

The 4 biggest challenges chemical manufacturers face

How global chemical companies can improve their leadership and market share by continuously measuring operational efficiency

Table of Contents

- 3 Why tomorrow's opportunities can be found in today's challenges
- 3 The four biggest challenges:
 - Responding to unanticipated variations in commodity prices
 - Handling the increased scrutiny from recalls and quality audits
 - Managing operational and manufacturing data
 - Driving down formula costs to create new efficiencies
- 7 What your competitors are doing to achieve IT excellence

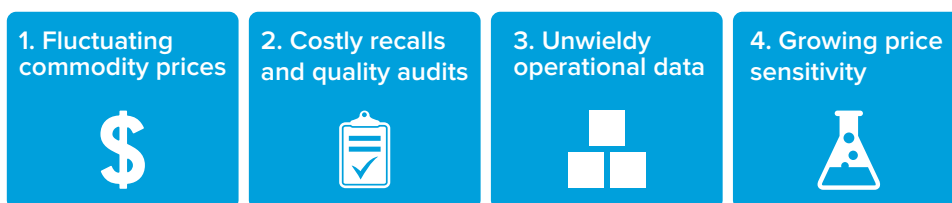
Why tomorrow's opportunities can be found in today's challenges

In today's business environment, a lack of agility can hinder an organization's ability to be competitive. With high capital costs and ever-increasing energy expenditures, an organization can become locked into patterns where it is implementing shortsighted, cost-cutting measures that can adversely affect operational productivity—decreasing overall market responsiveness.

To overcome their biggest challenges, chemical companies need to question whether they have the IT foundation to be successful. These efforts should support customer quality expectations and regulatory compliance initiatives through a reliable IT infrastructure. This IT infrastructure should include an ERP system that can analyze operational data and support business critical functionality, including track and trace abilities, seamless governmental regulatory compliance, formula optimization, and improved organizational transparency.

Operational improvements often go undetected because of an over-reliance on outdated, generic, or poorly integrated software solutions. Today's fast-paced technology landscape has changed the way business is done, as well as the nature of many chemical industry challenges—and it is time to turn these challenges into new opportunities.

Here are four of the biggest challenges facing chemical manufacturers.



The four biggest challenges:

① Responding to unanticipated variations in commodity prices

Though it may seem counterintuitive, lower energy prices can create as many challenges as they can solve. Most chemical manufacturers use natural gas or crude oil as a feedstock—either can account for more than half of a chemical company's production costs. A decade ago, energy costs appeared to be on a permanent upward climb. Recently, we have seen the emergence of cheaper forms of energy. The benefits of lower energy prices, however, are not evenly distributed on a country-by-country basis.

In 2014, access to shale gas gives US chemical manufacturers a competitive advantage over other countries. The US used to be one of the most-expensive countries in the world to manufacture chemicals. Through advances in horizontal drilling and hydraulic fracturing (aka fracking), the US has unlocked previously inaccessible shale reserves. US chemical investment in shale alone has since topped \$100 billion, according to figures from the American Chemistry Council (ACC).¹ Investing in shale gas has helped to reduce US energy prices, increase US chemical exports, and bring more manufacturing jobs stateside.

1. American Chemistry Council, "US chemical investment linked to shale gas reaches \$100 billion," Feb 20, 2014, Press Release.

With this rise in US chemical manufacturing, the ACC projects that US chemical sales will hit \$1 trillion by 2018. The ACC also sees that production growth in Europe and Asia will expand in the coming years as well, though not as substantially as in the US.²

Chemical companies in Europe are feeling the pressure, and have had to shave costs through plant closures and job cuts.³ Outside of the US, the competition has grown fiercer in other global markets. Dow Chemical projects that the European chemical industry will face a significant competitive disadvantage against its rivals in the US, whose electricity and raw materials costs are lower due to shale gas extraction. Dow also expects Asia and the Middle East to present stronger competition.⁴

The bottom line: Maintaining a big picture view of key metrics—such as inventory turns and manufacturing throughput, as well as transportations and logistics accuracy—help minimize overall costs. This is done by scheduling production processes either wholly to a new location or by moving key components of the manufacturing process to the most cost-effective location.

An ERP system can keep track of actuals and budgets for revenue and costs, profit and loss, and cash flow statements, as well as cost center information. Having this information as part of an organization's IT infrastructure can make it easier to find further efficiencies that stem from cheaper commodity prices. Conversely, an organization can seek out new efficiencies to ease the strain of higher geographic commodity prices.

