Customer service	Warranty costs, returns, allowances
Total supply chain costs	Percentage of costs to value of goods in the
Inventory management	
Asset utilization	

possible types of e-marketplace systems are possible, as shown in Exhibit 3. When the business orientation is cost reduction and the exchange interrelationship is low, the exchange is a procurement exchange. From there, an exchange is likely to move toward either a supply chain exchange (value-addition business orientation and low exchange interrelationship) or a procurement web (cost-reduction business orientation and high-exchange interrelationship). The ideal scenario of both value-addition and high-exchange interrelationship—that is, a networked exchange ecosystem—will likely take some time to fully evolve. IDSCM in this environment will be more complex and challenging.

The key ingredient for success in such a complex environment is managing fast and accurate information flow in a wide array of activities ranging from procurement to customer service. In the future, reducing costs and increasing revenues will depend on the ability to react seamlessly and quickly to customer needs and adjust procurement, production, inventory, transportation, and customer service systems accordingly. This ability to integrate demand and supply will help companies achieve higher profitability and greater return on assets in the long run.

### Footnotes

<sup>1</sup>Dong, Y., M. Dresner, and V. Shankar. "The Impact of Efficient Replenishment and Continuous Replenishment on Supply Chains," *Working Paper*, University of Maryland, 2001.

<sup>2</sup>"Digital Loyalty Networks: e-Differentiated Supply Chain and Customer Management," Deloitte Research, October 2000.

<sup>3</sup>Holmström, J., W.E. Hoover Jr., P. Louhivuoto, and A. Vasara. "The Other End of the Supply Chain," *The McKinsey Quarterly* 2000, 1, 62-71.

<sup>4</sup>Shankar, V. "e-Marketplaces: Evolution and Future," *Working Paper*, University of Maryland, 2001.

