The Shelf-Connected Supply Chain: Strategically Linking CPFR with S&OP at the Executive Level

By Fred Baumann

EXECUTIVE SUMMARY | Consumer goods manufacturers have made significant investments in cross-functional customer teams with the hopes of gaining better insights into consumer demand to improve sales. Many built these teams to assist in driving efficiencies back through their supply chains and formally link the customer's perspective into their on-going corporate sales and operations planning (S&OP) process. Yet it is still very common that the data and insights of these teams are lost in translation, and corporate planning functions continue to build their future plans off of historical shipments out of their plants and distribution centers (DCs) versus the demand signal from the shelf. This article highlights strategies for consideration for deploying a shelf-connected supply chain that links collaborative customer execution with executive level planning.

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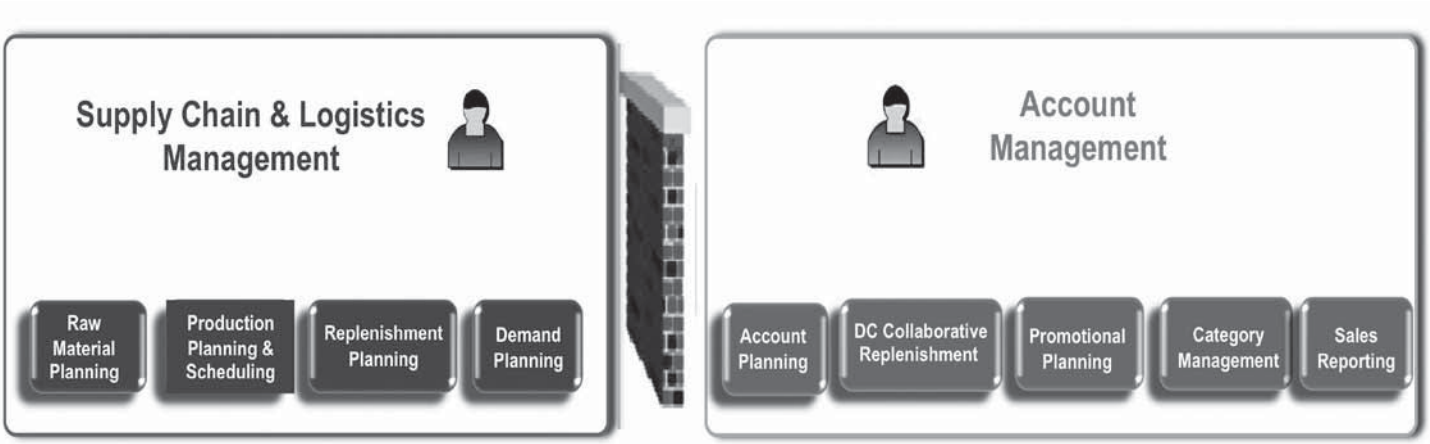
While globalization has resulted in many bottom-line benefits, it has simultaneously increased the level of complexity and uncertainty by which companies operate today, making the sales and operations planning (S&OP) process more critical to a company's success than ever before. Companies now face a host of new business challenges, including increased service level expectations from retailers, shorter product life cycles, and heightened cost

Figure 1 | Linking Supply Chain Leaders with Customers



pressures from global competition. As such, their position in the market is being defined by how quickly they can profitably respond to these challenges.

With this new level of variability, companies must have the ability to synchronize their demand and supply plans to that of their largest customer—especially now when critical-mass retailers have more influence than ever over manufacturing supply chain planning. To achieve this, companies must sense demand signals further down the supply chain and have a process in place to synchronize the executive planning and execution sides of S&OP.

IT'S EASIER SAID THAN DONE

For supply chain leaders, the goal of formally linking customer collaborative processes with corporate S&OP cycles makes sense. However, many companies have struggled to link these processes effectively. Figure 1 highlights a framework that has become all too common for fast-moving consumer goods manufacturers. In it, the boxes to the left of the brick wall highlight some of the key supply chain corporate processes in place today to support key downstream customers, including these:

- Raw Material Planning
- Production Planning and Scheduling
- Replenishment Planning
- Demand Planning

