

Process Chemical Supply Chain Planning: Finding the Perfect Formula

WHITE PAPER

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Seven strategic components for a proactive process chemical supply chain

Executive Summary

For process chemical companies in a world of rising customer expectations, global competition and increasing costs for ingredients and labor, an effective supply chain is critical to both service levels and top-line results. However, supply chain teams that rely on a jumble of spreadsheets, enterprise resource planning (ERP) systems, and antiquated supply chain applications risk failure. Keeping data in many different places and systems limits visibility and creates silos where planners, schedulers, operations managers and business leaders interact with different information and develop different plans to manage the supply chain.

A scalable and integrated supply chain planning platform is necessary to ensure the team has an accurate view of supply chain issues and can respond to events and market opportunities. Key requirements include the ability to:

1. Create accurate demand forecasts by ingredient, formula, location, customer, group and/or product
2. Develop optimized multi-plant schedules that consider a variety of capacity constraints
3. Optimize multi-mode shipments to control costs and meet customer requirements
4. Optimize the deployment of inventory across channels and distribution echelons to reduce inventory and lost tonnage
5. Conduct multi-scenario analysis to ensure a robust integrated business planning process leading to an optimal strategy
6. Develop optimal enterprise-wide plans to effectively manage a complex supply chain
7. Provide visual metrics and advanced analytics for a comprehensive and integrated view of supply chain performance

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Accurate Demand Forecasts

Why It's Strategic: Accurate demand forecasts lay the foundation for an effective supply chain. Chemical manufacturers faced with shrinking margins cannot afford to put the wrong product in the wrong location at the wrong time. While it is true that demand forecasts are never 100% accurate, a chemical manufacturer must rely on forecasts because raw ingredient acquisition and manufacturing lead times are usually longer than order lead-times. A major goal of a supply chain team is to minimize forecast error and increase predictability. With greater predictability, everything runs smoother at less cost. Time-phased finished goods forecasting allows a company to work from one "shared version of the truth" and develop purchase and manufacturing plans with confidence.

Best Practice Guidance: Demand planning software applies science to deliver predictions that approximate actual demand. Leading planning organizations strive for a multi-layered approach that employs a variety of statistical models in an unbiased way to analyze the many factors that influence demand for products in the marketplace over time.

Logility Advantage: Logility Voyager Demand Planning™ is a comprehensive forecasting solution that can automatically change forecast methods during a product's life cycle to maintain maximum accuracy from launch to end-of-life. It offers capabilities far beyond those available from spreadsheets and ERP systems, and can be the centerpiece of any planning technology platform.

Value: No other aspect of supply chain optimization has greater impact on business profitability. Providing the best forecast requires capturing demand signals close to the source and accurately predicting future demand with enough lead time and confidence to ensure maximum sales and operations performance at minimum inventory cost. Studies by the Aberdeen Group have shown that advanced demand planning solutions improve forecast accuracy by an average of 13%, delivering a 5% improvement in gross margin.

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— Aberdeen Group

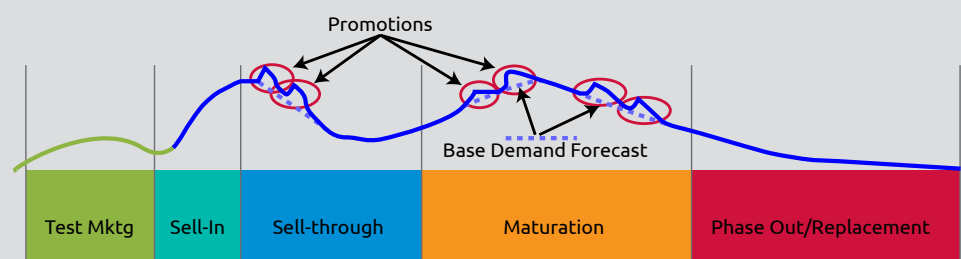


Figure 1. Forecasting across a product's life cycle

Optimal Multi-plant Scheduling

Why It's Strategic: Chemical production facilities are pressed by market demand for greater product variety and value-added specialty chemicals. Shifting to production lines that are more flexible helps produce a greater variety of products more efficiently, but global expansion adds the complexity of multi-plant scheduling, where the same products can be produced in multiple plants.

