BRICKS MATTER

The Role of Supply Chains in Building Market-Driven Differentiation

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Contents

CHAPTER 3

The New World of Demand Management: Demand Sensing, Shaping, and Translation

You can't wish demand to happen. There are no magic wands or easy buttons.

—Charles Chase

The global marketplace is volatile, fragmented, and dynamic. Supply processes are more mature than demand. There is a larger gap to fill in the redefinition of demand processes to be market driven than in any other area of supply chain management.

To become market driven, companies need to identify the right market signals, build sensing capabilities, define demand-shaping processes, and effectively translate the demand signal to create a more effective response. This approach makes the 30 years of technology

and process thinking by the first- and second-generation supply chain global pioneers obsolete.

Demand management processes are challenging. They are more difficult to get right than supply. Talent is scarce and the processes are evolving. Organizationally, the work on demand processes is fraught with political issues. (Demand processes are more politically charged than supply processes.)

As a result, many companies often want to throw in the towel. They want to forget demand and only focus on the redesign of supply processes to become more reliable, resilient, and agile. The list of possible projects is long and often includes lean manufacturing, cycle-time reduction, order management, or the redefinition of distribution center flows.

However, focusing only on supply has limited results. Supply-centric approaches can only impact business complexity. It cannot improve the potential of the supply chain as a complex system. Working supply processes in isolation to demand will drive up costs, increase working capital, and reduce asset utilization. The secret to building supply chain excellence is to build the right stuff in the demand management processes. Improvements in demand management will give the supply chain the right foundation to make effective trade-offs against the supply chain effective frontier (Figure 1.1).

DEFINITION

A supply-centric approach cannot compensate for the lack of a strong demand management process.

The development of a demand management strategy is easier said than done. Demand management systems were designed for the supply chains of the 1990s when there was less complexity. Over the past decade, supply chains have become more complex because of consolidation through acquisition and globalization. Unfortunately, the evolution of demand management practices has not kept pace with business needs.

Historic approaches to demand management are not up to the task. As a result, companies are coming to the realization that the demand

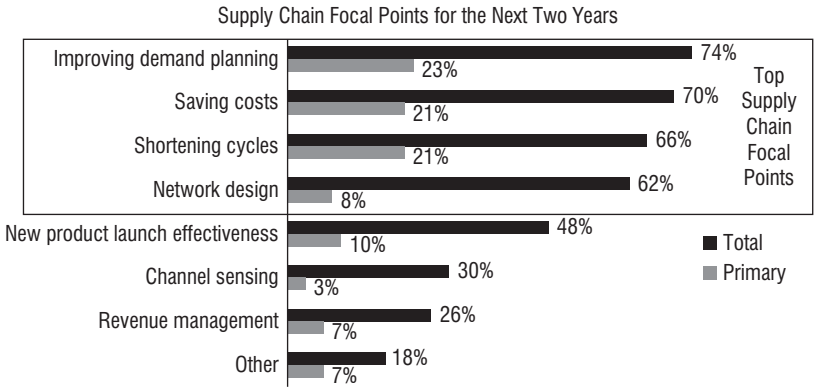

Figure 3.1 The Focus of Supply Chain Executives over the Next Two Years

management process requires a complete reengineering with an outward-in orientation. The process needs to focus on identifying market opportunities and leveraging internal sales and marketing programs to influence customers to purchase the company's products and services. It requires a champion—an organizational leader—to orchestrate the change management requirements of the market-driven value network.

This gap in demand processes is the highest priority area for supply chain leaders to close in the next two years. Figure 3.1 indicates the importance of this priority.

WHAT IS DEMAND MANAGEMENT?

Demand management is the use of forecasting technologies along with demand sensing, shaping, and translation techniques to improve supply chain processes. The journey to become market driven requires rethinking demand holistically: the source of demand signals, and the integration of the demand signal into horizontal processes.

> *For high-tech and electronics companies, the real challenge that you find is the reliability of forecasts. It is the number one issue that they face.*
>
> *—Sanjiv Sidhu, Founder, i2 Technologies; Current Chairman, o9 Solutions*

This journey starts with outside-in thinking and focuses on identifying the market signals and translating them into the drivers of demand. Market-driven forecasts focus on accurately predicting what customers will buy. This is in sharp contrast with the traditional demand processes that determine what companies will manufacture or ship. The input signals are from the market. There are many possible inputs: weather, events, seasonal response, social sentiment, or competitive pressures.

LEARNING A NEW LANGUAGE TO BUILD MARKET-DRIVEN DEMAND MANAGEMENT PROCESSES

The first step in building market-driven demand capabilities is getting clear on the definitions of a new set of process terms. Although the definitions are simple, the process implications are not. These demand definitions are:

- **Demand sensing:** Shortening the time to sense true market data to understand market shifts in the demand response. This is in contrast to the use of order or shipment data. These more traditional data sources have one- to two-week latency.
- **Demand shaping:** The use of techniques to stimulate market demand. The most common are new product launch, price management, assortment, merchandising, product placement, sales incentives, and marketing programs. These techniques lift demand and are usually worked together in campaigns. They are rarely deployed singularly.
- **Demand translation:** The translation of demand outside-in from the market to each role within the organization. The design of this system recognizes that the requirements for demand visibility for each supply chain leader—distribution, manufacturing, and procurement—are different.
- **Demand orchestration:** The process of making trade-offs market to market based on the right balance of demand risk and opportunity. These trade-off decisions are dependent on the use of advanced analytics to sense and shape demand simultaneously.

	Sell	Deliver	Make	Source
Network Design: Probability of Demand	Channel Design. Cost-to-Serve Analysis	Network Design		Supplier Network Supplier Rationalization
Supply Chain Tactical Planning: Demand Forecast	Category Management	Sales and Operations Planning New Product Launch		Category Management
Supply Chain Policy: Demand Shaping	Contract Management	Corporate Social Responsibility Revenue Management Working Capital Management		Contract Management
Market-Driven Signal Management	Demand/Channel Sensing	Demand Orchestration Demand Translation		Supplier Sensing
Transactional Processing: Order and Shipment Processing	Order Management	Order-to-Cash Procure-to-Pay		Purchase Order Management

Figure 3.2 Demand Signal Management in Market-Driven Value Networks

- **Downstream data:** The use of channel data to sense and shape demand. This can include data for sales at the point of transaction, sales through distributors, inventory in channel trading partners' warehouses, and demand insight data.
- **Demand shifting:** The shifting of demand from one period to another. This includes advanced shipments and moving product into the channel without stimulating actual sales. Demand shifting without shaping demand is a form of supply chain waste.

These concepts are shown in aggregate in Figure 3.2. This definition of demand signal management is quite different from the conventional definition of supply chain forecasting. It requires the active management of the demand signal through the network and planning horizons. This is in sharp contrast to the conventional definition of demand management where the forecast is created and consumed without active management throughout the value network.

WHAT IS MARKET-DRIVEN DEMAND MANAGEMENT?

Demand management is critical to driving out inefficiencies in the supply chain, and it is the most leveragable metric on the supply chain

effective frontier. A small improvement in demand planning has a larger impact on improving performance than an equal improvement in other metrics. It is pervasive.

Demand signal is critical. It is needed to coordinate basic operations. Moving goods from the suppliers' raw materials to finished goods in consumers' hands takes time. It synchronizes the processes of sell, deliver, make, and source across multiple trading partners. Predicting future demand helps to determine the right quantities of raw materials to buy, the target amount of finished goods to inventory, the number of products that need to be shipped, the number of people to hire, and the number of plants to build, right down to the number of office supplies (sourcing) that should be purchased.

Most companies do not have the luxury to wait for demand to occur and then react to a customer order. Because of the intricacies of supply chain processes, they must plan to be ready to fulfill channel sales. This includes sensing demand signals, proactively shaping demand, and translating demand into the most effective supply response to meet customer orders.

Market-driven demand management utilizes data from market and channel sources to sense, shape, and translate demand requirements into an actionable demand response bidirectionally from market to market. A true market-driven forecast is an unconstrained view, or a best estimate of market demand based on channel data. Demand shaping is based on campaigns to combine price, new product launches, trade and sales promotions and incentives, advertising, and marketing programs to impact what and how much customers will buy.

Demand Signal

The building of market-driven value networks is a critical part of channel strategy design. When implemented correctly, it exploits (or influences) the strength of an existing brand or segment to propel or pull products through the channels of distribution. It is outside-in. When successful, the data has minimal latency.

