Delivering a Competitive Edge Across the Supply Chain

An Industry White Paper

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Supply chain leaders face significant challenges today amidst market volatility and growing competition. Success across the supply chain relies upon having an effective integrated strategy between planning and scheduling in order to remain profitable and to be able to meet customer demand. To achieve this goal, investment in technology is a vital step to successfully modelling, visualizing, analyzing, monitoring, and reporting across the supply chain network.

Demand managers, planners, and schedulers play a vital role in delivering products to market, taking into account market demand, current inventories and operational constraints. The chemicals industry alone produces over 70,000 diverse products from acetylts to zirconium chemicals. The pharmaceutical industry has multi-product concurrent manufacturing, with intricate timing of production activities and equipment, such as clean-in-place skids that must be shared across assets. The consumer goods industry is characterized by rapidly changing consumer preferences, growth in emerging geographies, and volatile market conditions. While the specific business challenges may differ across all process industries, there is strong pressure to improve operational agility, reduce costs, maximize output, accelerate products to market, and meet compliance mandates while delivering high levels of customer service.

Companies must find a way to meet demand despite volatility in energy, operating and feedstock costs, plant utilization rates at near capacity levels and the need to keep inventory costs at acceptable levels. At the same time, many chemical companies are also facing demands for higher performance at lower environmental risk and they have to deal with a mature commoditized industry characterised by high volume, low margin and the increasing globalization of markets. If they are to effectively manage these challenges, companies across the supply chain need to find a way to closely integrate functions like forecasting, planning and scheduling. Integration is vital to drive efficiencies, enhance productivity and, ultimately, achieve a competitive edge.

All supply chains from the simplest to the most intricate constantly look to achieve streamlined operational efficiency. In doing so, they face a range of issues, such as a wide array of products with different manufacturing methods. Each will have different bills of materials, product grades and specifications that must be represented and managed as part of the manufacturing process.

A key supply chain area where businesses often struggle is having sufficient agility to react quickly to sudden shifts in the business or market environment. When a change, incident, or unexpected event occurs, awareness and action must follow immediately.

While these unexpected events can come in many different forms, they typically fall into three distinct categories. The first is around operational upsets. An example of this is an equipment failure — when a system or application stops working, for example, bringing production to a halt. The second category is an environmental disaster — flooding, tsunami, hurricanes, for example — that could potentially disrupt the supply chain, logistics and raw material supply in particular. The third key area is unexpected customer orders where companies need to weigh the pros and cons of disrupting the rest of their production operations in order to accommodate the opportunity to fulfill a lucrative order with a top tier customer.
The Key Role of Forecasting and Planning

For companies across the supply chain, success in meeting these challenges will largely rely on their ability to deliver efficient business processes and seamless integration between business functions. Most chemicals companies generate forecasts of predicted sales over a 12-18 month time frame — typically in monthly time schedules. That information then gets fed to the planning function. In a perfect world, these companies would like to always fulfill the demand and meet their forecasts. The planning model brings them back to reality as it creates an optimal production plan based on the assets that they have, the number of locations and corresponding capacity and the most cost effective way to store and transport material. Planning in this context is typically a part of Sales and Operational Planning (S&OP) — the process of aligning demand and supply to drive a business outcome. Businesses across the chemicals supply chain need to look at how they can most profitably meet customer demand while at the same time help drive operational agility.

With the flexibility and degrees of freedom built into today’s global supply chain, decision-makers often have the ‘luxury’ of being able to choose from several different options with regard to which plant location will fulfill customer demand. They may need to take into account transportation times and costs, for example, before deciding between sourcing product out of Europe, China, or the United States. Competing effectively in today’s process industries requires a fundamental shift from supply push to demand pull (essentially manufacturing to demand which delivers improved margins and higher levels of customer satisfaction). A recent white paper, The Evolution of Optimization in Process Industries, written by Pierfrancesco Manenti, Head — Europe, Middle East & Africa, IDC Manufacturing Insights, recommends to companies that have asset oriented value chains (AOVCs as the paper describes) to “rethink your supply chain structure to transform it into demand pull versus supply push, essentially manufacturing to demand, which offers better margins and higher levels of customer satisfaction.” This requires AOVCs to consider plants and assets as nodes in the global supply chain. This need is being driven by the requirement to engage more closely with customers and provide better service in an environment where they have more supply choice. As a result, manufacturers must compete not just on product quality, but also on how effectively they deliver what customers are seeking. Indeed, the IDC white paper finds that the most critical capability for a globally integrated asset-oriented firm is “its ability to optimize the global network of production assets dynamically to fulfill customer demand in the face of extremely dynamic business conditions”.

The Importance of Visibility

Visibility is very important to planning. Planners need to have an excellent overview of what is happening not just in a single plant, but across a network of plants. Having a high level of awareness across the supply chain, balanced with the needs of the business, will help at a regional and global level. It is crucial for chemical companies to be clear about the problems within individual plants and make them transparent to others within their organization.