Best Practice Guidance: Multi-plant operations require two levels of production planning:

- Tactical, in which aggregated levels of production quantities are assigned to production sites based on expected demand and known capacities.
- Detailed, in which batch processes are planned and plants are scheduled to meet customer orders.

Integrating tactical and detailed scheduling poses significant challenges but also provides the greatest payoff, in the form of system-wide efficiencies and customer responsiveness.

Logility Advantage: Logility's supply optimization solutions allow your team to create optimal production plans while adhering to resource constraints that can lead to reductions in manufacturing planning time by as much as 75%. Logility models true least-cost, least-change manufacturing and optimal inventory limits, creating long-range capacity plans, tactical master production schedules and work center schedules at individual plants while providing visibility across all facilities. Managers can visualize a minute-by-minute schedule for a single production line and facilitate plant-to-plant scheduling that keeps multiple facilities working toward common corporate objectives.

Value: Powerful, constraint-based techniques help planners take into account the impact of multiple production, supply and personnel constraints while creating achievable plans that leverage production network assets. Anticipating problems and evaluating alternatives leads to more realistic, constraint-based schedules and capacity plans. Visual tools pinpoint capacity and material exceptions, while powerful "what-if" simulations help identify and execute the best plan going forward.

Realistic constraint-based schedules and capacity planning tools can help reduce manufacturing planning time by as much as 75%.

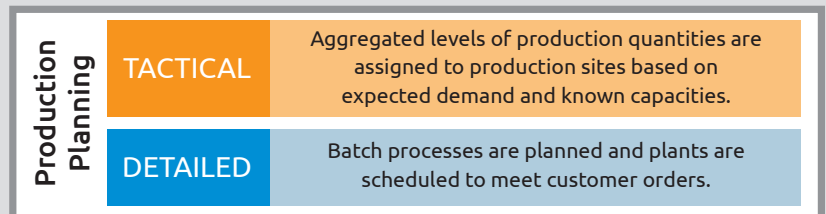


Figure 2. Two levels of production planning

Multi-mode Freight Optimization

Why It's Strategic: Bulk shipping requirements and rising customer delivery expectations challenge process chemical companies to meet customer demands for value-added services and lower prices. Transportation costs may account for 4%-8% of sales and 40%-60% of total logistics expenditure.

Best Practice Guidance: When dealing with bulk quantities, optimized distribution plans reduce product handling and ensure that inventory is available at the right place and time. A best-of-breed transportation management system can increase perfect orders through multi-mode freight optimization. Single step optimization of multi-modal shipments and carrier selection leads to the most cost effective transportation plan. Single step optimization enables the best possible carrier decisions while considering constraints such as rates, equipment availability, dynamic pooling, carrier performance and more.

Logility Advantage: Logility Voyager Transportation Planning and Management™ offers one-step multi-mode planning and optimization as part of a spectrum of advanced optimization and automation capabilities. Optimized transportation planning from Logility can drive as much as 20% in freight savings including 5% improvement in load consolidation, 4%-8% reduction in inbound freight costs, and 6% improvement in outbound freight costs.

Value: One specialty chemical company used Logility's transportation management system to offer its preferred customers single-day service, while maintaining the two-day service promise to the rest of its customers. The company was able to reduce the number of regional warehouses by 80% in favor of one mega-distribution center that was geographically close to its primary market. Ultimately, the company increased market share 10% in its target market while removing significant costs from its distribution networks.

High-levels of customer service require regional manufacturing locations and/or faster, more expensive transportation.

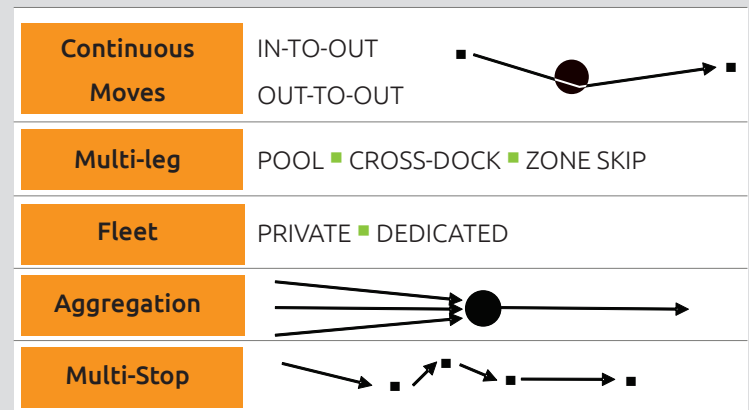


Figure 3. Multi-mode freight optimization

Multi-echelon Inventory Optimization

Why It's Strategic: Eliminating the cost impact of excess inventory is a priority for many process and chemical supply chains. To support this goal, leading companies are automating the application of optimized inventory management policies across global locations.