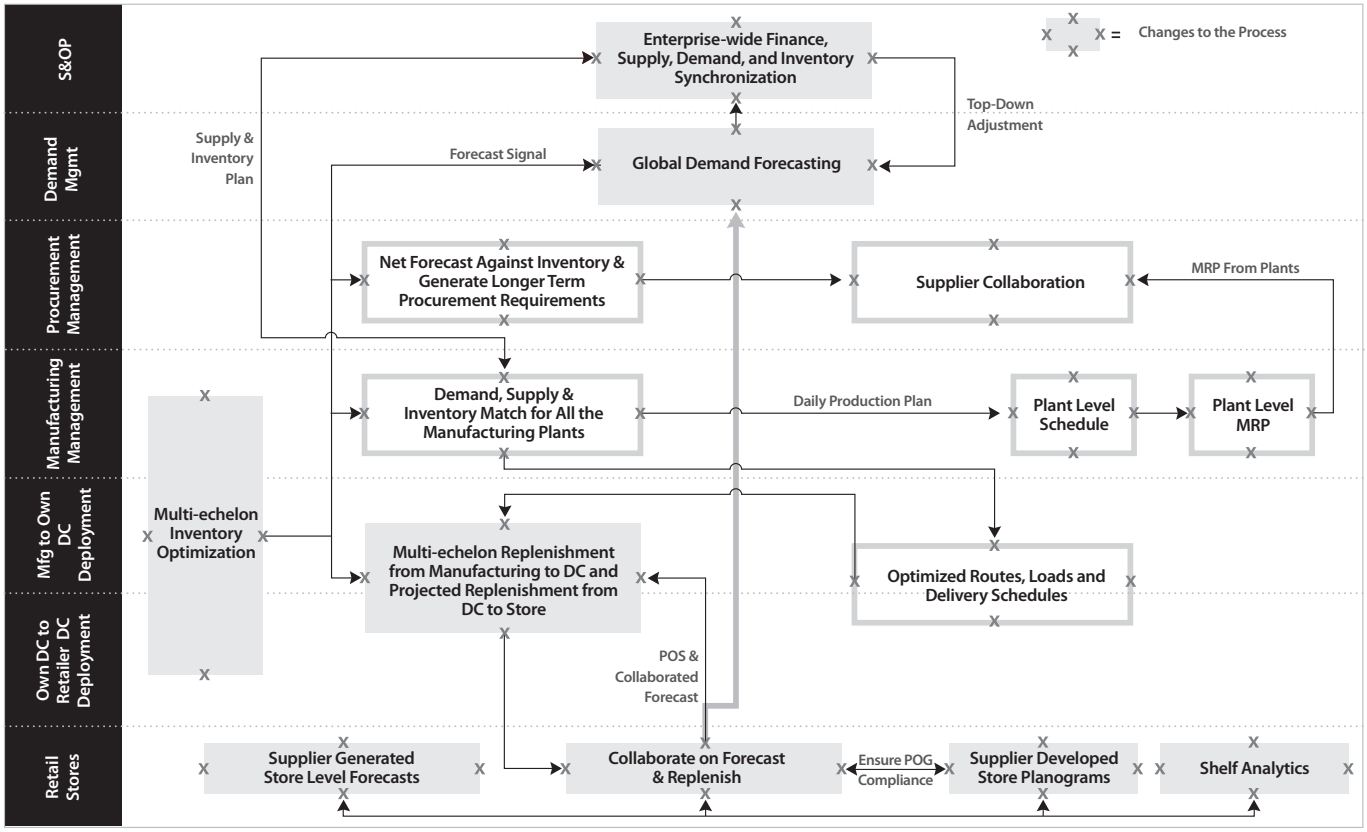
The predominant demand signal driving the above processes for many manufacturers has been shipments out of their distribution centers (DCs) and/or plants or in some cases historical orders on these supply nodes in the network. Improved fill rates or "perfect order" attainment were the primary metrics for success. Manufacturers have created pools of inventory as a buffer against the "bullwhip" of demand to maintain their key targets and have often been caught short when dramatic demand shifts have occurred at the shelf, thereby creating excess inventory and lost sales.