This is in sharp contrast with supply-driven demand concepts developed over the past 15 years. These legacy stand-alone product

demand processes focused only on historic—not current channel—data. They lacked the ability to flex: to sense and to shape demand. As a result, in these traditional systems, the supply chain was insular to the impact of market dynamics such as price, advertising, sales promotions, marketing events, economic factors, and competition.

The focus in market-driven value networks is to sense and to shape demand to orchestrate the demand response. As shown in Figure 1.3, it happens in stages:

Stage 1: The supply chain drives the efficient response. In this stage, the supply chain focuses on efficiency or asset utilization. The forecasting process is nascent. Companies model demand using basic forecasting technologies based on shipments and order data as inputs. The goal is to forecast future shipments. The data model represents what a manufacturer should make or a retailer should buy.

Stage 2: The supply chain drives the reliable response. At this level of maturity, the supply chain uses multiple signals to improve forecast accuracy including channel data. This modeling becomes more sophisticated and uses multiple indicators (from different data sources) along with enrichment data (e.g., customer demographics and weather data) to model the future forecast. However, the forecast is still a shipment-level demand signal to predict what shipments are required from a warehouse or a manufacturing center.

Stage 3: The supply chain drives the resilient enterprise. With more maturity, the company models channel sales. The forecast is based on what is sold, not what is manufactured or shipped. Demand translation processes are developed in sales and operations planning (S&OP) to translate "ship to" or channel demand to "ship from" or manufacturing requirements.

Stage 4: The supply chain creates the adaptive enterprise. At this stage of development, the company develops mature processes for revenue management and makes trade-offs in channel strategies based on baseline lift factors. The focus is on sensing and shaping demand. This is often referred to as a demand-driven supply chain.

Stage 5: The supply chain drives market-to-market alignment. In this stage, companies can trade off multiple demand shaping activities simultaneously in demand orchestration processes. This is translated bidirectionally into a supply plan balancing demand and supply uncertainty. For a retailer, this could combine revenue management, markdown strategies, new product launch, store format impacts, and cross-channel programs. For a manufacturer, this will trade off the impact of market-mix modeling of advertising, new product launch, revenue management and product portfolio management against the raw material risks, and corporate social responsibility goals in the extended supply chain. This is the definition of the market-driven demand response.

In each stage of the market-driven capability model, the role of demand changes requiring a redefinition of forecasting processes. Additionally, at each stage of the demand process, a supply chain leader can chose to constrain the forecast (reducing volume requirements based on channel or supply-side constraints) to better manage the supply chain.

Demand Challenges

In a May 1916 interview in the *Chicago Tribune*, Henry Ford was quoted as saying, "History is more or less bunk. It's tradition. We don't want tradition. We want to live in the present and the only history that is worth a tinker's damn is the history we made today." Many of the first generation pioneers in the companies we have interviewed over the past several months agree.

The historic definition, as defined by the first and second generation of supply chain pioneers, is limited and applicable to only stages 1 and 2 of the supply chain maturity model in Chapter 1 (Figure 1.3). The basis of the design of these traditional processes is the premise that an underlying pattern in historical customer shipment data can be identified using statistics. Any additional unexplained patterns could be simply addressed as randomness, or an unexplainable variation. These same processes assumed that the patterns (demand signals)—in this case, only trend/cycle and/or seasonality—will continue into the future.

The objective of all mathematical models is to maximize the ability to explain all the underlying patterns in the historical demand and to minimize the unexplained. The overall mathematical formula is:

Forecast = Pattern(s) + Unexplained

Like a compass, the market-driven demand signal needs to be built as a true north for the organization. To make this happen, companies need to focus on the elimination of bias (consistent overforecasting or underforecasting). It is not easy. The challenges to building market-driven demand management capabilities are many:

- **Incentives**. As long as sales are incented only for volume sold into the channel, and marketing is rewarded for market share, companies will never become market driven. To make progress on demand-driven initiatives, companies must focus on profitable sales growth to customers. The incentives need to be aligned outside-in based on channel metrics. The sales and marketing organizations, based on metrics, will normally contribute input to the demand plan that is the most biased of any organization within the company.
- **Traditional view of supply chain excellence**. For demand-driven initiatives to be successful, they must extend from the customers' customer to the supplier's supplier. The concepts of demand latency, demand sensing, demand shaping, demand translation, and demand orchestration are not widely understood. As a result, they require education and a business champion. Organizations not familiar with the concepts will not understand why the demand management processes need to change.
- **Focus**. In market-driven processes, the focus shifts from inside-out to outside-in. In traditional processes, the process focus is from inside the organization out, as opposed to from the outside (market-driven) in. To manage demand, focus is placed on revenue management as a horizontal process (this is covered in greater detail in Chapter 5).
- **Vertical rewards versus horizontal processes**. In supply-based organizations, the supply chain is incented based on cost reduction; procurement is incented based on the lowest purchased cost; distribution/logistics is rewarded for on-time

shipments with the lowest costs; sales is rewarded for sell-in of volume into the channel; and marketing is rewarded for market share. These incentives do not align to maximize value. To build a market-driven forecast, the forecasting group needs to report to a central organization. The goal of the group should be the reduction of bias and error and the use of the probability of demand.

- **Focus on transactions not relationships**. Today, the connecting processes of the enterprise—selling and purchasing—are focused on transactional efficiency. As a result, the greater value that can happen through relationships—acceleration of time-to-market through innovation, breakthrough thinking in sustainability, and sharing of demand data—never materializes. In a market-driven organization, demand error is part of the top-to-top meeting. Market-driven leaders set price targets based on their ability to forecast.
- **A forecast is not a forecast is not a forecast**. As companies work on demand architectures, they will find that they have multiple forecasts—sales forecast, financial forecast, production forecast, supply chain forecast, and procurement forecast—each with a different data model, granularity, and bias. As a result, tight integration is not a good idea; and the so-called one-number forecast is not realistic. Instead, as companies work through the issues, they will find the need to model market demand in a *ship to* or *channel data model*, and translate this demand to a *ship from data model*. The sales forecast then becomes an input into the corporate forecast, and this corporate forecast becomes the input into the financial forecast. These concepts require education and are often a major change management issue.
- **Data**. Working with data is a challenge for all. In traditional, supply-centric processes, the most common data input is customer orders. The second most common data source comes from customer shipments, or replenishment data. While market data—point-of-sale (POS) data and channel shipments—is growing in frequency and availability, it is not being effectively used today in 95 percent of organizations. Ironically, in the consumer products industries, POS data has been available for 32 years, but fewer than 10 percent of companies use channel data to drive their demand forecasts.

We overforecasted demand with a 34 percent bias believing that it would increase sales. It didn't. As a result, with the downturn in the economy, it added three months to our ability to figure out what was happening.

—Global Director of Demand Planning, Large Consumer Products Company

- **Getting channel data**. Traditional demand forecasting and planning processes are focused on planning rather than the use of current market. As industries have consolidated and become more global and leaner, they are more vulnerable to shifts in market conditions. The slightest disruptions in demand have become difficult to manage. To combat this, downstream trading partner data is shared in strong relationships. Companies have to earn the right to see and use channel data. Leaders make forecast sharing part of their top-to-top meetings. They measure bias and error for all trading partners.
- **Right technology**. Although traditional demand planning systems claim to have 20 or more different statistical methods embedded within the technology to model demand, the team building the market-driven supply chain will quickly find that they are not up to this new task. The technologies were designed to measure patterns based on history, not channel data. As a result, when the historical trend/cycle and/or seasonality patterns are disrupted by a global economic downturn, the supply chain goes on as if nothing had happened because it cannot sense. It is blind to the change.

  In market-driven demand forecasting systems, there are four categories of statistical methods: time series, intermittent demand functions, ARIMA, and causal models (e.g., multiple regression, ARIMAX, and unobserved component models). Although all four statistical models are required to accurately predict products sold within a corporate product portfolio, the causal models are designed to sense and to shape demand signals other than trend/cycle and seasonality. The best examples are when price, sales promotions, marketing programs, as well

as other related factors, change market demand.[1] In Figure 3.3, we show the conventional demand model and then contrast it with the evolution of the market-driven value network demand model in Figure 3.4.

