SUPPLY CHAIN

The next generation of SCM solutions

Dharmendra Sah, Partner – Oil & Gas Solutions & Services, ENU (Energy, Natural Resources & Utilities), Wipro, takes a look at the new generation of supply chain management solutions for the oil and gas business.

Along with the huge advances in information technology, supply chain management (SCM) has been a key driver for value optimisation in the oil and gas industry since the 1990s. The primary aims of SCM are to decrease inventory levels of working capital; increase the utilisation rates of fixed assets; improve revenues, margins, and service levels/times; and aid high velocity decision making by integrating operations. However, the current crop of SCM applications and decision support systems are fast approaching end-of-life and are no longer fit-for-purpose. As a result, there is a pressing need for new solutions that will stand the industry in good stead for at least another two decades.

The oil and gas industry is evaluating new options and collaborating closely with IT service providers to develop end-to-end, intuitive SCM solutions. The industry not only requires integrated SCM solutions – ie encompassing sales and manufacturing functions respectively – but also those that are vertically integrated, encompassing upstream and downstream functions.

One common objective is to have a minimum number of tools, or ideally a single solution, capable of capturing the entire business function data in a single dashboard.

A supply chain optimisation solution should enable the following:

- Streamlined business processes that drive a consistent and integrated approach in an organisation.
- Demand management and inventory optimisation to establish an optimal supply chain.
- Demand-driven services optimisation for demand fulfilment dove-tailed with demand management to enable a reduction in fixed costs.
- Strategic technologies that can aid velocity of decision making through transparency, collaboration, auditability and optimisation.

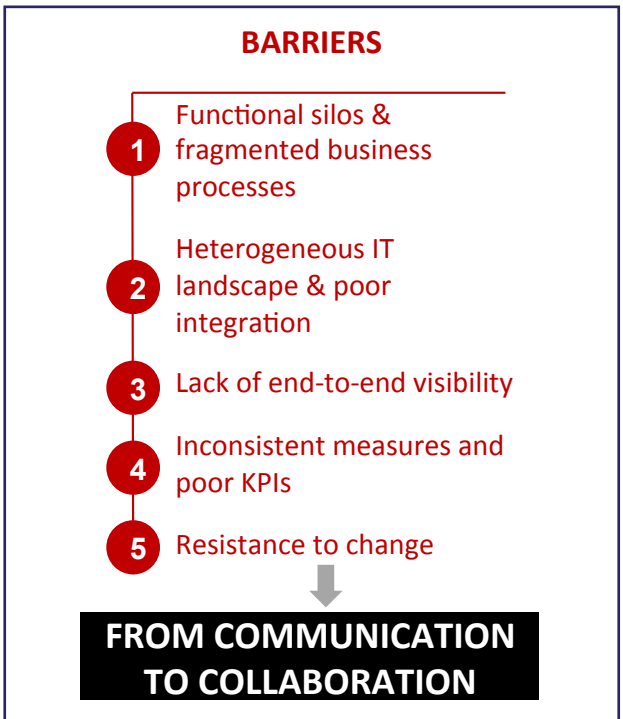

Figure 1: Barriers to supply chain management *Source: Wipro*

Superior SCM performance objectives can be achieved through a raft of next-generation solutions.

IT adoption

The oil and gas industry has lagged behind other industry sectors such as banking, finance and consumer goods when it comes to technology adoption. However, certain enterprises in the sector have moved from traditional solutions to agile solutions with next-generation capabilities, including in SCM. This has allowed them to identify, measure and resolve operational, as well as commercial constraints. This has allowed them to realise benefits such as more accurate results, workflow-driven auditable actions, a significant reduction in work hours and optimal utilisation of key resources for analysing results and execution based on insights, as opposed to spending hours mulling over spreadsheets.

Integration of business process and technology, analytics and dashboards for visualisation, modelling tools, people training and competency building are key elements of supply chain optimisation. Next-generation solutions which encapsulate these elements can help the oil and gas business chain adapt to heightened customer expectations and cost/margin pressures by improving collaboration, transparency and performance management through a single dashboard which can act as a control centre for real-time and end-to-end visibility.

