A holistic and transformative approach: demand-driven planning and forecasting

Advancing technologies are making it possible to generate new insights into consumer behavior, effectively changing the way consumer products and retail (CPR) companies conduct planning, and making real the possibility of demand-driven supply chains. Combining the application of cutting-edge technologies with data, analytics and process knowledge, demand-driven planning and forecasting allows organizations to sense demand signals, shape consumer demand and change the demand management game of play.

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DDP&F senses market changes five times faster and aligns value networks to changes in demand three times quicker than other approaches.

Source: C. W. Chase, *Next Generation Demand Management: People, Process, Analytics, and Technology.*

I n our digital world, traditional business models in the consumer products and retail (CPR) sector are increasingly challenged by many disruptive forces. Companies experience growing pressure to adapt to key trends in the market (see Figure 1). The ubiquity of the internet and availability of information at consumers' fingertips result in higher expectations for a seamless, omnichannel and customized experience. While organizations attempt to become more digitally savvy and conduct business with customers in new ways, they face three major challenges: limited growth, evolving consumer behavior and rising costs:

▶ **Limited growth across the globe:** In mature markets where consumer confidence is low, limited volume growth drives the use of more promotions and innovations to maintain sales and stimulate growth. The subsequent rise in sales volatility escalates costs and instability. Similarly, companies encounter challenging opportunities in emerging markets. The abundance of diverse, volatile markets with strong, native preferences mandates product variety and localization, thereby increasing complexity in the supply chain.

▶ **Evolving consumer behavior:** With digital technologies shifting control to the consumer, companies must rethink product, package design, marketing and fulfillment to keep up with customers' higher expectations. The proliferation of distribution channels results in consumers demanding availability at any time and any place, and retailers requiring higher service levels that drive up costs and complexity in routes

to market. In turn, the commercial function must align with supply chain, marketing and finance to balance profitability drivers with true demand.

▶ **Rising costs:** Competition from new players and new channels is changing marketplace dynamics. Consumers can now shop anywhere and at any time with limited brand and product loyalty. In response to shifting buying patterns, companies must have clearly segmented product and delivery offerings. Costs of goods sold are volatile, rising and difficult to hedge across commodities, labor and energy, generating more external cost pressures. Internally, excess capacity decreases efficiency, and margin leakage throughout the value chain erodes cost savings programs.

Demand planning plays a pivotal role in this challenging environment. Eighty-five percent of CPR companies believe it is growing in importance and 61% of best-in-class organizations cite it as a gamechanging capability.[1] The traditional method of baselining future demand on historical data no longer offers a competitive edge. Companies need a planning approach that addresses sales and marketing concerns such as market share and service level. To transform their supply chains into dynamic response networks, businesses must capitalize on demand-driven planning and forecasting (DDP&F).