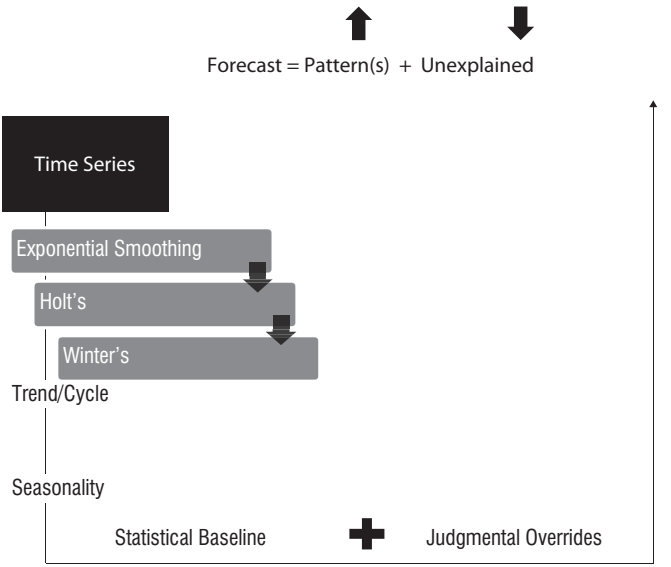

Figure 3.3 Traditional Demand Management Model

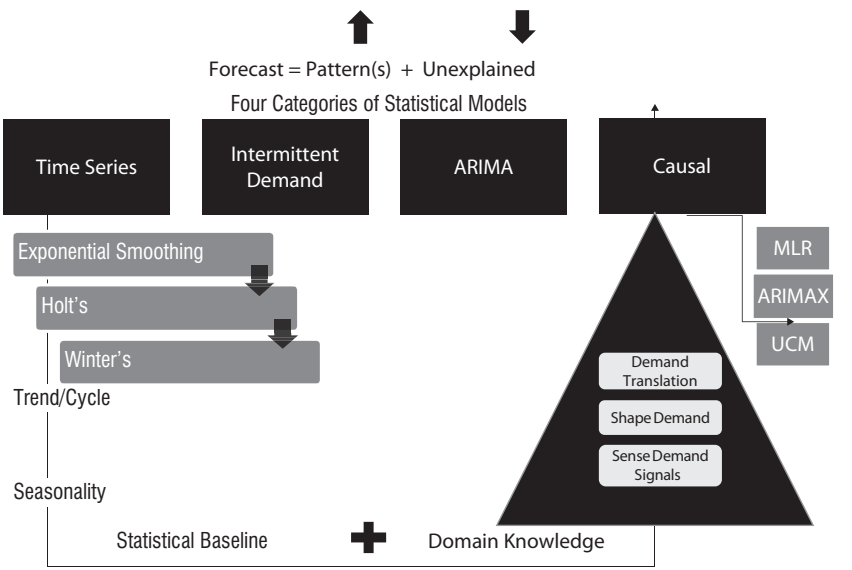

Figure 3.4 New Demand Management Model for Market-Driven Value Networks

Without these techniques to sense market demand, historic systems cannot predict changes in market trend and seasonality. These systems can predict the lift of the trend, but they are blind to determine the start and stop dates. As a result, trend/cycle and seasonality forecasting requires more judgmental or gut-feeling overrides to the statistical baseline forecast in an attempt to explain away the unexplained. Figure 3.4 is a simple illustration of this scenario.

- **Forecastability**. Given the volatility of demand in the marketplace and the proliferation of products and services, companies are questioning, "How forecastable are our products?" They want to know if the products are becoming easier or more difficult to forecast. As a result, the topic of forecastability is becoming the focal point for many supply chain articles. Companies are realizing that not all of their products are forecastable given data constraints and variability in demand. As a result, companies are asking, "What products are forecastable? What is not forecastable? How is the process of forecasting changing?"

  Item segmentation by product forecastability helps companies to achieve greater accuracy in their product forecasting processes. An assessment helps to pinpoint the issues. The framework in Figure 3.5 is a useful way to segment products and apply the concepts to supply chain design.
- **Overcoming forecast bias**. Forecast bias is consistent over- or underforecasting. The general tendency is for organizations to consistently overforecast. Much of the bias stems from judgmental inputs or gut-feeling adjustments in consensus forecasting. Bias is a major problem for the supply chain.

While forecasters felt that they had good justifications for making adjustments, in an in-depth study Robert Fildes and Paul Goodwin, experts in the demand planning field,[2] found them overly confident that their adjustments would improve forecast accuracy. This study reported three facts:

1. **Large adjustments are more beneficial than small**. In fact, the study showed that large adjustments did tend to be beneficial, but small adjustments did not materially improve forecast accuracy and sometimes made accuracy worse.

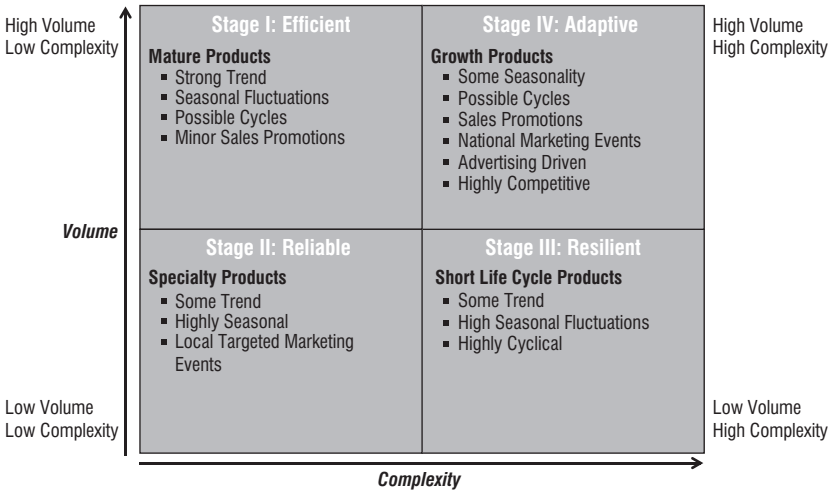

Figure 3.5 Rethinking How Companies Respond to Demand

2. **Negative adjustments are more valuable than positive**. Subsequently, negative (downward) adjustments were more likely to improve forecast accuracy than positive (upward) adjustments. Organizations, based on traditional metrics, are incented for a positive bias.
3. **Recency**. Fildes and Goodwin also found that overoptimism tends to lead to erroneous positive adjustments, while negative adjustments are based on more realistic expectations. Finally, they found a bias toward recency—that is, emphasizing the most recent history while treating the more distant past as bunk. This focus on recency tended to undermine the process of statistical forecasting.

If past history was all there was to the game, the richest people would be librarians.

—Warren Buffett

In this new world of market-driven value networks, companies need to look at the forecast not just as a number but to view it as a

range of probabilities. It requires a new approach. Instead of tightly integrating a fixed number to supply, in market-driven value networks, the probability of demand is translated and used to determine supply strategies.

Historically, companies have focused too much on the accuracy of imperfect numbers. A frequent mistake is focusing on the accuracy of a number with high variability. After all, what good is a number with a 50 percent error with 9 significant digits? In market-driven value networks, it is more valuable to know the range of probabilities and the market assumptions than the specific number.

WHAT IS DEMAND SENSING?

Demand sensing is the translation of downstream data with minimal latency to understand what is being sold, who is buying the product (attributes), and how it is impacting demand. Overall, there are four techniques to improve channel sensing:

1. **Focus on market drivers**. For each supply chain, there is a market driver that can be tracked and monitored as an indicator. For a manufacturer of lighting fixtures, it's the number of home starts; while for a manufacturer of asphalt, it's the number of miles of roads to be paved under government contracts.
2. **Use of downstream data (for demand pattern recognition)**. This requires the ability to collect and analyze data across market channels and geographies to understand who is buying which product and in what quantities. In the case of e-commerce, this can be click-through data; and in the case of social data, this can be consumer sentiment patterns. In the case of discrete manufacturing, this can be distributor sell-through data.
3. **Translating market data to supply**. After determining the patterns and trends, the demand signal is translated to supply. This can take the form of distribution targets at the distribution center (replacing traditional demand-consumption logic), manufacturing and inventory targets, and supply requirements.
4. **Measuring the impact of demand-shaping programs**. By definition, this is the company's ability to analytically measure

and determine the impact of demand shaping activities such as price promotions, sales tactics, and marketing events as well as changes in product mix, new product introductions, and other related factors on demand lift. Demand sensing reduces demand latency, or the time to sense market impacts, to measure the effectiveness of the program sooner. It also includes measuring and assessing the financial impact of demand shaping activities related to profit margins and overall revenue growth. Sensing and shaping go hand in hand in demand orchestration.

Traditional demand management processes use structured transactional data (orders and shipments). Unstructured data sources, such as weather patterns and social sentiment data, are increasingly important sources of insight for market-driven value networks. Unfortunately, unstructured data cannot be used in traditional demand architectures.

The minute that you launch the product, you get the market reaction, but it is not being used in the forecast. The use of this sentiment is the next big opportunity.