To the right of the "wall" in Figure 1 are the same manufacturer's cross-functional teams that support the sales and service of their products to their critical mass customers. These teams have added significant value in executing Collaborative Planning, Forecasting and Replenishment® (CPFR) activities and vendor managed inventory (VMI) programs to improve sales and coordination. Market consolidation has created an environment where an ever-increasing share of the business is coming from a shrinking list of very large retailers. Some of the key planning processes of these teams include:

- Sales Account Planning
- Collaborative Retailer DC Forecasting and Replenishment
- Promotions Planning
- Category Management
- Sales Reporting

The cross functional retail teams working with the supplier account teams are closest to the consumer demand signal. Determining a way to close the planning and information exchange gaps between these two groups represents a significant opportunity to drive greater revenue at a lower operational cost. Closing the gap requires a fundamental shift in some of the planning processes currently executed by corporate planning departments.

Figure 2 | Shelf-Connected Supply Chain Model



SHELF-CONNECTED SUPPLY CHAIN MODEL

Figure 2 highlights the new process paradigm for the shelf-connected supply chain. The shaded boxes represent some of the largest opportunities for change. Starting at the bottom of Figure 2 with Retail Stores we have the following:

Supplier Generated Store Level Forecast: Manufacturers need to be able to model and forecast demand at their customer's shelf level. Manufacturers with the ability to forecast at the shelf will capture changing trends faster than their shipment-based forecasting counterparts, enabling them to make proactive changes to inventory and production strategies. Moving to a shelf-level forecast capability requires the adoption of technology that can scale to potentially hundreds of millions of SKU/location combinations. This solution must be driven by an exception management framework model that enables a planning staff to effectively capture insights without reviewing every item/location intersection.

Collaboration on Forecasting and Replenishment: Many manufacturers have been caught off guard by a dramatic increase in retail orders or a significant drop off in order levels without an apparent reason for the order shift. After due diligence with the retailer, it often becomes apparent that the root cause is a change in replenishment policy. For instance, changes in service levels, safety-stock settings, lead times, transportation modes, and order parameters can drive large swings in order patterns. Manufacturers need visibility into retail order strategy parameters to better predict future time-phased orders coupled with store-level forecast collaboration to move to a shelf-connected supply chain model.

Supplier Developed Store Planograms: There is a great opportunity to formally bridge and integrate the shelf planning and demand management function within a manufacturer. Often the category management teams and demand forecasting teams operate in

a totally independent manner or are very loosely coupled with informal collaboration. It is common for category management teams to allocate space on the shelf by a historical demand average and some corresponding rule of thumb parameters such as "case pack and a half." As manufacturers transition to retail-shelf driven forecasting, they can apply these time-phased forecasts to the way shelf space is allocated more effectively. In addition, having visibility into a time-phased demand plan can assist retailers and manufacturers with the frequency by which shelf resets should occur for a category. For instance, highly seasonal products and categories may be reset more frequently to avoid stock-outs or excess inventory situations. Measuring demand variability at the shelf can also drive more intelligent space-allocation decisions. For example, items that have the same average demand over time can have very different demand distributions. All other things being equal, products that have stable and continuous demand streams may require fewer facings than items with the same average demand that have highly variable erratic demand patterns.

There has been a significant amount of innovation in the area of shelf-space automation, enabling manufacturers and retailers to develop store-specific planograms based on the unique demand patterns and consumer demographic data found at the store level. Many retailers and manufacturers are moving away from a "one-size-fits-all" or regionally based shelf set to shelf plans and assortments that are optimized by store cluster or individual store. The execution and implementation of a store-level reset can have a dramatic impact on the corresponding time-phased order plans that are executed to the manufacturer. Next-generation software providers have recognized this link and have formally integrated store-level forecasting and replenishment to planogram management and execution. This models the impact that shelf set changes and promotional displays can have on planned order flows.

Shelf Analytics: Many manufacturers have invested in demand signal repositories to leverage the point-of-sale information obtained from their critical mass trading partners. These repositories have helped manufacturers measure the impact of past promotions, monitor distribution of new and existing items, and identify pricing trends and historical out-of-stock situations. Next-generation solutions are moving from a historical perspective of the retail shelf and moving to a predictive future.

Capabilities now exist that enable manufacturers and their retail trading partners to leverage algorithms that focus on the root cause to determine which items are likely to be out of stock in the future. This is a transformational change from the history-based analysis that identifies out of stocks after they have occurred. Some of the most common out-of-stock root cause identifiers include the following:

- Phantom/ghost inventory where perpetual inventory found in the retailer's system is likely to be inaccurate
- Inappropriate ordering parameters
- Inaccurate demand forecasts
- Insufficient shelf-space allocation due to promotions or seasonal demand
- Shelf distribution driven by poor in-store execution

Manufacturers that can identify these out-of-stock situations and dynamically adjust forecasting and replenishment parameters via collaboration with their retail partner will have a competitive advantage over those that do not.