Figure 1. Key challenges and trends in the CPR market
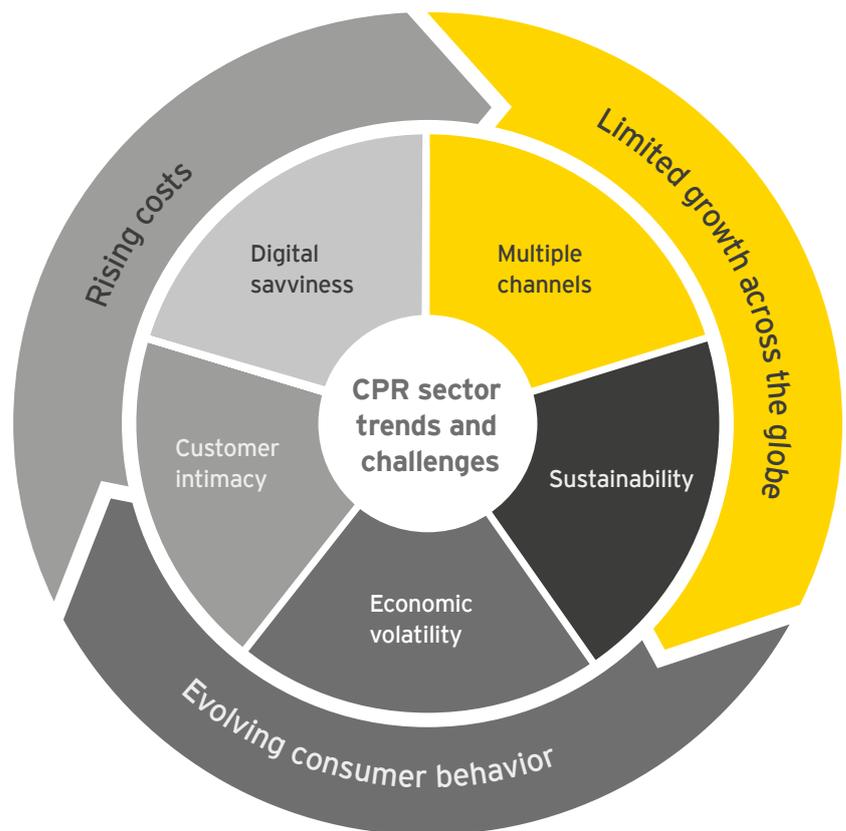
1. N. Castellina, *Integrated Planning for Consumer Products: A Centralized Approach to Demand, Supply Chain, and Operations Planning,* Research Report. Aberdeen Group, April 2016.

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The expedited prediction of and alignment with real-time demand results in: better customer service, substantial reductions in inventory and waste and improved working capital.

Source: *C. W. Chase, Next Generation Demand Management: People, Process, Analytics, and Technology.*

What is DDP&F?

DDP&F uses the latest technologies to execute on three crucial activities:

► Demand forecasting: This involves the use of advanced statistical models to generate a specific forecast by unit in stock (SKU) or demand forecast unit from the latest data available within and outside the organization. Demand forecasting leverages information, such as past sales data, past promotional activities and advertisements, pricing changes, weather forecasts, competitor pricing and channel inventory.

► Demand planning: This incorporates the use of the aforementioned statistical forecast to develop what-if analyses around the demand drivers, sales and marketing tactics, their respective costs and the resulting profitability generated by the predicted revenue

rather than an "inside-out" perspective (i.e., "What products do we want to sell"). DDP&F takes the hard labor and guesswork out of forecasting, leaving human intelligence free to concentrate on the more value-adding aspects of planning and portfolio development.

Rather than basing forecasts on demand planners' judgement, simple baseline statistics and sales history, DDP&F provides an informed estimate of market demand by integrating all necessary demand drivers into a comprehensive predictive model. Besides having demand planners handle any remaining unexplained drivers on an exceptions basis to produce the best judgement for the organization, sales and marketing are also key, integral parts of this exercise. The combination of data, analytics, technology and domain expertise allows the process to continuously fine-tune forecasts based on key assumptions and offers precise insights on the right mix of target customers, products, channels and geographic segments.

uplift. Demand planning is performed by the demand planner, with sales and marketing planners, to produce a consensus forecast that will function as the basis for further supply chain planning activity.

► Demand sensing: the use of short-term downstream data to understand customer demand by capturing demand signals at the most disaggregated levels. Demand sensing also includes the use of forecasting methods to predict near real-time information based on the current market reality.

While traditional planning is reactive, DDP&F is proactive, flexible and decision-making oriented. With it, companies can sense market changes five times faster and respond to them three times quicker.[2] It assumes a collaborative, predictive, connected and "outside-in" focus (i.e., "What are consumers buying from us")

2. C. W. Chase, *Next Generation Demand Management: People, Process, Analytics, and Technology,* Wiley and SAS Business Series. Hoboken, NJ: John Wiley & Sons, 2016.