—Sanjiv Sidhu, Founder, i2 Technologies; Current Chairman, o9 Solutions

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The longer the supply chain, the greater the need for demand-sensing capabilities. With global outsourcing, companies have built long supply chains that translate rather than sense demand. As a result, the use of sensor data, market data, or temporal data (e.g., weather, traffic, etc.) to sense and reduce latency is an opportunity for most companies.

The most successful implementations of demand sensing are in consumer packaged goods and consumer electronics. Following the recent financial downturn, greater adoption is being seen in other industries.

Here are some rules of thumb for demand sensing:

- **Data**. Data requires harmonization, synchronization, and cleansing. It comes in many forms with different frequencies

and multiple data definitions. Data structures need to be synchronized at three levels: product hierarchy, calendar, and unit of measure. The synchronization of data from multiple trading partners requires a demand signal repository.

- **Organization**. The use of downstream or channel data also depends on the organization having the right combination of inspiration (vision), perspiration, and innovation. It is not as simple as stuffing downstream data into traditional supply chain technologies.
- **Right data model**. To use downstream data, the forecasting model needs to be built to use the data. This requires the modeling of the ship to or channel views and the translation of demand to the ship from or manufacturing views. For 80 percent of companies that have implemented enterprise resource planning systems and advanced planning systems, this is a problem. In short, the technologies have been designed to model what manufacturing should make and not what the channel will sell. This difference is shown in Figures 3.6A and B.
- **Organizational political impacts**. The use of downstream data gives true visibility to the channel. As a result, it can take time for the sales organization to get comfortable with demand-sensing processes and the use of downstream data. The greater the forecast bias, the larger the political implications and the greater the need to focus on change management.

As described earlier in the chapter, the more sensitive and responsive channel sales are to trends and seasonality, the more important demand sensing is to driving supply chain excellence. The ability to rapidly detect changes in demand gives companies greater flexibility to accommodate those changes, or influence overall demand.

WHAT IS DEMAND SHAPING?

Demand shaping happens when companies use sales and marketing tactics like price, promotion, new product launch, sales incentives,

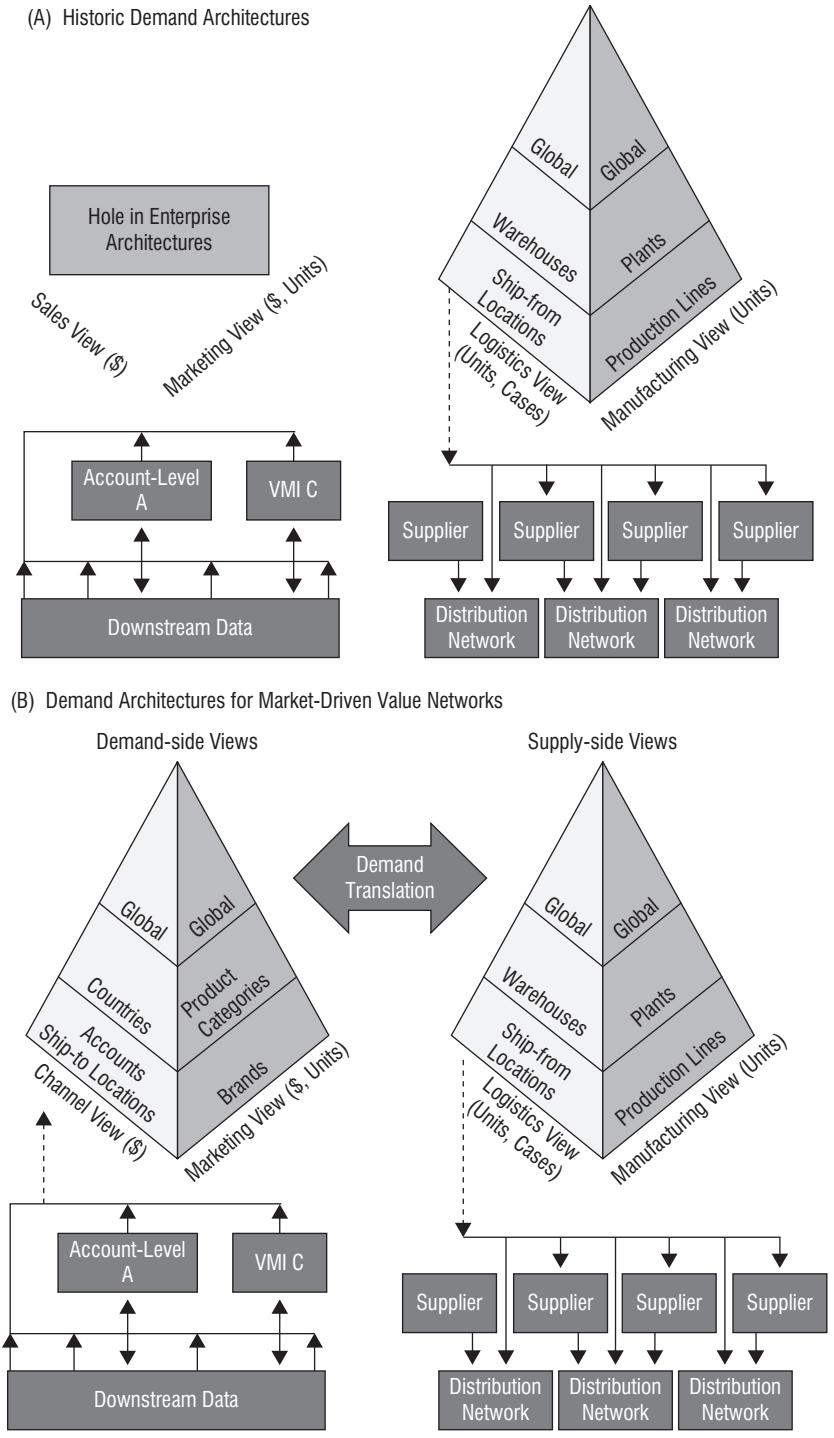

Figure 3.6A and B Data Model for Market-Driven Forecasting Data

or marketing programs to increase market share. The use of these tactics increases demand elasticity. Many times, companies believe that they are shaping demand, but find that they are really just shifting demand (moving demand from one period to another). Demand shaping creates value while demand shifting results in waste.

The first step in the market-driven demand management process is sensing market conditions based on channel signals. The second is shaping demand using advanced analytics. Demand sensing reduces the latency of the demand signal by 70 to 80 percent. Shortening the time to sense true customer acceptance improves the company's ability to understand and see true impacts of demand-shaping activities like price, promotion, sales, and marketing incentives and new product launch to increase demand lift.

Three elements are critical to an effective demand-shaping program:

1. **Data analytics**. Demand shaping is data-driven decision making. It is the ability to increase or decrease the volume and profit of goods sold by changing sales, product and marketing tactics, and strategies. This can be achieved by enabling what-if analysis so companies can understand the impact of changing price, trade promotions, marketing events, advertising, and product mix on demand lift and profitability to make optimal demand shaping decisions. It is an analysis of the elasticity of baseline volume. This usually refers to the shaping of unconstrained demand (i.e., demand shaping independent of supply constraints).
2. **Demand pattern recognition**. Demand pattern recognition uses customer data and channel insights along with multidimensional data (time, geography, channel, brand, product group, and product type) to improve decisions.
3. **Real-time supply visibility**. As demand is shaped, forecast error increases. As a result, it is important to have flexible supply processes to translate the demand impacts to internal and external supply organizations through supply visibility with minimal signal distortion and latency.

CASE STUDY

DELL: A CASE STUDY IN DEMAND SHIFTING

Dell pioneered the direct model for personal computers back in the 1990s, becoming a poster child for supply chain management. Dell's package-to-order philosophy differentiated them from the make-to-stock processes of the other computer makers. Initially, Dell avoided retail channels, instead offering every customer the opportunity to order a unique product built to their specifications. The genius behind Dell's direct model was that every PC that was built was pre-paid. The unique configurations coupled with the short lead times were tough to forecast.

To compensate, Dell shifts demand at the point of sale. For example, if you went online to the Dell website to purchase a Dell Inspiron 15 laptop, you may find a sales promotion pop-up that says, "For today and today only you can purchase a Dell Inspiron 17 laptop with a bigger screen, more processing capacity, bigger hard drive with expanded memory, as well as additional software for a reduced price." Consider a likely scenario of under-forecasted demand for key components for the Dell Inspiron 15 laptop. To align the supply chain, Dell actively shifts demand by offering a sales promotion to move a customer from the Inspiron 15 laptop to the Inspiron 17 laptop. Its goal was not to lose a sale or delay a shipment, but increase profitability.