Multi-Echelon Inventory Optimization: By leveraging multi-echelon inventory optimization, companies can improve the accuracy and performance of daily replenishment and inventory planning to drive higher levels of in-stocks with lower inventory across the network. Shelf-connected solutions incorporate scenario management down to the customer level, enabling companies to make strategic, informed decisions that further enhance their inventory control. Multi-echelon solutions look at safety-stock requirements beyond a single node within the supply chain to consider inventory, cash, budget, and service level tradeoffs and how they fit into different strategies that encompass the entire network.

Companies that adopt multi-echelon inventory optimization down to the retail customer can:

- Quickly adapt inventory policies and stocking strategies to address changing market conditions, business objectives, supply chain constraints, customer segmentation, and buying behavior.
- Eliminate excess inventory and reduce obsolescence costs while maintaining customer service levels.
- Develop inventory strategies that maximize the profitability and volume of key materials, components, and products.
- Reduce stock-outs and excess inventory through early warning and performance analysis.

Multi-Echelon Replenishment: Many manufacturers have become frustrated with store-level CPFR programs because they have not been able to integrate the insights from the collaboration back into their supply chain. For many, this was

because they did not have an effective way to translate the store-level forecast into a reliable time-phased order plan. Large-scale retailers are now deploying multi-echelon planning solutions that incorporate the constraints of their network in order to produce a reliable time-phased order plan. These plans incorporate but are not limited to the following:

- Time-phased demand forecasts from the shelf
- Calculating minimums from shelf-set plans
- Shipping and receiving calendars of their stores and DCs
- Required lead times between each of the nodes in their supply chain network—from the suppliers order point to the shelf
- Item case pack and pallet rounding rules
- Transportation minimums and rounding rules
- Safety stock requirements
- Order cycle targets

Manufacturers can create these time-phased plans independently or work with their key trading partners to capture this plan as a replacement to a less reliable order forecast that is based exclusively on historical shipments of a manufacturer shipping DC location.

Global Demand Forecasting: Manufacturers that adopt a shelf-centered point of view map key customer demand forecasts directly into their forecasting hierarchy and take into account the customer's view into their consensus demand planning process. Many manufacturers incorporate customer demand hierarchies today, but the statistical views are often built upon shipment histories versus a shelf-driven demand signal. The shelf-connected model starts with the pull signal from the shelf as the primary input to develop accurate customer time-phased order plans. A time-phased order plan that incorporates the customer-level demand signal is a foundational building block to synchronized enterprise-wide S&OP.

Synchronized Enterprise-Wide S&OP: As shown in Figure 3, the brick wall is removed as a company updates its business processes to the shelf-connected model discussed earlier. A synchronized S&OP process transforms the traditional supply and demand balancing exercise into an integrated business planning process that aligns a company's operational plans with its long-term business strategies and financial objectives. To achieve this level of coordination, companies must establish an integrated planning framework that links S&OP with CPFR initiatives.

Starting at the bottom part of Figure 4, companies have established collaborative trading partner initiatives with their key customers and suppliers to build joint