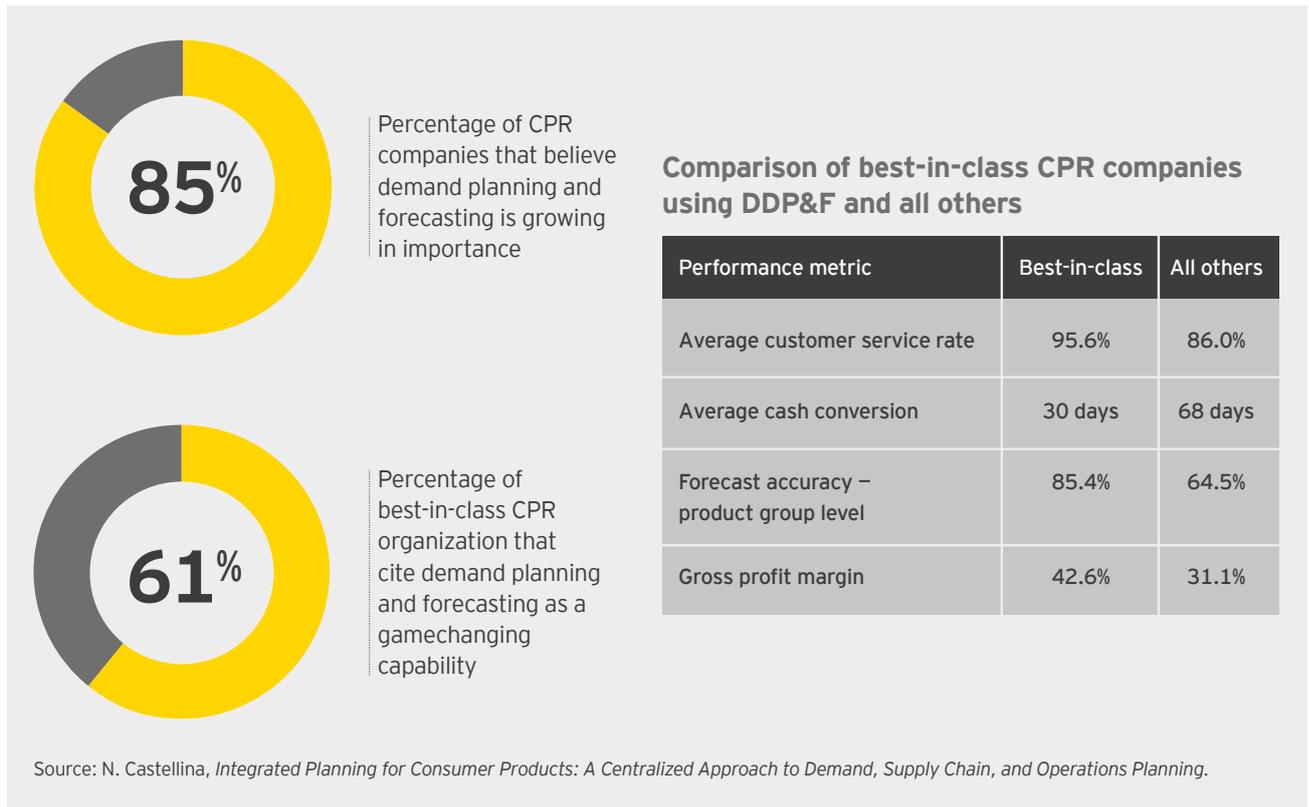A holistic and transformative approach: demand-driven planning and forecasting

The key to optimizing
advancing technologies and
strengthening the DDP&F
process lies in culture
and change management.