You know the age-old conflicts between someone wanting to schedule production, and someone else wanting to meet customer demand, all happening while the manufacturing team wants to run one code for ten days without changing.

—Vice President of Customer Service, Consumer Products

Demand planning has evolved from a shadowy concept to a critical planning function.

—Deborah Goldstein,
Vice President of Demand Planning, McCormick

ACHIEVING MARKET-DRIVEN CAPABILITIES

To achieve market-driven capabilities companies need to focus on a four-step process:

1. Sense demand signals through the synchronization of internal and external data.
2. Shape demand using advanced analytics to create a more accurate unconstrained demand forecast.
3. Orchestrate based on cross-functional collaboration with sales, marketing, finance, and operations planning that reflect capacity constraints and market-to-market variability.
4. Create a final constrained demand response.

Using what-if analysis, demand forecasters can shape unconstrained demand based on current sales and marketing activities as well as external factors affecting demand. This includes weather, special events, and economic conditions to optimize volume and revenue while minimizing marketing investment. Figure 3.7 illustrates the four key steps in the market-driven demand management process.

For many, this is a radical shift. Most demand forecasting processes are supply driven with little emphasis on predicting unconstrained demand, let alone shaping demand. In the interviews of 75 supply chain pioneers, when we asked about demand shaping, we found that most companies shift, versus shape, demand to meet supply constraints. Today, the norm is fitting demand to supply, rather than supply to demand.

In contrast, market-driven supply chains sense demand signals and shape future demand based on sales and marketing strategies and tactics, rather than reacting to past supply constraints. It puts more emphasis on downstream activities that directly affect consumer demand, thus creating a more practical view of true unconstrained demand. This design should include an iterative framework that combines analytics and domain knowledge with financial analysis of go-to-market strategies.

To be effective, the process needs discipline. The overall market-driven forecasting process design combines quantitative analysis

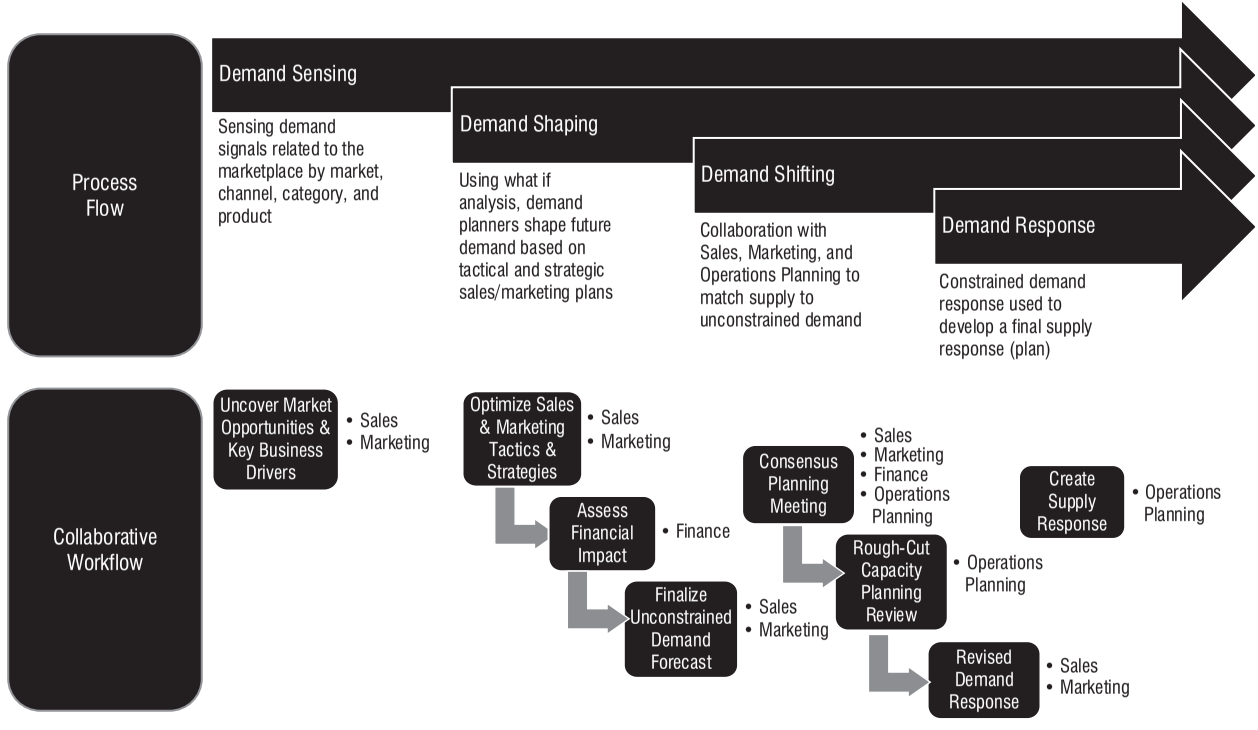

Figure 3.7 Market-Driven Demand Management Process

to measure effectiveness. It allows the demand forecasting process owner to view departmental forecasts from various functional viewpoints, which have different perspectives, to better understand business impacts.

Financial analysis is necessary throughout the market-driven forecasting process to evaluate the profit potential and impact of various sales and marketing strategies and tactics that are designed to drive incremental demand. Finance's role is more of a support function to assess the revenue and profit implications of sales and marketing activities that are used to shape demand. In many cases, the payback, or revenue potential of sales promotions and marketing events, is minimal at best. These activities can cause huge volume swings in demand, which can create havoc throughout the supply chain, shifting resources and adding unnecessary costs. Supply chains with large volume swings must be designed to absorb the impact.

Although the intent of demand shaping is to lure new consumers to the company's brands and products, the large majority of marketing programs only shift demand. Without financial analysis and discipline, this over time can erode brand equity and the overall health of the business

Synchronizing Signals

The financial budget is an initial planning tool to gauge the potential health of the business. In many cases, the financial plan is created six months to a year in advance, making it obsolete after the first demand forecasting cycle update. By the time the first period of the plan is reviewed and updated, more new, and relevant information is available that can be used to assess the variance between the original plan and current market conditions. That same information can be used to

influence demand-shaping activities by assessing the profit impact and supporting marketing programs that can close those gaps during the demand shaping activities.

Synchronization of financial budget and channel data is a challenge. Figure 3.8 illustrates the difference between weekly syndicated scanner data for a beverage product as compared with shipments in a market area. Although the data is very close, there are many periods where supply is greater than demand and vice versa, making it difficult to predict true demand using shipment data alone. In the figure, trade (supply) loading due to trade incentives (e.g., off-invoice allowances, trade promotions, and other related trade incentives) is obvious. In addition, there are periods where sales promotions and other related consumer promotion incentives have been implemented to drive incremental demand, as well as selloff of retailer inventories. As a result, the goal should be data synchronization, not tight integration.

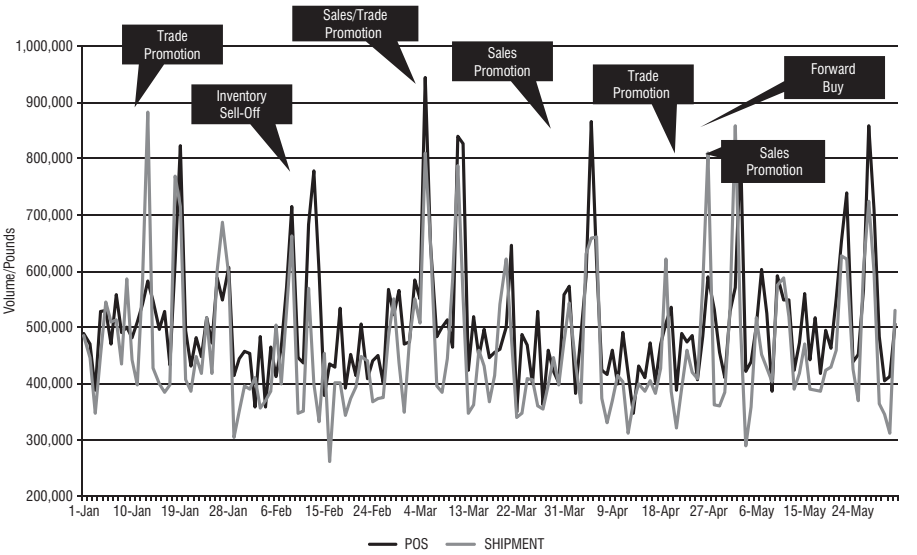

Figure 3.8 Demand versus Supply Response

CASE STUDY

DRIVING BOTTOM-LINE IMPROVEMENTS

The implementation of a new demand management system helped a large U.S. direct store delivery company improve forecasting accuracy by 4 percent and increased service levels by 6 percent. Despite growing volumes, the company was able to hold inventory costs flat. The company also found that based on the new forecast, the sales department was better equipped to plan profitable sales promotions. The project's savings exceeded expectations.

