



HOW-TO GUIDE

6 steps to digitize the end-to-end supply chain in chemical manufacturing

Building an infrastructure to analyze chemical company data

Data analysis has become an increasingly important driving force in critical decision-making for the chemicals industry. For some time now, many chemical manufacturers have relied on data coming from digitized physical assets—such as equipment and machinery—to help manage and optimize production and plant equipment more efficiently. But not nearly as much effort has gone into implementing an infrastructure that's capable of analyzing data from operational business processes, such as the elements of planning that go into managing an end-to-end supply chain.

Today's cutting-edge forecasting, planning, optimization, and predictive capabilities come directly from digitizing supply chain networks and business processes. But many chemical companies face an uphill battle trying to optimize their end-to-end supply chains with so much data existing outside of their organizations. With the majority of supply chain data resting in the various systems of trading partners and logistics providers, it's critical for organizations to use a platform that allows them to gain access to network-wide data so they can make smarter, faster decisions. A digital supply chain can help chemical manufacturers leverage this data.

Here are six ways chemical manufacturers can digitize the end-to-end supply chain.

1. Use forecasting capabilities to minimize variability

Chemical products go into diverse applications and end markets. By the time information reaches producers, small demand changes to the end product can translate into big impacts. To understand true demand, manufacturers should employ powerful supply chain planning tools that analyze leads for products, categories, business, and sales. These tools use logic and statistical methods (such as Bayesian analytics) to leverage multiple forecasting methodologies to combine historical data, market indicators, competitive intelligence, and internal sales forecasts to run simulations and project concrete demand forecast. In addition, machine learning can be leveraged to detect seasonality and growth trends for predictiveness and to improve forecast accuracy. Demand sensing against forecast can detect any new trends or exceptionally large orders, which can then be presented for review and actions.

2. Streamline supplier complexities to enable optimization

Materials in the supply chain in different parts of the world follow their own seasonal patterns. For example, in oil and gas, production slowdowns in the Gulf of Mexico are anticipated during hurricane season, but the extent to which weather actually impacts production is difficult to predict. Supply variations have a bearing on availability, quantity, cost, and lead times of raw material across the chemical supply chain—making the job of the procurement team extremely arduous. A good supply chain management (SCM) solution should interact seamlessly with a company's enterprise resource planning (ERP) system to provide demand forecasts, receive bill of materials, and specify forecast requirements for each raw material. The solution should aid procurement associates in their efforts to combine these raw material requirements across plants and carry out centralized bidding processes to realize spend synergy, or at the minimum send out RFQs. The solution should also help collate all proposals from suppliers; run what-if scenarios between various vendors based on targets such as payment terms, volume slabs, lead times and cost; and finalize vendors for all direct procurement.

3. Increase resilience with sophisticated planning and scheduling

Chemical manufacturing can be scheduled in continuous and batch runs—various streams and chemical processes can merge, demerge, and produce intermediate (bulk) material or finished goods. Lacking accurate demand forecasts and having to deal with the variability of supplier changes, means that planners often have a difficult time determining intermediate goods and finished goods production volumes. A modern supply chain planning (SCP) tool can help address planning and scheduling challenges. For instance, it can help plan and manage constraints for new products to be applied during a critical launch phase. The right SCP tool can also assist with asset scheduling by considering multiple bottlenecks—including tanks, filling lines, flow rates, availability of specialized employee crews, compliance, etc. Sophisticated SCP tools are also capable of connecting multiple production schedules built by different schedulers, optimizing the separate schedules to achieve maximum efficiency of the entire plant.

4. Improve chemical storage, inventory levels, and warehouse operations

The task of storing chemical products at the production plant presents a lot of challenges. Since most products can't be mixed together, a standard cleaning operation must be implemented between storing different products in the same tank. Warehouse capacity, multiple SKUs, specific storage requirements for different types of chemicals and their packages, shelf-life—along with **rising fulfillment costs**—are other challenges modern warehouse operations encounter. To keep costs as low as possible, while delighting the customer, it's pivotal for manufacturers to keep the right amount of material at the right place at the right time—whether it's raw material or finished goods. Combining a warehouse management system with an ERP system enables an accurate view of goods inventory and accurate costing and invoicing. Ideally, the ERP system should be built specifically for chemical manufacturing, with support for back-flushing, catch-weight, by-product and co-product credits, etc. This allows for accurate planning, storage, and a real-time view of materials—no matter where in the supply chain cycle they are.

5. Run a smooth sales and operations planning process

Demand forecasting should be approached as a statistical science. When done right, it helps to remove supplier variability, optimize planning, harmonize scheduling, coordinate right-size inventory, and develop warehouse strategy—bringing it all together into a sound, sales, inventory, and operation planning (SI&OP or S&OP) process. Unfortunately, a smooth SI&OP process is virtually impossible. There are almost always changes lurking on the horizon. It could be economic fluctuations that lead to changes in demand, or freight and logistics-related changes, such as a scarcity of truck drivers or the increasing monopoly of railroads. These changes present multiple scenarios to the supply chain function that can't be evaluated or analyzed without proper data and tools—certainly not using Microsoft Excel® spreadsheets or old ERP systems. Advanced, what-if, scenario management—with budget, financial, and KPI reconciliation—provides the potential solution to these dilemmas. Scenario analysis with embedded analytics allows chemical companies to breakdown these problems by solving for maximum profit, minimum cost, or best lead-times.

6. Use transportation management to gain real-time visibility of materials

Moving the flow of goods from plant to warehouse, distribution network, and end-customer can't be done with “old-school” logistics systems in a competitive marketplace where customers have high expectations. Chemical companies must be able to see beyond the four walls of their operations in order to control all moving parts and improve supply chain performance. Advanced, cloud-based, digitally transformed networks are connecting supply chain partners, events, and devices—enabling stakeholders to respond quickly and decisively to disruptions, seize opportunities, and orchestrate and fulfill demand from anywhere along the supply chain. The networks are designed for the global enterprise to orchestrate and optimize global chemical flows. This business-to-business connectivity creates savings, augments throughput, and improves customer service—resulting in increased sales and margins.

To learn more about this topic and gain some practical information about how your organization can create an end-to-end digitized supply chain, check out this [best practice guide](#).

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INF-2353813-en-US-0122-2