In this context, being able to proactively look ahead is vital. Planners need to ask themselves — “will we have raw material supply five months from now?” and “do we need to order now to avoid a shortage?” Another key area of focus should be around inventory storage. Ideally, planners will be looking to ensure products are manufactured just in time to be shipped, so as not only to drive agility, but also to avoid the product using up limited storage space for an extended period and
incurring inventory holding costs. At the same time, planners must find ways in which they can improve the business process by delivering a framework for cost reduction and service improvement. They also need to be focused on improving user productivity by facilitating quick analysis and decision-making through clear, visible and understandable reporting.

The Link to Scheduling

The long-term plan for the supply chain needs to integrate with the overall budget and business strategy. While planning works to a 12-18 month time horizon, scheduling works to a much tighter timeframe — typically 3 months at the longest. In an ideal scenario, schedulers should work to the inventory target guidelines provided by the planners, but they will also need to react to immediate needs and changes in the plant and be agile enough to spot opportunities and act fast for the benefit of the plant.

Schedulers typically receive an updated ‘snapshot’ — either nightly or on demand — of information that specifies what has been produced, the actual inventory positions and whether there are new orders. Once the model has been updated with the latest information, the scheduler will generally adjust it to resolve inventory problems, avoid late shipments and bring in ad hoc production opportunities. The schedule keeps track of all of those changes and maps them back to the system of record, typically the ERP. In practical operational terms, there are a host of challenges associated with scheduling across the supply chain. While schedulers typically have intimate knowledge of their business and manufacturing process, they need help in balancing the thousands of competing constraints that must be considered when developing the best schedule. It is crucial that schedulers have technology at their disposal that enables them to visualize potential schedule conflicts and provide guidance on how to analyze and resolve them as quickly as possible.

The other big issue is that while many companies are successful at achieving tightly coupled integration between scheduling and the ERP system, data integration between scheduling and planning remains generally poor in some organizations. According to a market study of the specialty chemicals industry conducted by AspenTech in 2011, information passed between the planning and scheduling functions is largely manual and underutilized. This is largely the result of business function silos, which create a ‘disconnect’ between supply chain planning and schedule execution. The value of integration is to align business processes, providing the ability to evaluate multiple scenarios for constrained production lines to optimize assets and maximize earning potential.

Finding a Solution

In overcoming these supply chain issues, companies should above all look for solutions that enable them to develop integrated, optimized plans and schedules with the agility to respond to market opportunities as they arise. To deliver competitive edge in this area, they need to increase operational efficiency and the best way to achieve that is through solutions that support improved planning and scheduling of the production and distribution process. Many companies have turned to AspenTech, a leading provider of process industry software, to help tackle inefficiencies end-to-end throughout their engineering, manufacturing, and supply chain processes.

Ease-of-use is also important here. The simple, straightforward user interfaces offered by AspenTech’s supply chain solutions, for example, provide fast access to information that can expedite profitable responses to unexpected market demands and opportunities, which is becoming a necessity in an increasingly competitive marketplace. For planners and schedulers who may have little formal supply chain training, software ease-of-use is invaluable not just in enabling users to carry out their work effectively and in helping the company to become more agile, but also in ensuring the software tools can help to make more informed decisions rather than using traditional spreadsheets.
Critically, supply chain software solutions are capable of maximizing supply chain agility by constantly balancing supply and demand on an enterprise-wide scale based on dynamic market conditions. Therefore, in meeting the raft of challenges presented by today’s global supply chains, companies need to find a way of driving operational efficiencies, agility and competitive edge whether they are operating relatively simple or extremely complicated supply chains. Today, the latest breed of high-performance supply chain software solutions are being adopted by many of the leading chemicals companies across sector.

As these organizations seek to improve their assets, a truly integrated asset-oriented company today will have the ability to optimize its global network of production assets dynamically to fulfill customer demand with changing business conditions. Ultimately, improved operational performance will lead to faster response to market opportunities and increased margins across the value chain.
Remaining Competitive

Supply chain leaders in the process industries are constantly seeking ways to drive better business results from their supply chain processes. High forecast error due to market volatility and large infrequent orders are just a few of the barriers to improve supply chain performance. Good visibility and supply agility will enable improved insights into the most profitable options for fulfilling demand. Crucially, supply planning must enable and connect to scheduling at the operating level.

Cultural issues around silo work-patterns need to be consigned to the past and they must demonstrate the commitment to operate with greater collaboration and integration — people, processes and technology. Equipping staff with leading-edge software will help to provide the appropriate tools to maximize skills and overcome critical obstacles within the operation — dynamically and efficiently. Such software tools provide an integrated solution set that tackles inefficiencies end-to-end throughout engineering, planning and scheduling and plant operations processes. Companies deploying dedicated software tools for chemicals are able to generate benefits of millions of dollars per year, per plant with payback in months instead of years. Better alignment of processes and equipment from the plant floor through to executive decision-making levels will also provide the ability to distribute, visualize and analyze information more intelligently.

Process manufacturers must increase the alignment of their supply chain practices to maximize opportunities in the market. The transition to a demand-driven business model is an essential foundation from which process manufacturers can launch a more transaction-oriented and astute approach to their business. The short-term prize is profit and optimization — the long-term reward is market competitiveness and commercial sustainability across the supply chain.
About AspenTech

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