The business processes across the petroleum value chain, ranging from oil/gas wellheads to fuel dispensers, have benefited from game-changing technologies in digitalisation, innovation in application and data services such as the Internet of Things, 3D printing, drones, video analytics, big data platforms and infrastructure, any-device-anywhere-any-network capabilities, cyber security and

The need to improve the velocity of decision making remains the biggest challenge

Figure 2: Performance management – a dashboard as the ultimate control centre for real-time and end-to-end visibility *Source: Wipro*

business models such as software-as-a-service.

An emphasis on analytics

As noted in an IDC Energy Insights report from July 2015, best-in-class companies are working toward implementing analytics platforms that deliver role-based access to business intelligence tools (dashboards with KPIs such as production uptime, system availability, production levels, quality, plan versus actual), for financial and operational management. Advanced analytics can improve business agility by optimisation, simulation and prediction, guiding operational decision-making based on product demand and crude availability.

For instance, in the refinery sector, crude oil purchasing decisions affect the petroleum value chain the most. Using advanced analytics when making crude purchasing decisions can lead to margin addition of as high as $1/b. Additional margins can also be gained by optimising the crude logistics through co-loads and freight optimisation including return freights. Improving refinery operations through advanced planning, scheduling and blend optimisation, demand forecasting, inventory and freight optimisation in the primary distribution modes and service assurance, inventory optimisation, truck scheduling in secondary distribution functions are key benefits.

The need to improve the velocity of decision making remains the biggest challenge. Analytics provides decision-making support by providing corrective, predictive, prescriptive and self-corrective actions. High velocity decision-making requires converting raw data into insight-driven decision making, for improved outcomes through opportunity capture. Unlike older analytical models, new generation analytics can collect and relate disparate data from different sources such as machine data, sensor data, geographical location data, activity/log data and weather information. As a result, investments towards the robust development and testing of new advanced analytical models need to be stepped up to keep pace with dynamic business requirements, cost optimisation and margin improvement.

However, in order to drive larger adoption in the industry, it is important to contextualise analytics specifically for the oil and gas domain.

Integration of business process and technology, analytics and dashboards for visualisation, modelling tools, people training and competency building are key elements of supply chain optimisation

Advanced modelling tools

High fidelity modelling tools for various functions within the oil and gas supply chain are essential for efficient supply chain optimisation. These tools include engineering models, demand-forecasting models, planning-optimisation models for strategic and operational decision-making for the supply-demand, production, inventory, event-based scheduling models, blend-optimisation models, advanced process control models, real-time optimisation models, distribution optimisation models for primary as well as secondary distribution and transportation.

There have been efforts by industry OEMs to minimise the bill of materials of the models to promote interoperability in those cases where multiple models have been integrated for ease of use. However, developments are underway to create a single model which can support multiple functions, for demand forecasting, refinery planning, scheduling, primary and secondary distribution.

Advanced demand management

Demand management tools have really advanced in the last decade, and can now evaluate and forecast a few hundred thousand SKUs (stock keeping units). Most of the advanced systems are self-learning and produce better rolling forecasts. For example, in the chemicals and lubricants industries where there are a high number of product grades and SKUs, and in the fuels industry where there are fewer, it is important to have a robust and granular view of demand. Companies can set accurate inventory targets at various levels of the supply chain, minimise wastage and improve efficiency if they have a detailed insight into demand, which in turn helps effective demand management.

We can even trade lucratively (spot vs term) to leverage benefits from the raw materials supply markets by having a reliable view of future demand. Production can also be better aligned to what is being consumed in the market. The purchase of raw materials will also be in sync with required production processes.

Driving forward

In summary, the oil and gas industry is moving towards the development of next-generation SCM solutions and solution architectures, and revamping existing solutions. This is being driven by the need to improve profitability at a time of oil price volatility, as well as the innovation in the LNG industry, which is unencumbered by legacy technologies. ●