The heavy promotional nature of the products caused demand to wax and wane by store or region. Before using their new market-driven demand management solution, the planners struggled to accurately factor in product seasonality. The sales force was also guessing at how much product needed to be stocked for special promotions designed to drive volume, or even what price point to select to drive enough volume to turn a profit.

"Our existing solutions did a poor job of forecasting demand around promotions," explained the director of demand and supply chain planning.

Data was so scattered in numerous locations. Some of it was sitting in spreadsheets in regional offices and might be sent in once a week, if that. In the division that managed delivery to drugstore chains (a growing business), forecast accuracy was decreasing by the year.

"It was driving a lot of service issues and increasing our carrying costs," explained a senior manager for strategic sourcing.

No Second-Guessing

"When we switched to our new demand management solution, we saw our forecast accuracy improve immediately. We also saw service levels take off in a positive way and our inventories decreased. We exceeded our original projections; the accuracy is driven by a change from a 50,000-foot view of forecasts to a more detailed look. Now we can talk about a particular deal with a retailer and know what kind of lift is generated and then that drives the supply chain. There is no second-guessing," said a demand planner at a food and beverage company.

Creating Synergy between Sales and Demand Planning

The new demand management solution featured an interactive portal where salespeople enter the attributes of a promotion they would like to run and the demand planners provide a variety of scenarios (demand

(*Continued*)

shaping) to help the sales team decide if the promotion would be profitable. The sales teams now had the capability to measure the impact of in-store merchandising vehicles such as endcap displays to determine the incremental unit volume impact, as well as margin impact within designated market channels (i.e., retail grocery channel).

Using the new demand management solution, the demand planners can make calculations and let salespeople know when there isn't enough specific product in the pipeline near their territory to meet the estimated volume that the promotion will generate, and then work with sales to find a better promotion (demand shifting). They can also help the sales team calculate the lift for a promotion, and whether that sales increase—at that price—will make the promotion profitable.

Critical to this demand-shaping service is the speed to value. The answer needs to be quick. The demand management staff no longer needs from six hours to an entire weekend to gather the data, including tens of thousands of time series calculations. To get an answer, it is now minutes for a response. When it took a long time to gather data, information was released on a rigid schedule, and it was often out of date. With the new system, that is no longer the case.

Achieving Lasting Return on Investment

The company used its demand management solution to build three additional attributes into its forecasts: competitor activities, weather conditions, and promotion cannibalization of existing sales.

"We are trying to understand if our promotions are impacting sales of other products. With more confidence in the forecasts, planners are using the demand data to align the entire organization, affecting what we produce, where we're going to ship, all the way up to our top line financial commitments. This drives all facets of our business. With our new market-driven demand management process and solution, we're able to accomplish our goal of right flavor, right time, right store," said the manufacturer's planner. "It's hard to put a price tag on it, but it is really invaluable in terms of running the business effectively and better serving the customer."

For this company, demand shaping is becoming an essential part of the S&OP process. From a tactical standpoint, demand shaping enhances the demand and supply planning process by improving demand/supply balance. Although most companies use demand forecasting to plan for customer demand, this company now has the opportunity to use demand shaping and shifting to close the gap between unconstrained demand expectations and supply availability.

WHY IS BECOMING MARKET DRIVEN IMPORTANT FOR INDUSTRIAL COMPANIES?

Market-driven strategies are often associated only with consumer product companies. The literature is full of examples of forecasting shelf-level consumer demand and sensing demand using retail POS data. However, demand management is just as important for industrial sectors. The difference is the inputs. For example, an aircraft manufacturing company that has a three-year backlog of planes needs to focus on demand contract management, platform rationalization, back orders, design modifications, and engineering changes.

One problem is the lack of market visionaries in the industrial manufacturing industries. While Procter & Gamble painted the vision of the customer-driven value network for the consumer goods manufacturing sector, there is no industrial company that has waved a similar flag in the discrete manufacturing sectors. Let's look at an example of where market data could change a discrete manufacturing supply chain. The color of an automobile is the singular most important buying criteria for a consumer entering a distributor showroom. Many buyers leave compromising on color because the car that they want is not available. For manufacturing, the selection of color is problematic. It is the first step of assembly and the selection of color drives many other decisions for the car's interior. Automotive manufacturers know that they do not know the product that car dealers want, but they have been slow to collect data on consumer intent (what they wanted versus what they bought). Likewise, the manufacturers have been slow to use e-commerce data from cars sold online to drive features, colors, and styles on the manufacturing line for other channels. The industry has an opportunity to better synchronize demand signals.

Industrial companies tend to be driven by product innovation, not market insights. As the environment for these large organizations becomes more diverse and global, these product-driven industrial sectors are struggling to reduce complexity in their product and supply networks.

A good demand management process will enhance the S&OP analysis by providing a consensus demand forecasting environment that incorporates statistical methodologies, dashboarding capabilities and

improves workflow to create a more accurate unconstrained demand forecast. As a result, market insights matter more than ever.

DRIVING THE MARKET-DRIVEN DEMAND MANAGEMENT ADVANTAGE

Market-driven demand management is supported by demand-driven forecasting principles that have a significant impact on a company, whether the company sells products or services. Companies that have implemented a market-driven forecasting process have experienced four key benefits:

1. **Alignment**. A market-driven forecast is a more effective approach for upstream planning. It better anticipates unconstrained demand. The benefits of more effective upstream planning include a reduction in out-of-stocks on the shelf at retailers; a significant reduction in customer back orders; a reduction in finished goods inventory carrying costs; and consistently high levels of customer service across all products and services.
2. **Visibility**. Because of improved collaboration, senior managers have a better understanding of what drives profitability, resulting in tighter budget control and more efficient allocation of marketing investment dollars. This results in a better understanding of product, customer, and market profitability, allowing the creation of more focused strategic and tactical plans to allocate resources across brands and products to drive incremental unit volume growth and profitability.
3. **Growth**. As all the stakeholders in the process begin to trust the market-driven forecasting process and enabling solutions, they become more closely aligned, driving quality collaboration among sales, marketing, finance, and operations planning, as well as with external stakeholders. The building of these stronger relationships translates into stronger network integration, which helps to minimize the pressures of the market dynamics surrounding the company's brands and products.
4. **Competitive advantage**. The focus is not only on cost savings as a justification for introducing a new world demand management process and enabling solution. Market-driven value networks can create a competitive advantage in providing higher

quality demand forecasts to improve customer service over competitors to increase market share for a company's products and services.

Supply chain technology adoption has always been slowed by issues with scalability, data cleanliness, and the sheer volume of data. Today's technology makes this no longer an issue.

A good demand management process will enhance the horizontal processes outlined in Chapter 5. It is the backbone for the S&OP process, providing a consensus demand forecasting environment that incorporates statistical methodologies, dashboarding capability, and workflow to create a more accurate unconstrained demand forecast. It is the baseline forecast for revenue management, and the driving force in network design to determine supplier development practices.

There is a need to hold people accountable in the forecasting process. Accountability is the mortar between the bricks of the market-driven value network. Based on the lessons on bias from Fildes and Goodwin's study, discussed earlier, we know that when people touch the statistical baseline forecast their intentions are good, but their execution does not always add value to the demand forecast. In fact, most people who touch the forecast actually do not add any value. These non-value-added touch points need to be identified and either improved or eliminated. The best approach for a company to take is to implement a new methodology for measuring demand management process performance and accuracy called *forecast value added* (FVA). The term *FVA* was first used by Michael Gilliland in a 2002 article in the journal *Supply Chain Management Review*.[3]

FVA uses standard forecast performance measurements (metrics) to identify value-added or non-value-added activities in the process that contribute to the accuracy or inaccuracy of the demand forecast. The result is a mechanism that reduces non-value-added touch points, thus improving the overall accuracy. Companies that have successfully implemented FVA have experienced significant improvement in overall forecast accuracy and reduced cycle times. If an activity does not improve the accuracy of the statistical baseline forecast, it should be eliminated, or minimized (simplified), to reduce cycle time and resources.

It is also good practice to compare the statistical forecast to a naïve forecast. (The naïve forecast is a simple technique where the forecast equals the volume of goods sold in the prior forecasting period.) Naïve forecasts, in some situations, can be surprisingly difficult to beat, yet it is very important that the organizations ensure that software and a statistical modeler improve on the naïve model. The focus needs to be on continuous improvement. If the software, modeler is not able to do this, it makes sense to implement better software, improve the skills of the modeler, or just use the naïve model as a baseline forecast.