DDP&F reduces forecast deviations, increases revenue and margins, and stimulates productivity for more effective upstream planning. It enhances collaboration through better understanding of different modeled market activities' profitability drivers, tighter budget controls (especially around the trade investment budget), and improved strategic and tactical resource allocation across brands and products. Internal and external stakeholders become more aligned, driving quality relationships, better customer service and stronger network integration. DDP&F also substantially reduces inventory on hand and
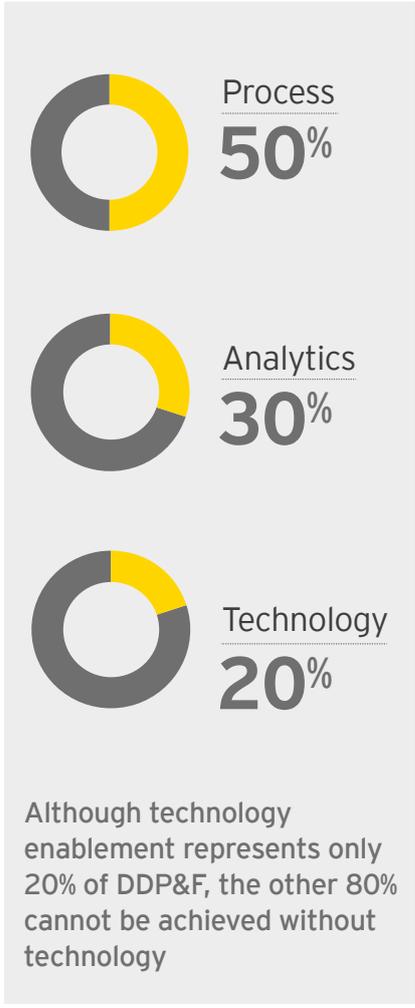
Figure 2. Impacts of DDP&F

85% — Percentage of CPR companies that believe demand planning and forecasting is growing in importance

61% — Percentage of best-in-class CPR organization that cite demand planning and forecasting as a gamechanging capability

Comparison of best-in-class CPR companies using DDP&F and all others

Performance metric	Best-in-class	All others
Average customer service rate	95.6%	86.0%
Average cash conversion	30 days	68 days
Forecast accuracy – product group level	85.4%	64.5%
Gross profit margin	42.6%	31.1%

Source: N. Castellina, *Integrated Planning for Consumer Products: A Centralized Approach to Demand, Supply Chain, and Operations Planning.*

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> While traditional forecasting is supply-driven and reactive, DDP&F is proactive, flexible and decision-making oriented.

waste, thereby increasing working capital. It leads to higher market share, better returns on marketing and promotional investments, and improved service levels. The impacts observed are significant, with average 10% increases in customer service ratings, 56% reductions in cash conversion cycles, 21% improved forecast accuracy and 12% growth in gross profit margins (see Figure 2).[3]

How to implement DDP&F

DDP&F comprises 50% process knowledge, 30% analytics and 20% technology combined with indispensable people and cultural components.[4] Although technology accounts for a small portion of the overall equation, it is vital in enabling the remaining 80%. Selecting the right software and infrastructure, building proofs of concepts to test viable options and adopting advanced analytics are crucial in collecting and synthesizing information that impacts demand planning. Cross-functional

Process
50%

Analytics
30%

Technology
20%

Although technology enablement represents only 20% of DDP&F, the other 80% cannot be achieved without technology

collaboration must occur among the sales, marketing and planning functions, while the supply chain and commercial strategies must closely align, with operations and finance working hand in hand.

Best-in-class CPR companies often implement an integrated supply chain operating model that optimizes information flow within the network and proactively manages risk. They redefine their visions to accommodate an evolving demand management model and make performance management a cornerstone of the enterprise. From a process standpoint, leading organizations redesign their demand management process to implement demand sensing, shaping and monitoring, and embed KPIs, such as forecast value added (FVA) and bias, data analysis and reports into the decision-making process. To achieve integration between business functions, they implement automated, collaborative workflows, redefine roles and responsibilities, develop people competencies, and structure centers of excellence around demand management and predictive analytics (see Figure 3).

Emerging trends and the future of demand planning

The advent of technological advancements have great implications for the future of demand management. Emerging technologies facilitating DDP&F include big data, predictive analytics, advanced statistical modeling and digital technologies.

3. N. Castellina, *Integrated Planning for Consumer Products: A Centralized Approach to Demand, Supply Chain, and Operations Planning,* Research Report. Aberdeen Group, April 2016.

4. C. W. Chase, *Next Generation Demand Management: People, Process, Analytics, and Technology,* Wiley and SAS Business Series. Hoboken, NJ: John Wiley & Sons, 2016.

Figure 3. Key attributes of best-in-class DDP&F practices

It is worth noting the following themes which we recommend are addressed when considering demand management:
- Embedding demand planning and working collaboratively with sales and marketing functions is on the increase.
- Aligning commercial strategy with supply chain has become a top priority.