In addition to tracking production processes, this IT system should be tracking sales orders, bookings, revenues, and gross profits—then analyzing both sales performance and profitability by product and customer to help companies make better pricing and production planning decisions. These operations should be monitoring critical factors like production orders, in-time production, and rework.

With this data being tracked in real-time, it's possible to quickly respond to fluctuations in energy prices—and their repercussions.

② Handling the increased scrutiny from recalls and quality audits

Recalls and quality audits are receiving more publicity than ever before, making the response to them more urgent and sensitive. Because chemical companies need to comply with a variety of regulatory compliance and government-mandated requirements, they must maintain strict quality management and detailed product information.

Special production techniques, materials, and packaging needs force companies to keep stringent control over their manufacturing processes. Chemical companies also need to accurately capture data from operational processes so they can visualize and test their supply chain traceability—and be prepared in the event of a recall or quality audit. All this adds cost and risk.

Being able to track individual lots from procurement through manufacturing and ultimately into the finished goods supply chain is a critical need. This helps ensure that a company can respond quickly to any inquiries, ranging from country of origin to specification compliance. Also, if it's necessary to recall a product, the company will already have established proactive routines to lower risk, minimize the impact, and help improve customer and consumer trust.

2. Scott Jenkins, "US chemical sales projected to reach \$1 trillion by 2018, ACC says," *Chemical Engineering* ([http://www.che.com/only_on_che/latest_news/U-S-chemical-sales-projected-to-reach-\\$1-trillion-by-2018-ACC-says_11316.html](http://www.che.com/only_on_che/latest_news/U-S-chemical-sales-projected-to-reach-$1-trillion-by-2018-ACC-says_11316.html)), Dec 13, 2013.

3. Ed Crooks, "Shale gas boom helps US chemicals exports," *The Financial Times* (<http://www.ft.com/intl/cms/s/0/2b1753c4-6024-11e3-b360-00144feabdc0.html#axzz2zd6tpM4c>), Dec 9, 2013.

4. Kirstie Knolle, "Dow Chemical sees competitive disadvantage for European rivals," Reuters (<http://uk.reuters.com/article/2014/06/02/uk-chemicals-usa-europe-idUKKBN0ED1W620140602>), June 2, 2014.

The track and trace system a chemical organization chooses should adhere to these three processes:

- Comply with all regulations (across governmental borders and agencies).
- Be able to identify contaminated batches.
- Guarantee full transparency.

In order to be prepared for quality audits, traceability data should be integrated across the business and made accessible with easy-to-understand visualizations that can be shared with personnel, suppliers, customers, and other third parties during a quality audit process.

This data is often overlooked as a means to drive operational efficiency. But, if this data is organized with the proper analytics tools, a chemical company can quickly identify affected products in their supply chain, place these items on product hold, and ensure that each product meets the necessary regulatory standards for national or international sale.

Through mining their data backwards, chemical companies can trace the lots, batches, intermediary products, or raw materials that are the root cause of a problem. Likewise, they can maintain airtight records to produce in the event of an audit. With this information being tracked, there are also new avenues available for increased manufacturing and supply chain efficiency.

By keeping up-to-date compliance metrics, chemical companies can:

- Maintain an efficient manufacturing process.
- Anticipate the ebbs and flows of regulatory compliance.
- Speed their time to business.

Additionally, using a database (or databases) to store batch information in a web portal or ERP system can keep every ingredient and step along the manufacturing process—as well as key stakeholders—organized. It comes down to having a strong track and trace system at the ready.

③ Managing operational and manufacturing data

Customers, whether they are other manufacturers, distributors, or retailers, want more for less—and they want it faster. They also want to transfer as much risk to their suppliers as possible. Shareholders want more revenue, profit, and a better return on their investment. Suppliers add to the pressure that manufacturers are under with higher prices, and fluctuations in the quality and chemical makeup in the raw materials they deliver. Regulators respond to safety and environmental concerns with greater oversight and tighter regulations.

The companies that are the most successful at responding to these value chain constituents are those that do the best job managing their operational and manufacturing data. Many manufacturers lack complete information on what products make or lose money. Their systems are unable to capture the actual end-to-end costs of individual products. In addition to all the variable costs, capital equipment needs to be serviced, upgraded, and replaced which also impacts overall costs.

Chemical manufacturers need accurate, reliable information about operations, equipment and other asset histories, and costs. They must be able to track the asset utilization in their plants to minimize unexpected downtime, while making sure they deliver complete orders, on time.

Chemical challenges

Rather than being inundated by a sea of data, a business analytics and asset management toolkit integrated into an ERP system can help chemical companies unlock the potential of big data. This makes data and analytics more consumable for the end-user, and makes it easier to integrate the insights offered by analytics into everyday business and manufacturing processes—from corporate headquarters to the manufacturing plant.