Figure 3 | Next Generation of S&OP

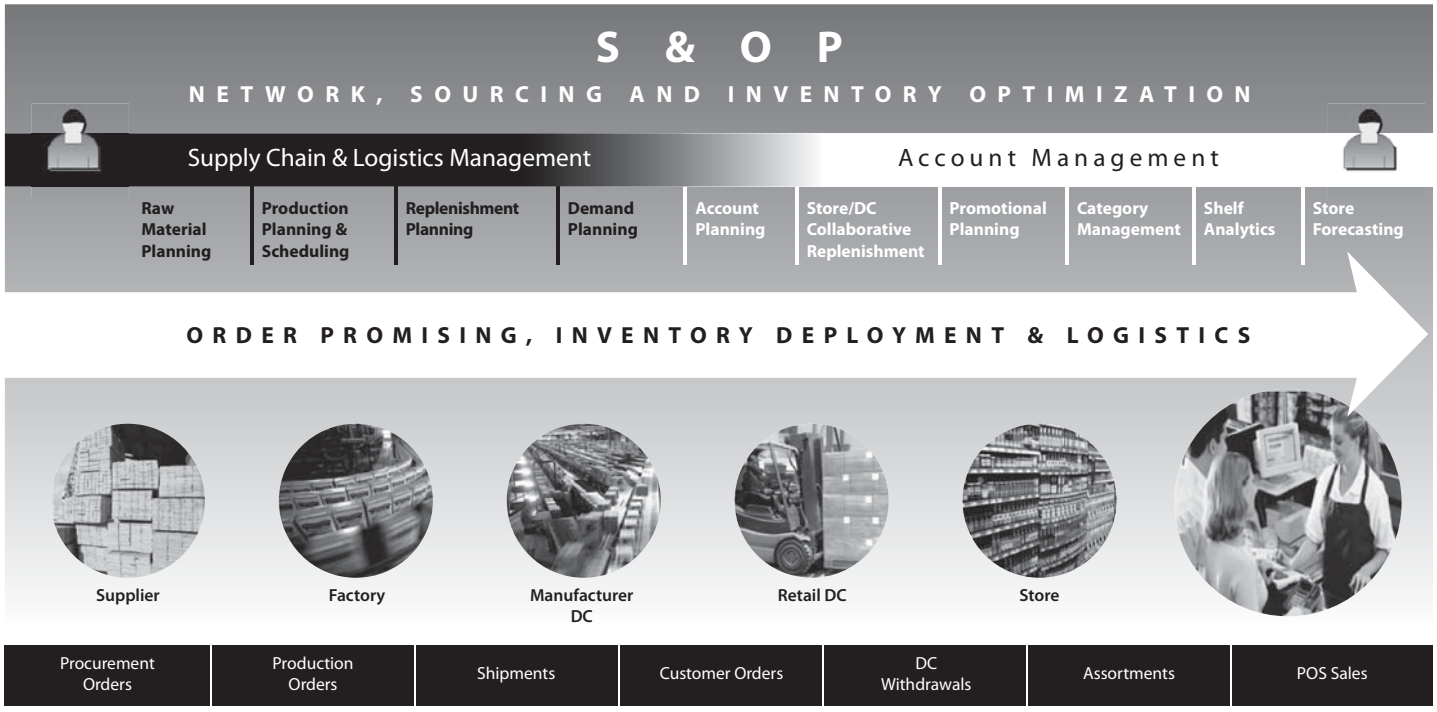
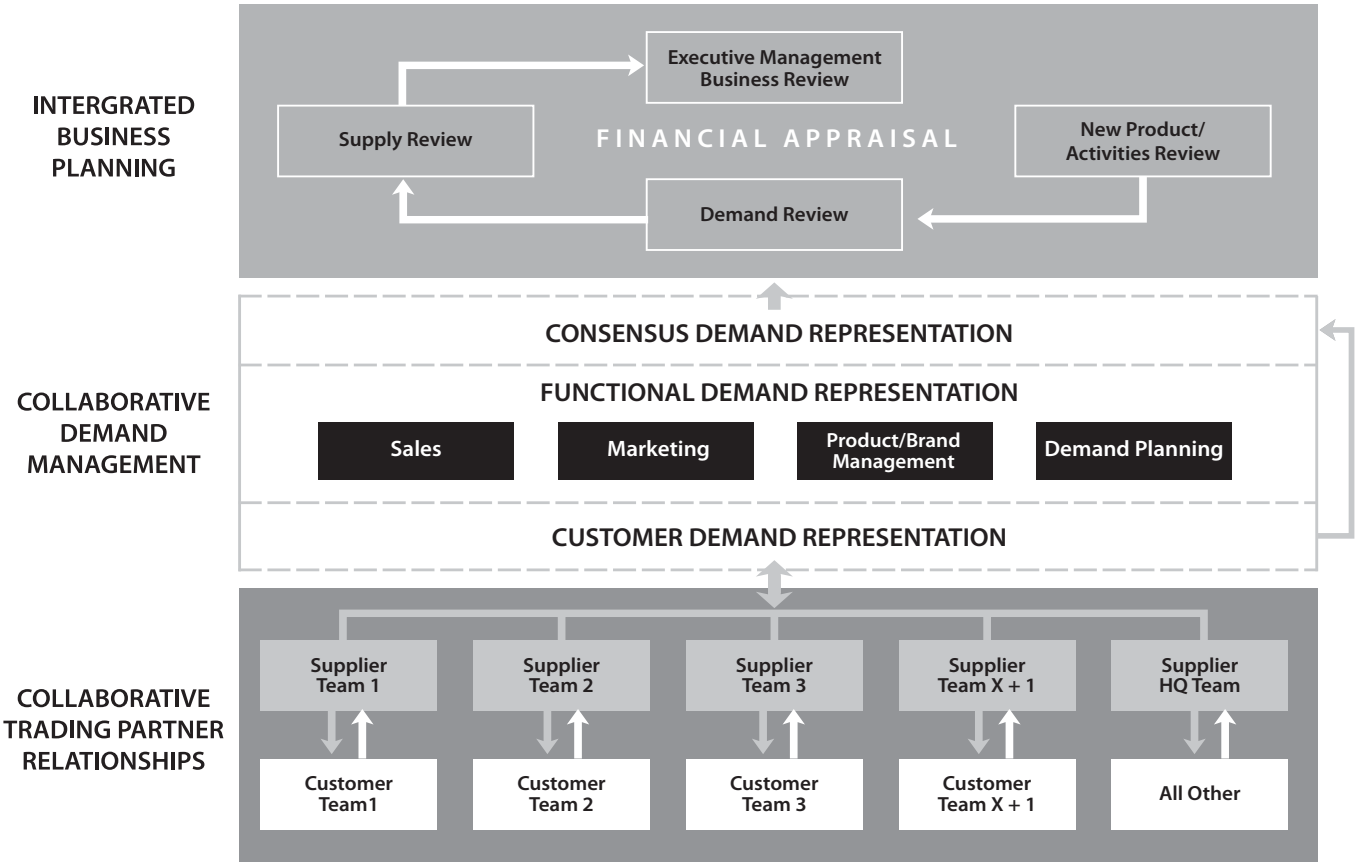