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▶ Big data: The availability of large data sets hosted on tools, such as Hadoop, allow for the pooling of all incremental downstream data impacting demand. Typical examples include point-of-sales data, stock situations at individual warehouses, delivery requests by retailers, weather and social media trends by products and brands.

Real-time data and the ability to collate information from all enterprise data sources improve CPR companies' short-term predictions and empower demand sensing capabilities. The actual profundity of big data lies in its mining and conversion of copious raw data into usable information that can help organizations make better decisions. The results are significant. Better forecasting accuracy can allow companies to reduce finished goods inventory, become more agile in responding to unpredictable demand changes, capture upside revenues and working capital and make more informed decisions. Better understanding of the demand levers can also allow companies to capture customer behavior changes better, adapt promotions faster and respond quicker to avoid losing market share.

▶ Predictive analytics: DDP&F systems use advanced analytics to monitor incoming signals for any kind of deviations, interpret them and develop an appropriate response. Pattern recognition and machine learning help identify repetitions and correlations, and predict demand spikes and troughs. Using these insights, warehouse management systems can predict orders customers place for distribution centers, selectively bring these products to the front ahead of time and drastically reduce response time.

▶ Advanced statistical modeling: Models such as dynamic regression, autoregressive integrated moving average and consumption-based modeling using multi-tier causal analysis are more accurate in explaining variance

in demand patterns. Using these models, organizations can increase or decrease volumes and profit of goods sold. They can also change sales, product and marketing tactics and strategies and verify capacity constraints.

The results are appropriate presentation and response to signals through alarms, alerts, standard reports and ad hoc reports that allow management to capture additional upstream value and lead to longer-term supply chain synchronization.

► Digital technologies: Digital technologies, such as robotics process automation (RPA), artificial intelligence (AI) and the cloud allow businesses to move increasingly toward "autonomous value chains" that provide end-to-end synchronization, and enable smart business and operations planning. Robots can perform much of the data gathering and data feed processes for DDP&F, making it faster and more affordable. Advanced warning systems monitor issues and allow companies to synchronize across their value chains to keep planning systems properly tuned.

Integration of cloud-based tools into an exceptions-based planning process enables smart business and operations planning that tests scenarios live before committing plans to production. Coupled with AI and RPA, these advancements culminate in lights-out planning that dramatically reduces the proportion of SKUs needing intervention and manual planning effort.

The key to optimizing advancing technologies and strengthening the DDP&F process lies in culture and change management. Collaborative planning and a holistic, integrated approach across finance, operations, sales and marketing are crucial for success. From the top down, management must provide a cohesive strategic direction toward common goals across functions and be flexible in adapting that direction to market intelligence. Externally, CPR companies must actively partner with their customers and suppliers. By aligning with customers, they can collect copious data on consumer behavior and buying patterns, understand demand for each brand in each market and plan and adjust forecasted figures accordingly. On the supplier front, synchronizing demand and supply plans on a rolling, monthly basis allows for more accurate source, transport, inventory and production planning. These actions result in a "single point of truth" integrated across the strategic, business and financial plans at varying levels of granularity, and foster trust and buy-in from stakeholders across the entire supply chain.

Conclusion

Despite the evolution of demand management and the development of the DDP&F model, challenges still lie ahead for companies in the CPR industry. Many organizations struggle with how to analyze and make practical use of the mass of data being collected and stored, while others struggle to understand how to synchronize and share external information with internal data across their technology