Best Practice Guidance: Effective inventory reductions are best achieved by synchronizing demand forecasts, inventory quantities, and supply throughout the extended enterprise. It is essential to develop time-phased inventory policies and optimized replenishment plans for each item at each location. Multi-echelon inventory optimization (MEIO) considers all usable inventory across the supply chain and determines the most efficient amount and positioning of buffer stock to meet customer service goals while minimizing cost. MEIO transforms inventory into a lever for balancing supply and demand.

Logility Advantage: Logility Voyager Inventory Optimization™ models inventory network-wide and determines the optimal strategic policies and tactical targets for driving powerful financial benefits throughout manufacturing and distribution networks.

Value: Companies leveraging Logility Voyager Solutions™ have discovered that right-sizing inventory buffers and restructuring where and how inventory is held can reduce inventory by 10%-30% without compromising service levels. Logility frees up the cost of capital that would otherwise be trapped in inventory, reduces logistics costs associated with that inventory (warehousing, insurance, labor, etc.), reduces write-offs of obsolete inventory, and minimizes shortages and stock-outs that cause fulfillment delays and cancelled orders.

Multi-echelon inventory optimization discovers the causes, amounts, and locations of existing inventory and replaces rules of thumb with science in planning where and how much buffer stock to hold.

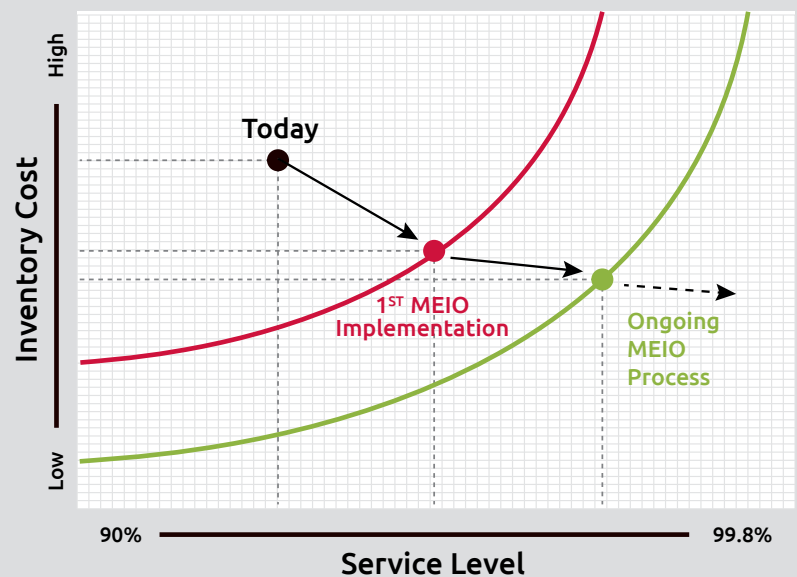


Figure 4. MEIO considers demand variability and supply reliability to determine inventory investments required to achieve service goals

Integrated Business Planning

Why It's Strategic: In the process chemical industry, it's extremely challenging to align supply capacity to variable demand for thousands of items, while meeting corporate objectives. Many chemical companies have demanding customers and run on razor-thin margins. The potency of ingredients changes over time. Shelf lives are limited for both components and finished goods. Market share is won or lost based on how well a company predicts and reacts to market shifts. Integrated business planning (IBP) can mean the difference between success and failure.

Best Practice Guidance: Companies in many industries leverage sales and operations planning (S&OP) to balance supply with demand. Those that take a spreadsheet-driven approach find that S&OP success depends on investing a significant amount of time manipulating data to develop a demand consensus and achieve a simple supply feasibility match. IBP combines the operational focus of S&OP (volumetric) with financials, ensuring a continuous alignment between demand, inventory, supply, and manufacturing plans, as well as between tactical and strategic plans.

