

# Supply chain management: It pays to be agile

**T**oday's chemicals industry faces a series of business challenges. Rising raw materials costs, regulatory issues and the need to find new sources of revenue by expanding product portfolios are all increasingly important if companies are to remain competitive.

One thing is certain – supply chain disruptions will inevitably occur. The complex global supply chains of the process industries feel the ripple effect of events that previously had only local reach. A catastrophic event, such as a Tsunami or Hurricane, can disrupt feedstock availability and cause capacity outages. A logistical disruption, such as Mississippi River flooding causing a closure to barge traffic, forces chemical companies to scramble to find other modes of transporting both raw materials to manufacturing facilities and products to customers.

Not all disruptions are a result of natural disasters. Demand volatility is also a significant area of concern. In the chemicals industry, both demand and supply can fluctuate quickly and widely. The need for agility is not a new concept, so why do chemical companies that seem to have much of the infrastructure in place for an agile supply chain continue to struggle to achieve it?

## Barriers to agility

The global market research firm, Aberdeen, reports that over 84% of companies still rely on spreadsheets and manual data gathering to support some part of their supply chain. The process of harnessing the necessary data is labour intensive in that it often has to be compiled from disparate systems and manipulated into a usable form. The data chore precludes the



analysis required to detect anomalies and react quickly enough to make a difference.

For those companies that do leverage technology to manage their supply chains, islands of information can still exist due to organisational silos and a lack of integrated business processes between supply chain functions.

Chemical companies are looking for tools to help understand the range of possible responses to an unexpected event, operational upset or demand change. Complex supply chains have many degrees of freedom and it is virtually impossible to determine the impact a decision will have on the competing objectives and cost trade-offs associated with procurement, production and distribution without the help of technology.

Take for example the following case study. A company that manufactures and sells chemical fertilisers has a large, vertically integrated manufacturing unit consisting of a urea plant, an ammonia plant and two complex fertiliser plants. Excavation work being carried out by a contractor building a highway has damaged the underground naphtha pipeline feeding the site. A fire

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broke out due to leakage in the pipeline carrying this feedstock and has yet to be repaired. In light of the naphtha stock-out, the urea and ammonia plants have been shut down. The company's complex fertiliser manufacturing plants at the same facility may also have to be shut down due to non-availability of ammonia and phosphoric acid, the key raw materials.

## About the author



Sunil Chaudhari heads up the South Asia Business of Aspen Technology as Country Manager with responsibility for strategic business operations & growth. Based out of Pune he leads the company's Core Sector businesses in Engineering & Construction, Energy (Upstream, Midstream & Downstream) & Chemicals. In addition, his charter includes ensuring visibility for AspenTech as the leading software solution provider for process industry in the region, creating optimal value for its customers. He has had more than two decades of industry experience in Asia Pacific & global markets.

At this point, the company's supply chain organisation must spring into action, examining possible responses to the impending fertiliser plant closure. Here are a few options they can consider:

- Examine alternate sourcing options for fulfilling demand for fertiliser products. For instance, the company can consider increasing production at another facility to compensate the loss in capacity.
- Import the key raw materials from another supplier. This will incur additional transportation costs, but if the company has strategic suppliers and make vs. buy flexibility, this is a viable option.
- Determine the most profitable orders to fill before raw material stock is exhausted and renegotiating delivery dates for lower priority customers.

The company needs to have the ability to determine which of these options are possible, or just as importantly, most profitable. Quick and easy access to the right data and rigorous, economic-based business simulation is vital. However, not all companies have the

processes and tools to make informed decisions in a timely manner, with visibility into what the short and long-term impact will be for the business.

Traditional supply chain processes focus on efficiency and cost control. The outcome is typically a modest improvement in return on assets (ROA), but not necessarily in agility or responsiveness. In fact, efficient supply chains that focus on being high-speed and low-cost often fall victim to deteriorating performance and become uncompetitive because they don't adapt to changes in the market.

For example, price volatility affects the decisions made by chemicals manufacturers, from feedstock selection in the bulk chemical industry to proliferation of product specifications in the speciality chemicals industry. Recent fluctuations in energy and commodity costs are a reminder to supply chain professionals that they cannot assume any price stability when making inventory, transportation, or manufacturing decisions.