Implementing FVA into the demand management process requires that forecasts be recorded and saved before and after each cycle. Having the capabilities to store forecast history by a stream of activities (e.g., consensus forecast adjustments, managerial overrides, price lift calculations, etc.) is critical to measuring the value-added, or non-value-added, contribution to the overall process. Utilizing the statistical baseline forecast as the default is the key to establishing a benchmark to measure the effectiveness of all the touch points in the process. Unfortunately, few companies capture the appropriate data, or the level of detail on a historical basis, to conduct FVA. This is an opportunity.

Traditional supply chains are operationally disconnected and reactive to demand. Demand volatility and operational complexity require supply chains to become more resilient. Market-driven value networks begin with conscious choices that integrate and synchronize supply with demand channels and product portfolios.

SOCIAL: A NEW FORM OF DEMAND SIGNAL

With the evolution of social technologies (see Figure 3.9), companies can now have a relationship directly with their customers. Most companies are dabbling in the use of social technologies for marketing but have not connected the signals to the supply chain. Instead, Facebook and digital marketing initiatives are currently managed by the marketing department. In the traditional organization, it is marketing for the sake of marketing. The pace of change, as shown in Figure 3.9, and the size of the opportunity are daunting.

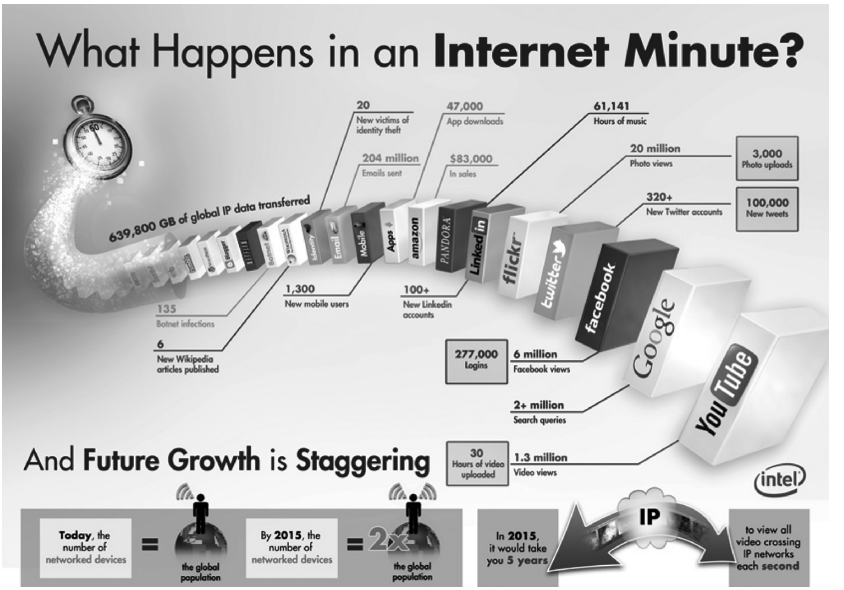

Figure 3.9 The Impact of Social Media on Consumer Behavior *Source:* Intel

Today, too few companies are thinking about the use of social data to improve the demand forecast to become market driven. In interview after interview with pioneers, we have been looking for this change; but so far, it has not happened. What is the difference between a market-driven and marketing-driven approach? It is distinguished by three elements:

1. **It is not about *you*. It is about *them*.** When a company is a marketing-driven organization, the message is all about them. It is about the company's products or the company. The brand managers try to own a closely held message. The goal is to yell the message and get it everywhere. In contrast, when companies are market driven, the goal is to increase customer relevance and create relationships with the shopper, the customer, and the greater market. It is no longer about just the brand or the company; instead, it is about the buyer of the products or services. In this new type of supply chain, the power shifts to the buyer, or end consumer. The goal is to serve the customer.

2. **Open process that is orchestrated cross-functionally**. In the traditional organization, marketing-driven initiatives are tightly controlled within the marketing department. In the market-driven organization, the focus is outside-in and horizontal.
3. **Market-driven companies listen**. These companies also test and learn in real time. They align their supply chains to orchestrate while implementing test-and-learn strategies in the channel. They use data analytics to sense answers to the questions that they do not know to ask. They continuously test and learn. In contrast, a marketing-driven company constructs campaigns, analyzes data, and retests concepts. The campaigns are based on history. They are static. It is hard to listen when you are so busy filling social media sound waves with your message.

Improving New Product Launch

The lifeblood of a corporation is new products. A new product launch is an example of where a marketing-driven approach can yield big dividends. The number one issue for new product launch failure is the lack of good demand insights.

The use of social technologies to listen to consumer sentiment is an opportunity to rectify this situation. This information can be used in cross-functional launch meetings to be more effective. Dell, Newell Rubbermaid, and Whirlpool do this weekly. This could be an easy fix—placement, information, message—and quick sensing allows them to get it right before the product fails.

When companies launch new products, they can now use action buttons to sense the market response to their new product launches. These data can then be used to build forecasting models. For example, if a fan in a company's loyal demographic wants the new product, it is a powerful causal factor to put into a demand forecast. If the majority of consumers hate the product, it is probably time to rethink the product build plan. The value is the speed at which a company can access this insight. Instead of a 7- to 14-day latency to get channel data, the company is able to see the end consumer's response in near real-time (1 to 2 days).

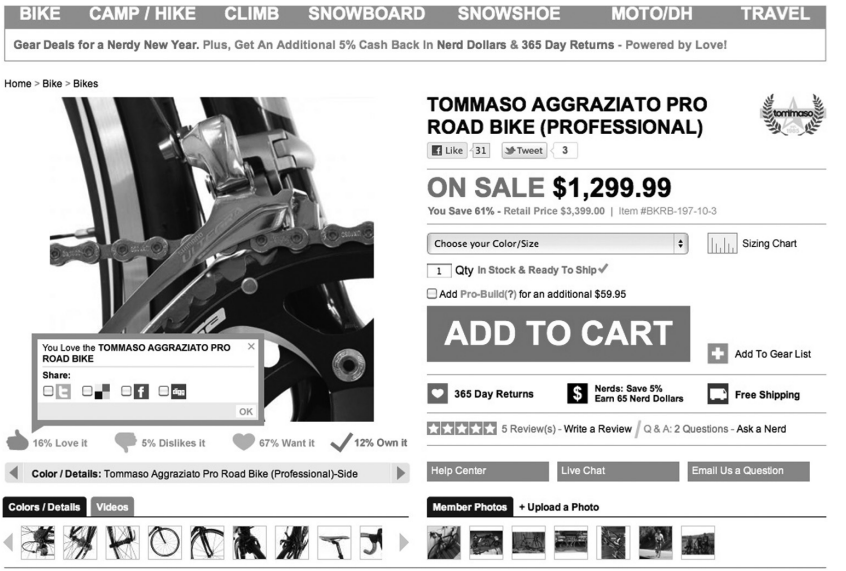

Figure 3.10 Use of "Action Buttons" in a New Product Launch *Source:* GiantNerd.com

Figure 3.10 shows the use of an action button on an e-commerce website. With this type of feature, as the product is shipped to the market, companies can follow the social sentiment closely. It can be used as a causal factor. The action buttons are also a great way to get direct customer feedback. In combination with demand sensing technologies, this helps companies to get a quick read of the market.

Listen and Use Social Sentiment Data

Across the Web, consumers today post ratings and review data about products. This near real-time data is a great opportunity for a company to understand customer sentiment and share the information with retail customers. In the case of Newell Rubbermaid, it enabled its team to leverage immediate feedback from consumers to identify an issue and quickly respond to ensure that the launch was a success. Prior to the use of this type of data, brands faced a 7- to 14-day latency to receive and understand consumer data. In the next case study, we share how Newell Rubbermaid, a leader in the use of

social data, was able to identify an issue that could have caused negative word-of-mouth sentiment circumventing leading retailers from returning the product.

CASE STUDY

DEMAND SENSING AND NEWELL RUBBERMAID NEW PRODUCT LAUNCH

Few companies use social sentiment in the supply chain better than Newell Rubbermaid. The company is an S&P 500 company and a global marketer of consumer and commercial products with 2011 sales of approximately $5.9 billion. It is headquartered in Atlanta, Georgia, and has approximately 21,000 employees worldwide.