architectures. These companies are looking for enterprise-wide solutions that provide actionable insights to make better demand-driven decisions and improve corporate performance through better intelligence (see Figure 4).[5]
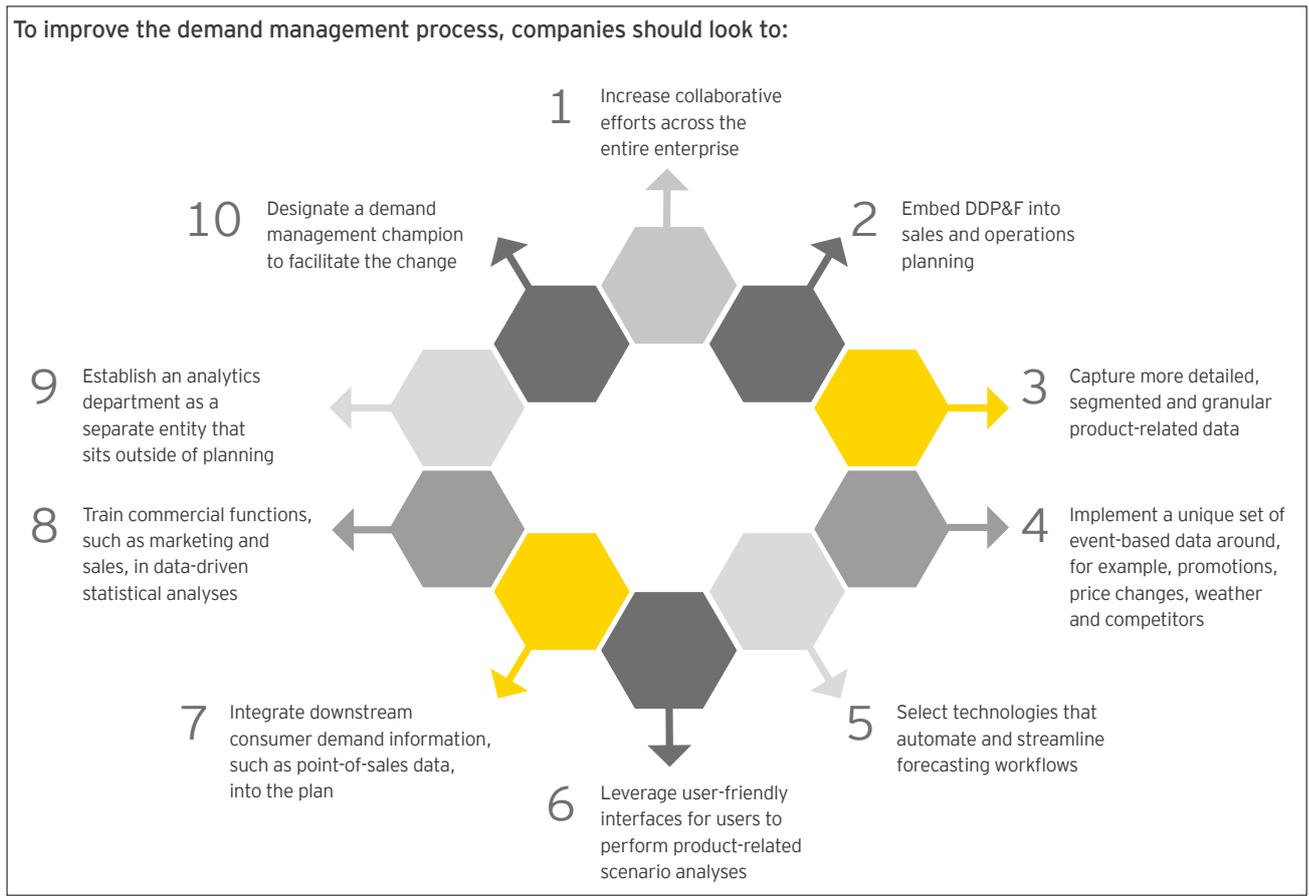
The first step on the road to success is to evaluate the maturity of your organization's demand planning function across multiple dimensions (see Figure 5). Communication and effective change management, enabled by collaborative workflows designed to create a consensus demand plan, are also key in breaking down silos and integrating people, culture and process. An internal demand champion plays the indispensable role of influencing the organization in accepting the new process, and metrics must reflect a focus on customer value rather than supply operations.

Moreover, operations must move beyond execution excellence to include the ability to transform demand signals into profitable and agile supply responses. The right technologies must be in place to transcend supporting transactions, enabling robust analytics and collaborative relationships. With the plethora of demand planning technologies in the market today, CPR companies must choose a single effective and overarching solution with components that improve the impact of DDP&F in support of vertical integration and integrated business planning. The future is open source and data driven, and companies are striving to be at the helm through technology enablement.