### Cultivating an agile supply chain

Best-in-class companies are lever-

### About the company

AspenTech [[www.aspentech.com](http://www.aspentech.com)] supplies of software that optimises process manufacturing – including energy, chemicals, pharmaceuticals, engineering & construction, and other industries that manufacture and produce products from a chemical process. With integrated aspenONE solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs and become more energy efficient.

aging technology and using agile supply chains as a competitive differentiator. But what steps can chemical companies – especially ones that already have much of their supply chain infrastructure in place – take to foster agility in their supply chain? Visibility into the right information is half the battle. Transforming data into a usable format facilitates decision-making based on facts and economics, rather than focusing on solving the crisis of the moment. An easy-to-use interface can enable the user to hone in on the specific information required to react to variability in customer orders, demand forecast, material availability and production capacity. Exception reports should direct the user to the highest priority problems and side-by-side comparison reports containing related information provide guidance on the best course of action for profitability.

Consider the example of an international manufacturer and supplier of petrochemicals and fabricated products, operating from two modern facilities in the United States, which produces and ships polyethylene products to both



domestic and international customers. The company needed to better understand their customers' business and improve visibility in order to balance customer service goals with efficient manufacturing and optimal inventory levels. With an organisation consisting of only about 10 representatives that handle customer service functions worldwide, they have a lean operation for a 2.5 billion lb/year polyethylene business. Limited visibility into inventory positions led planners to maintain a 'stash' of inventory to ensure that customer service goals were met, resulting in additional inventory costs. They also needed to eliminate emotion from the forecast and establish a process for handling unplanned orders. Determining if they could fill an unplanned order took four hours of work to reconfigure the schedule to avoid a delivery date violation and determine new ship dates.

The polyethylene business engaged customers as partners and began collaborating with them on a daily basis to work with them on forecasts, ship dates, inventory, invoicing, and quality. They believe that providing the best customer service in the industry is key to gaining customer loyalty in a "commodity" business. They leverage 'aspenONE' supply chain management to support their customer services objectives in the following ways:

- A rigorous monthly demand management process that monitors forecast accuracy and includes a process for orders that were not originally forecasted.
- A sales and operations planning process that gives them insight into whether or not it is profitable to fill an unplanned order.
- Improved inventory management where all stakeholders have visibility into what is being made.
- Improved planning and scheduling to achieve on-time shipments with minimum inventory.



The biggest contributing factor contributing to their industry leading customer service is improved visibility. Schedule visibility improved from 6 days to 90 days, enabling them to catch and prevent delivery date violations before they happen. Now, the customer service manager knows about any violations in time to negotiate new delivery dates with customers, resulting in a 95% on-time shipment rate. Through better supply chain management, they are also able to deal effectively with capacity issues, like assessing the impact of batch changeovers and downtime on overall production. They now have greater control over their supply chain, leading to lower costs and customers that are repeat buyers.

The ability to perform rigorous business simulation via what-if analysis is a 'must-have' for chemical manufacturers. Without this capability, companies are blind to both profitable opportunities and potential risks. Best practices dictate developing a 'playbook' to respond to unplanned events, both upside opportunity scenarios and downside risk mitigation scenarios. By identifying a set of scenarios to con-

sider and the circumstances under which they would apply, chemical companies can be much more nimble when the unexpected occurs and make the best decision both tactically and strategically. One major speciality chemical producer was faced with a colossal challenge in 2008 when Hurricane Ike threatened the Gulf Coast of the United States, where they had several assets. As expected, plants were shutdown and feedstocks were disrupted. Thanks to robust scenario analysis, visualisation, and simulation capabilities, they were able to activate supply contingency plans and reschedule all of their plants before power was even restored to many of their customers.

## CONCLUSION

If chemical manufacturers do not adapt their supply chains, they will not stay competitive for long. The best supply chains are not just fast and cost effective. They are agile and adaptable, and ensure that all stakeholder interests are in alignment. While it is hard to assign a monetary value to having the ability to react, agility drives improvements in customer service, asset utilisation and inventory management.