In April 2008, the company launched Rubbermaid Produce Saver food storage containers as an extension to its popular Easy Find Lids line. The product was designed to extend the life of fruits and vegetables by 33 percent compared with traditional Rubbermaid containers. Rubbermaid Produce Saver addressed the two factors that age fruits and vegetables quickly—moisture and lack of oxygen—with a vented lid to allow produce to breathe and a tray to elevate food out of moisture in the container. The product launched in three sizes: 2-, 5-, and 14-cup bowls. Sets of four containers retailed at mass retailers and grocery stores ranging in price from $9.97 to $12.99.

The first seven consumer-generated product reviews about Produce Saver on the Rubbermaid.com brand website included two five-star and five one-star reviews. Rubbermaid contacted the five one-star reviewers to find that there was a product usage issue. Consumers were not following instructions to "not wash the produce" before they put it into the container. As a result, the washed produce was rapidly spoiling in the containers, rather than lasting longer. After seeing the consumer comments (see Figure 3.11A), Rubbermaid quickly responded to make sure consumers understood how to use the product by putting additional instruction information on the product page and writing a blog post on how to use Produce Saver for best results (as seen in Figure 3.11B). As consumers used Produce Saver correctly and achieved the desired result—fruits and veggies lasting longer—the result was improved recommendations on the website. Because of early demand sensing and consumer feedback, Newell Rubbermaid was able to take immediate action to help ensure the product launch was a success.

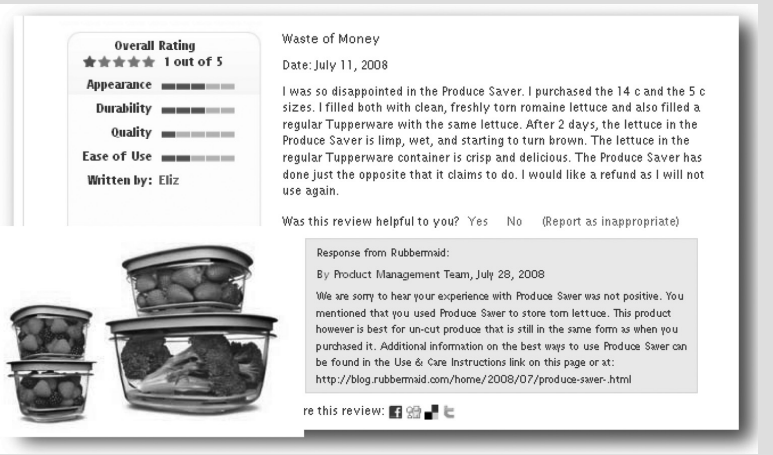

Figure 3.11A and B Listening and Learning in New Product Launch: Produce Saver *Source:* Newell Rubbermaid, SXSW Presentation, 2010

(*Continued*)

Social media should not be social for the sake of being social. It is not just about the number of fans. The data should not be relegated to the marketing department. The process should not be outsourced to a public-relations firm. Instead, it should be seen as a way to have a new form of relationship with the customer. Leaders recognize it as a new demand signal, realizing that it is a new and valuable input into the market-driven supply chain.

HOW CAN A COMPANY IMPROVE DEMAND MANAGEMENT?

There are several key steps a company can take to begin the transition to a market-driven demand management process:

- Ensure *accountability* and a focus on continuous improvement by using the FVA techniques.
- Make *data sharing* and forecast accuracy part of top-to-top meetings with trading partners. Take ownership of the forecast error in the extended value network.
- Introduce *S&OP processes* based on a strong demand-driven forecasting process that focuses on data and analytics to sense demand signals, and to shape and to translate demand to create a more accurate demand response.
- Increase *granularity of data* analysis to reflect what is sold in the channel. Define the business hierarchy in the model based on profit implications.
- Leverage a demand management technology to automate forecasting workflow to create a more accurate unconstrained demand forecast. The enabling solution should provide a user-friendly interface that allows nonstatistical users (or planners) to systematically run *what-if analyses* to shape demand.
- Evaluate the fit of the data model to use channel data. Investigate integration of *downstream data,* such as retail POS data, to provide a better source of true demand. Synchronize data inputs.
- Embrace new forms of *channel data* to drive innovation.

TO DRIVE CHANGE

- Map available demand signals and design how to use them outside-in.
- Forecast with the goal in mind. Evaluate the fit of the demand models and statistical engines.
- Build demand sensing and shaping capabilities into the process.
- Design supply processes based on the probability of demand.

New types of information, more data granularity with less latency, combined with greater computing power should open up new opportunities. Most of the technologies utilized in traditional demand management processes were first-generation analytics built on established data models based on a predefined set of questions. They are not equal to today's challenge. As a result, many companies embarking on this journey will either need to buy new technologies or reimplement existing systems.

SUMMARY

Demand management is the natural place to start the market-driven value network transformation. To accomplish this goal, focus on:

- Eliminating bias through measurement and accountability.
- Driving continuous improvement processes to improve the demand management process through FVA analysis.
- Implementing a simple, easy-to-use system for sales to calculate the profitability and market share impact of demand shaping programs. Use checks and balances through the finance organization to hold sales accountable for demand shaping profitability.
- Tuning data models frequently (at least once a year) to be sure that the forecasting technology is properly aligned to the ever-changing business requirements.
- Building strong channel relationships to get access to channel data. Use analytics and harmonize the data for usage.

- Embracing new forms of data. Synchronize the inputs.
- Focusing energy on a common plan with role-based views. It is too complex and counterproductive to focus on "one number" or a tightly integrated plan.

NOTES

1. Charles W. Chase Jr., *Demand Driven Forecasting: A Structured Approach to Forecasting* (Hoboken, NJ: John Wiley & Sons, 2009), pp. 21–50.
2. Robert Fildes and Paul Goodwin, "Good and Bad Judgment in Forecasting: Lessons from Four Companies," *Foresight: The International Journal of Applied Forecasting* (Fall 2007): pp. 5–10.
3. Michael Gilliland, "Is Forecasting a Waste of Time?" *Supply Chain Management Review*, July–August, 2002.

About the Authors

Lora Cecere is the founder of the research firm Supply Chain Insights, which is paving new directions in building thought-leading supply chain research. She is also the author of the enterprise software blog *Supply Chain Shaman*. The blog focuses on the use of enterprise applications to drive supply chain excellence. As an enterprise strategist, Lora focuses on the changing face of enterprise technologies. Her research is designed for the early adopter seeking first mover advantage. Current research topics include the digital consumer, supply chain sensing, demand shaping and revenue management, market-driven value networks, accelerating innovation through open design networks, the evolution of predictive analytics, emerging business intelligence solutions, and technologies to improve safe and secure product delivery. With more than 30 years of diverse supply chain experience, Lora spent 9 years as an industry analyst with Gartner Group, AMR Research, and Altimeter Group. Prior to becoming a supply chain analyst she spent 15 years as a leader in the building of supply chain software at Manugistics and Descartes Systems Group, and several years as a supply chain practitioner at Procter & Gamble, Kraft/General Foods, Clorox, and Dreyers Grand Ice Cream (now a division of Nestlé).

Charles Chase is the principal industry consultant of the manufacturing and supply chain global practice at SAS. He is the primary architect and strategist for delivering demand planning and forecasting solutions to improve supply chain efficiencies for SAS customers. He has more than 26 years of experience in the consumer packaged goods industry and is an expert in sales forecasting, market response modeling, econometrics, and supply chain management. Prior to working as the principal industry consultant at SAS, Chase

led the strategic marketing activities in support of the launch of SAS Forecast Server, which won the Trend-Setting Product of the Year award for 2005 by *KM World* magazine, and SAS Demand-Driven Forecasting. He has also been involved in the reengineering, design, and implementation of three forecasting and marketing intelligence processes/systems. Chase has also worked at the Mennen Company, Johnson & Johnson, Consumer Products Inc., Reckitt & Benckiser, the Polaroid Corporation, Coca-Cola, Wyeth-Ayerst Pharmaceuticals, and Heineken USA.

Chase is a former associate editor of the *Journal of Business Forecasting* and is currently an active member of the practitioner advisory board for *Foresight: The International Journal of Applied Forecasting*. He has authored several articles on sales forecasting and market response modeling. He was named a 2004 Pro to Know in the February/March 2004 issue of *Supply and Demand Chain Executive* magazine. He is also the author of *Demand-Driven Forecasting: A Structured Approach to Forecasting* (Wiley, 2009).

ANALYTICS

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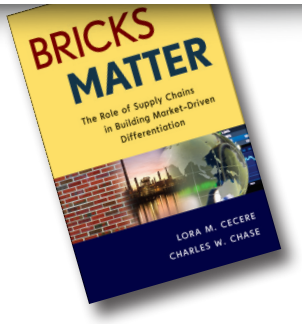

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