5.   C. W. Chase, *Next Generation Demand Management: People, Process, Analytics, and Technology,* Wiley and SAS Business Series. Hoboken, NJ: John Wiley & Sons, 2016.

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Figure 4. How to improve the demand management process

To improve the demand management process, companies should look to:

1 Increase collaborative efforts across the entire enterprise

2 Embed DDP&F into sales and operations planning

3 Capture more detailed, segmented and granular product-related data

4 Implement a unique set of event-based data around, for example, promotions, price changes, weather and competitors

5 Select technologies that automate and streamline forecasting workflows

6 Leverage user-friendly interfaces for users to perform product-related scenario analyses

7 Integrate downstream consumer demand information, such as point-of-sales data, into the plan

8 Train commercial functions, such as marketing and sales, in data-driven statistical analyses

9 Establish an analytics department as a separate entity that sits outside of planning

10 Designate a demand management champion to facilitate the change

To enhance sustainability, CPR companies must also measure ongoing success. The measurement of any process indicates the process members' strong commitment to it, and demand management is no exception. Strong demand management can enhance the business planning process by providing an environment that incorporates statistical methodologies, dashboard capabilities and workflows. Leading companies also measure demand planner FVA with standard error and bias.

The end result of DDP&F can be a business that is more closely linked to the market and pull-driven with the ability to position inventory correctly, react swiftly to real consumption levels and reinforce the success of its strategy. ∎

Figure 5. Demand planning function maturity matrix

	Stage 1 Informal	Stage 2 Reactive	Stage 3 Standard	Stage 4 Advanced	Stage 5 Proactive
Meetings and collaboration	► Consensus demand plan is used. ► No meetings ► No collaboration	► Discussed at top-level management meetings ► Focus is on financial goals.	► Staff pre-meetings happen. ► Executive S&OP meetings take place. ► Some supplier and customer data exists.	► Supplier and customer data is incorporated. ► Suppliers and customers participate in parts of meetings.	► Event-driven meetings supersede scheduled meetings. ► Real-time access to external data
Organization	► No S&OP organization	► No formal S&OP function exists. ► Components of S&OP are in place.	► S&OP function is part of another role, e.g., product manager or supply chain manager.	► Formal S&OP team exists. ► Executive participation happens.	► S&OP is understood, organization-wide, as a tool for optimizing company profit.
Measurements	► No measurements	► Measurement of how well operations meet the sales plan	► Stage 2 measurement takes place. ► In addition, measurement of forecast accuracy against actual sales	► Stage 3 measurement takes place. ► In addition, measurement of new products ► Measurement of S&OP effectiveness	► Stage 4 measurement takes place. ► In addition, measurement of company profitability
Information technology	► Individual managers keep their own spreadsheets. ► No consolidation of information ► Short-term forecasting is largely manual.	► Numerous spreadsheets exist. ► Some consolidation takes place, but done manually. ► Standard statistical forecasting happens and user override for short-term forecasts.	► Information is centralized. ► Revenue or operations planning software is used. ► More sophisticated statistical models are used and a rudimentary homegrown tool is used for short-term forecasts.	► Batch processes happen. ► Revenue and operations optimization software is used that links to ERP, but they are not jointly optimized. ► S&OP workbench exists. ► DDP&F tools used	► S&OP optimization software is fully integrated. ► Full interface with ERP, accounting and forecasting ► Real-time solver is used. ► DDP&F is used with multiple data sources, including retail sales out, stock, shipments and weather.
S&OP integration	► No formal planning ► Operations attempts to meet incoming orders	► Sales plan drives operations. ► Top-down process is used. ► Capacity utilization dynamics are ignored.	► Some plan integration takes place. ► Sequential process is used in one direction only – tempered by business goals.	► Plans are highly integrated. ► Concurrent and collaborative process is used. ► Constraints are applied in both directions.	► Plans are integrated seamlessly. ► Process focuses on profit optimization for the whole company.