MANAGING THE UNEXPECTED IN COMPLEX CHEMICAL SUPPLY CHAINS

SAP White Paper

EXECUTIVE SUMMARY

Unexpected events are a daily challenge of chemical supply chain and logistics management. As they cannot be appropriately considered in corporate planning processes, these events can severely impact and even disrupt supply networks. Moreover, complexity, global scale and the shift towards leaner chemical supply chains increase the vulnerability of supply and logistic operations by unexpected events.

As a consequence, chemical companies need to anticipate and minimize the impact of unexpected events. They need to get prepared for the management of disruptions on their chemical supply networks. The introduction of adaptive supply networks is the most effective counteractive measure to identify, mitigate, and respond to unexpected disruptions.

The key process enablers to achieve adaptive supply networks are increased visibility and flexibility, synchronized supply and demand, and enhanced collaboration of business partners. The most responsive and best prepared supply network management will be the one that can rely on optimal information, visibility and collaboration capability. These capabilities can be supported and improved through IT applications and a flexible IT architecture.

FACING UNPREDICTED EVENTS IN CHEMICAL SUPPLY CHAINS

Unpredicted events do not necessarily cause harm or financial loss to all companies in a common network. For instance, a short-term, strong demand increase is a business opportunity and not a threat. However, to benefit from this positive demand disruption, the corresponding supply needs to be adapted. Consequently, the whole supply chain has to be realigned to fulfil the demand increase.

More challenging than positive demand changes are 'negative' disruptions that weaken supply chain performance and lead to direct financial losses. Fast perturbations of demand as well as of supply and operations are caused by accidents, natural disasters, operational difficulties, reduced supplier availability, and industrial actions like strikes. Moreover, today's supply chains are even more vulnerable to these fast evolving unpredicted events due to decreasing redundancy, tight capacities, and increasing global complexity.

MASTERING UNCERTAINTIES WITH ADAPTIVE SUPPLY NETWORKS

Consequently, an even faster adaptiveness of the overall supply network is required to identify, analyse, and mitigate the disruption process and to recover within a changed supply network environment.

Some key factors to achieve a sufficient adaptiveness of logistics and supply chain are:

- Status and risk of supply chain operation is visible and can be analyzed
- A disruption can be detected and understood
- The supply chain is demand-responsive, i.e. supply and demand can be synchronized
- Hazardous materials and their transportation process are monitored
- Supplier and customer can establish a trustful relationship base on a transparent data interchange

Numerous management strategies and procedures have been developed to shift logistics and supply chain organizations and processes towards a higher degree of adaptiveness. Some of the preferred measures to deal with the unexpected include increased redundancy, higher safety stocks, and improved collaboration with business partners to better detect risks and to jointly react in times of disruptions. Enhanced visibility over the entire logistic process becomes critical to deal with the unexpected.

The organizational setup is definitely the key prerequisite for adaptive supply network operations. However, in view of the increasing network complexity, the support of the corresponding logistics and operations workflows with information, business collaboration and integration capabilities is of very high importance.

ENABLING ADAPTIVE CHEMICAL SUPPLY CHAIN MANAGEMENT THROUGH IT SOLUTIONS

By providing information, analysis, collaboration, integration, visibility and control as well as synchronization of supply and demand, information technology has become an essential cornerstone to establish adaptiveness in chemical logistics and supply chains.

Real business cases prove how successfully supply chain adaptiveness can be supported and realized through IT solutions:

- SOLVAY S.A. for instance, Belgium's leading supplier of plastics, chemicals and pharmaceuticals, has to deal with one of the world's most complex and challenging supply chains. In order to optimize its supply chain management, SOLVAY decided to run SAP's supply chain management application (my SAP SCM), which is also fully supporting eVMI for Solvay and its customers. As a result, supply chain responsiveness and demand fulfilment are significantly improved. Solvay's ability to monitor the supply chain from end to end leads to improved visibility into customer demands, better control of stocks and the avoidance of unplanned events.

- Real-time visibility to manufacturing exceptions and performance variations enables chemical manufacturers and their production personnel to adapt change and to respond to shifts in demand. EASTMAN Chemical Company decided therefore to establish a real-time transactional integration between its ERP software from SAP and plant floor systems. SAP's Manufacturing Integration and Intelligence application (SAP xMII) enables Eastman to aggregate data from multiple, disparate systems across the enterprise and deploy applications rapidly to empower the supply chain and production personnel with the appropriate decision support.

- And BASF can proactively manage unexpected situations in its ocean-freight supply chain through an IT solution which maps out all the different stages in transportation by sea. BASF decided to run SAP Even Manager, software that maps out all different stages in transportation by sea. The end-to-end monitoring show when a container leaves a port, when it reaches its destination port, and when the agent needs to arrange custom clearance. The achieved transparency and traceability of its maritime supply chain helped BASF to assess risk, prioritize actions, to ensure the safety of personnel and to minimize damage during two major hurricanes that hit the U.S. coast (Rita and Katrina). Shipments were diverted to safe harbours and alternative sourcing strategies could be developed.

IT solutions can significantly enhance operational adaptiveness and, consequently, companies' ability to respond to unexpected events and to mitigate risks. A prerequisite is the integration of people and applications to obtain maximum transparency on logistics operations, best support of workflows and sufficient collaboration between business partners.

Therefore, IT applications should be built on an IT architecture that can achieve adaptability at highest efficiency and lowest cost. The ideal IT architecture has to integrate people and interface enterprise software applications independent of system and software language. And, as most of the supply chain processes are crossing industry borders, IT architecture should also support industry standards defined by independent organization like CIDX (Chemical Industry Data Exchange).

SAP's business process platform NetWeaver productizes the integration needed at a company and it also increases adaptability through a deep commitment to standards. SAP NetWeaver is based on open standards like Web Services and supports chemical industry standards as well.

Using NetWeaver as a platform, SAP has created the enterprise service-oriented architecture, enterprise SOA. For adaptive supply networks, this architecture provides the ability to chance business processes at the speed of business. With enterprise SOA, existing functions and applications can be reused and composed in a way that all kinds of procedures, measures, and workflows to analyze, mitigate, and respond to the unexpected can be fully supported.

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