Figure 4 | Intergrated S&OP and CPFR Framework



value by collaborating on forecasts, new products, and replenishment plans. These external insights can improve the collaborative demand planning processes that are internally executed across functions within a company as shown in the second layer of Figure 4—Collaborative Demand Management. After a consensus demand plan is created that incorporates the key insights from customer and supplier relationships, it becomes a key input into the long-range integrated business planning process. This allows a company to synchronize its demand, supply, new product, and financial plans over a time horizon that links to corporate strategy. This time horizon is typically 18 to 24 months or more on a rolling basis (see the top layer in Figure 4).

Recently, significant transformations have occurred in the marketplace that make the connection of S&OP and CPFR more attainable and valuable, including the deployment of time-phased order planning capabilities by many critical-mass retailers. With this new capability, retailers can now provide a view of what they plan to order beyond a single lead time in addition to providing critical-mass demand data from the retailer's shelf or Web portal. This further improves the company's planning process.

Additionally, businesses need the ability to create and evaluate scenarios for demand spikes, supply shortages, and other strategic, operational, and tactical events. This analysis enables companies to examine how different scenarios will affect their financials, thereby helping them to determine the best course of action and enhance the sales and operations plan. Yet, in order for a company to achieve perfect-order fill rates and customer service targets, the sales and operations plan creation must be tied to plan achievement.

To accomplish this, companies must be able to track their daily progress against the sales and operations plan and take corrective actions to resolve any performance gaps or deviations as they occur instead of waiting for the next month's S&OP cycle to modify future plans. As companies sense any gaps in performance—such as demand or mix deviations, supply constraints, or unexpected competitive actions—they must have access to "process playbooks" to improve their response time. Process

playbooks provide companies with the most profitable solution to a particular deviation, automatically escalating deviations not included in the playbooks to the appropriate executive for immediate resolution. By employing this type of continuous improvement process, companies can ensure that they are operating in accordance to plan.

ACHIEVING THE PLANNING-EXECUTION CONNECTION

Despite the various benefits, many companies find it challenging to connect the executive planning and execution sides of S&OP. In fact, a recent AMR Research study found that "few companies claimed linking successfully the S&OP output to operational or execution processes." The study further shows that 30 percent of the companies find driving the use of a plan in daily operations is their biggest challenge.

Technology plays a key role in synchronizing this process. Companies interested in achieving an integrated planning framework that connects execution, operational, tactical, and strategic processes will benefit from a technology solution that features the following.