Logility Advantage: Logility Voyager Integrated Business Planning™ blends business planning at the strategic level with S&OP at the tactical level. Analytics and optimization engines synchronize high-level and operational supply chain planning by combining data from sales, marketing, production, procurement, transportation, and finance. Logility provides one powerful decision center for all stakeholders, driving dramatic customer service and gross margin improvements through improved inventory turns, better product life cycle management, and optimal use of supply chain assets.

Value: IBP dramatically reduces the time to complete tactical and strategic plans, as well as the resources required to support them. Closer alignment of supply to demand improves customer satisfaction, while better alignment of strategic goals to tactical plans enhances revenue growth. Having an end-to-end view of the business enables better decisions and more effective responses to supply chain disruptions.

Integrated Business Planning helps visualize, evaluate and optimize plans for customers, markets, investments, and resources to achieve business goals and drive shareholder value.

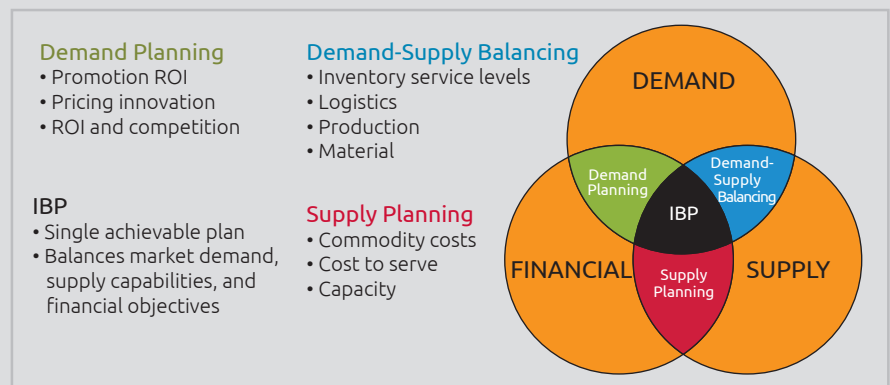


Figure 5. Integrated business planning unites volumetric and financial planning

Enterprise-wide Supply Chain Planning

Why It's Strategic: Often, a formula to make 500 liters of a chemical must be scalable to make 250 liters or 1,000 liters. The availability of an ingredient can often determine where a product is manufactured and how much can be produced. In process manufacturing the option exists to make as much of a finished product as is made possible by the least-available ingredient. This complexity requires nimble and powerful supply chain planning and optimization capabilities.

Best Practice Guidance: Supply chain planning organizations need maximum end-to-end supply chain visibility and control. An integrated planning system makes optimal use of critical resources and inventory while ensuring customer demands are met. Critical production resources may unexpectedly become unavailable. A supplier may become temporarily unable to provide key components of a crucial item. A large order may arrive at the last minute, forcing a decision that impacts other orders for the same or derivative products. Synchronization is key to making optimal decisions quickly and realistically when these situations occur.

Logility Advantage: Logility Voyager Supply Planning™ helps match the most profitable options to the least-cost methods that satisfy all requirements. It optimizes complex sourcing, production and distribution decisions to simplify efficient usage of resource allocations. By balancing resources, supply chain constraints and desired customer service levels, Logility achieves optimal supply plans based on dynamic real-time information.

Value: Integrated supply chain planning capabilities can boost customer service levels by 5%-10% while reducing forecast error by 10%-30% and inventory by 15%-30%. Other benefits include faster fulfillment cycle times, reduced out-of-stocks and lost sales, lower material acquisition costs, and lower freight costs.

Growing globalization has created complexity and competition in the process chemical industry that did not exist five years ago.