“ERP systems contain large amounts of data that can be used to gain visibility into business operations and underpin informed management decisions,” suggests a report by Aberdeen Group. “Often there is difficulty in finding the data needed and analyzing it to gain insight. Data may be siloed or inaccessible to business users, preventing these organizations from gaining the full return on investment (ROI) from their ERP implementations.”⁵

Embracing data analysis can help to calculate the formulas and costs of each product—and improve competitive and operational advantages.

④ Driving down formula costs to create new efficiencies

A chemical manufacturer’s formulas specify what raw materials it needs. But the availability of raw materials is affected by factors like:

- The seasonality of when raw materials are available vs. when they are needed
- The costs to purchase these materials from national or international vendors
- Scheduling and plant maintenance constraints
- Research and development time

...and the list goes on.

Customers have higher expectations for product, quality, availability, and price performance. But raw materials, especially those that are naturally occurring versus those that are man-made, have inconsistent quality and chemical makeup, forcing chemical manufacturers to adjust their formulations to maintain consistency and compliance. Similarly, disruptions caused by weather and geopolitical issues can create formulation problems. It falls on the manufacturer to create formulas that better mitigate the issues of raw material variability and availability based on seasonality and unpredicted disruptions.

With all of the complex operational challenges presented by formula strategies, each existing and new formula must be optimized to improve competitive and operational advantages. Making incremental improvements to existing business processes may help better manage the constraints created by raw material utilization, but this approach is unlikely to do enough. To truly overcome the adverse impact of difficult and fast-changing constraints, chemical companies need to work smarter.

Formula optimization is one of the best strategies for accomplishing this goal. With formula optimization, chemical companies can deliver a higher level of value to internal and external stakeholders. With greater insight into how the best available materials are being used, organizations can find new ways to create the best possible product—at the best possible price.

5. Aberdeen Group, *ERP plus BI: Maximizing the return on your ERP investment*, June 1, 2012.

The software solution used to manage and optimize formulas should be able to analyze complex and variable supply, production, and demand constraints, as well as financial considerations, to produce quality data that can serve as the basis for a formulation decision. And, this solution should provide direct access to better internal and supply chain information to support new product research and development. If this solution can streamline the steps involved in formulation, it can help the chemical company respond faster to market demands when launching new products and reformulations.

What your competitors are doing to achieve IT excellence

The time is right for chemical companies to adjust their business processes to cope with new challenges through their choice in technology solutions.

In the coming years, research from IDC Manufacturing Insights forecasts that software spending for manufacturers, including the chemical industry, will be focused on software applications, followed by system infrastructure software, and then application development and deployment. Application investments will continue to dominate external spending on software, representing 76.3% of a company's budget.⁶

Chemical organizations considering new investments in IT resources should evaluate whether their current software is meeting current industry best practices and—most importantly—whether their IT tools are helping them be as productive as possible. These tools are providing new competitive edges for chemical manufacturers who have examined their IT infrastructure.

Technology is advancing at a rate where it is no longer cost-efficient to wait until these tools have matured. “Never in recent memory have we seen such an explosion of technology. It is driving change in manufacturing operations and business processes. The risk of not adopting new technology until it matures is now greater than the risk of adopting new ‘bleeding edge’ technology,” said John Blanchard, ARC Advisory Group, in a recent webinar.⁷

By evaluating their current IT infrastructure and considering their future needs, chemical companies can find new opportunities to create operational efficiencies, while also preparing their organizations to remain competitive in a fast-changing business environment. For chemical manufacturers, today's challenge will indeed be next year's opportunity, proving that it pays to be prepared.

6. IDC Manufacturing Insights, *Best practices: Asset-oriented value chain 2013–2014 investment guide*, 2013.

7. Blanchard, John, “Chemical industry trends, drivers, and automation solutions,” presentation, ARC Advisory Group, as part of the Infor webinar, “A calculated approach to lowering cost and gaining efficiency for chemical manufacturers,” May 14, 2014.



Infor is fundamentally changing the way information is published and consumed in the enterprise, helping 70,000 customers in more than 200 countries and territories improve operations, drive growth, and quickly adapt to changes in business demands.

Copyright© 2014 Infor. All rights reserved. The word and design marks set forth herein are trademarks and/or registered trademarks of Infor and/or related affiliates and subsidiaries. All other trademarks listed herein are the property of their respective owners. This document is provided for informational purposes only and does not constitute a commitment to you in any way. The information, products and services described herein are subject to change at any time without notice. www.infor.com.

INFDP1445720-EN-US-0714-1