A Robust S&OP Data Management System: Given the breadth and depth of today's global supply chains, companies have exponentially more data that have to be consolidated into one format that can be easily digested and acted upon. Solutions need a meta-data management layer that features mappings and common data definitions for business unit, product, geography, etc., to help facilitate this process. Plus, with the increase of partners from emerging markets, companies need to be able to consolidate data with varying degrees of sophistication and different time horizons into one cohesive plan.

A Consolidated Business View for All Stakeholders: An effective S&OP process involves input from stakeholders such as finance, product development, procurement, manufacturing, demand and supply planning, and sales and marketing. Yet, each stakeholder needs the ability to view the time-phased plan in the language and hierarchy level respective to that individual's role in the organization. For instance, a production planner may only need visibility into family-level demand on a key resource within his plant, whereas a senior-level executive may want an aggregated financial view of how the plan is operating against budget and whether the company is on track to achieve its long-term objectives.

Visibility into All Supply Chain Functions: Businesses need insight into company-wide supply chain planning activities, as well as the plans of their supply chain partners. This level of visibility is critical for companies initiating demand-shaping activities as they need visibility into the extended supply chain network to ensure planned promotions won't strip away their capacity to make the product. This visibility will become even more critical as the economy recovers, enabling companies to divert sources of supply to higher-margin markets in order to boost the company's overall margins.

Automated Workflow Synchronization: Within the S&OP process, there's a cadence and order to the activities that must occur and a level of coordination required among stakeholders. As companies deploy an integrated S&OP framework, the number of steps and coordination of activities across these functions and resources will increase. By using automated workflows and alert mechanisms, critical decisions can be elevated to the appropriate stakeholders, ensuring that the company continues to achieve its goals and objectives by operating according to plan.

IT'S THE JOURNEY, NOT THE DESTINATION

A company's need for an S&OP process that closes the planning-execution gap will be determined primarily by the industry in which it operates. Not all stages of the S&OP maturity model, however, will apply to each industry (Figure 5). For example, companies in the consumer electronics industry are constrained by increasingly short product life cycles. Consequently, execution to plan has become a condition for market survival, prompting those in the consumer electronics industry to move toward the highest levels of S&OP synchronization.

On the other hand, industrial manufacturers, business-to-business manufacturers, and companies with slower-moving consumer goods can achieve great gains through modest S&OP improvements such as enhanced process orchestration and synchronization with finance. Ultimately, the closer a company is to the end consumer, the more important it is for them to understand the demand stream and harness that knowledge to create an integrated S&OP process that satisfies the company's business objectives and bottom line. *(info@ibf.org)*

Figure 5 | **Synchronized S&OP Maturity Model**

Characteristics	Consensus Demand Management	Supply-Demand Balancing	Integrated Business Planning (IBP)	Inter-Enterprise IBP
Strategy for Operations Synchronization	Disconnected	Disconnected	Connected Within Company	Connected Within Company & Key Trading Partners
Organizational Functions Involved	Demand, Sales (Planners)	Demand/Sales/Mfg (Directors)	Demand/Sales/Mfg/Finance (Senior Execs)	Demand/Sales/Mfg/Finance (Senior Execs - Connected Across Companies)
Financial Integration	None	None	Tightly Coupled	Tightly Coupled, Trading Partner Influenced
Cross-Functional Process Facilitation	Limited	Demand - Supply	Workflow Automation, Qualitative Continuous Improvement	Inter-Company Process Orchestration With Qualitative Continuous Improvement
Enterprises	Single	Single	Single	Multiple With Accountability
What-If Scenario Analysis	Volume-Driven	Volume-Driven	Financially Driven	Financially Driven, Multi-Company Orientation
Ownership	Sales/Demand Management	Supply Chain	Senior Leadership	Connected Senior Leadership
Functional Requirements	Forecasting & Internal Collaboration ✚	Rough-Cut Capacity Planning ✚	Capacity Optimization, Process Calendars, Simulation, Time-Phased Financial Statements, Process Scoring, Dashboards, Executive Visualization ✚	IBP Functionality Modeled for Multi-Enterprise Review
Metrics	Fast Accuracy Fill Rate	Fill Rate, On-Time Delivery, Turns	Revenue, Cost, Market Share, Profitability, Cash Flow	Revenue, Cost, Market Share, Profitability, Cash Flow