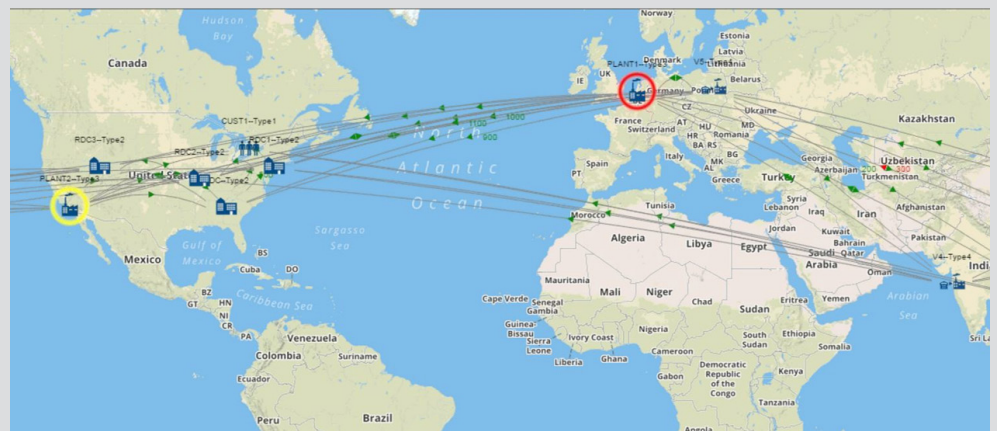


Figure 6. Enterprise-wide supply chain planning

Comprehensive Supply Chain Analytics

Why It's Strategic: Each region or operating company transforms data into actionable information. Each major supply chain function may have its own processes and systems. This can create a virtual “spaghetti bowl” of data that is impossible to make sense of at a consolidated level.

Best Practice Guidance: Leading companies understand that “What gets measured gets done.” A supply chain planning System of Record (SOR) manages and integrates supply chain metrics system-wide, transforming data into information to visualize performance and identify issues. The SOR automatically displays (both graphically and numerically) information each supply chain member needs to perform their job. It organizes aggregated views used to evaluate functional tradeoffs, conduct scenario analyses and develop optimal supply chain plans.

As changes and disruptions are sensed and adjustments made, graphs and alerts are updated in real time so that everyone in the extended supply chain has the latest information to work from. Management by exception through collaborative workflow and configurable alerts help focus supply chain resources on the most important opportunities, freeing up time for more value-add activities.

Logility Advantage: Comprehensive visual analytics, built into each Logility solution, enables the ability to monitor, measure and report the status of the entire supply chain. A rich visual interface displaying Key Performance Indicators (KPIs) helps teams track the performance of past planning efforts against actuals and analyze outcomes. Management by exception helps resolve issues before they become major problems. Logility automatically monitors and measures critical events in the supply chain and issues instant alerts of conditions that need attention.

Value: Real-time integrated supply chain metrics allow planners to simulate, monitor, control, alert, and measure critical supply chain events. Planners move from a reactive response to proactive management where they are able to “do more with less,” focus on high-priority tasks and resolve issues at an early stage.

Built-in integrated interactive visual displays bring people together in solving problems, reaching consensus and making more informed decisions with greater confidence.



Figure 7. Supply chain metrics

Conclusion

Complex process chemical supply chains have many moving parts, each with their own challenges and potentially conflicting objectives. Only a scalable, interoperable supply chain planning and optimization platform can ensure a company's supply chain performance is optimized. Seven key elements in formulating a winning process chemical supply chain management system are:

1. Accurate demand forecasts
2. Optimal multiple plant scheduling
3. Multi-mode freight optimization
4. Minimized inventory and lost tonnage
5. Robust integrated business planning
6. Enterprise-wide supply chain planning
7. Comprehensive, analytics and visual metrics

Logility Voyager Solutions provide a comprehensive and integrated platform for automating and optimizing your process chemical supply chain planning. Logility has helped many process chemical companies revolutionize their ability to compete more profitably.

Logility helps supply chain teams climb the maturity curve to a higher level of supply chain performance that meets or exceeds overall business goals. Contact us to learn how Logility can help you and your team meet or exceed your company's business goals.

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About Logility

With more than 1,250 customers worldwide, Logility is a leading provider of collaborative supply chain optimization and advanced retail planning solutions that help small, medium, large, and Fortune 500 companies realize substantial bottom-line results in record time.

Logility Voyager Solutions is a complete supply chain management and retail optimization solution that features a performance monitoring architecture and provides supply chain visibility; demand, inventory and replenishment planning; sales and operations planning (S&OP); integrated business planning (IBP); supply and inventory optimization; manufacturing planning and scheduling; retail merchandise planning, assortment and allocation; and transportation planning and management.

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