Data-Driven Outcomes: How the Internet of Things is Driving Digital Transformation in the Chemicals Industry

A Frost & Sullivan White Paper
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INTRODUCTION

The Internet of Things (IoT) is designed to enable seamless connectivity among devices and applications to deliver measurable benefits around business process change, supply chain management, enterprise resource planning, and manufacturing and production—all with the goal of lowering costs, driving productivity, and uncovering new revenue opportunities. The Internet of Things can help companies:

- Increase regulatory compliance and lower their environmental impact.
- Use assets more efficiently and effectively.
- Spur data-driven innovation.
- Enable managers and executives to ensure best practices are always followed.
- Boost productivity by streamlining business processes and automating decisions.
- Improve the customer experience.

Indeed, Frost & Sullivan research shows that chemicals manufacturers that leverage the reams of data available to them by combining smart sensors, apps and services, mobile devices, industry-specific software, and other IoT technology can speed decision making, increase accuracy and eliminate errors, and enable advanced practices like predictive analytics, proactive customer management, and just-in-time manufacturing. Specifically, chemicals companies looking for an edge in an increasingly competitive global marketplace can analyze data from multiple sources in real time to improve quality, streamline their supply chain, better manage human capital and other resources, and positively impact the bottom line.
UNDERSTANDING THE INTERNET OF THINGS

The Internet of Things (IoT) is an idea that sprung from an always connected world. Frost & Sullivan defines the IoT as a set of processes that connects a variety of devices across multiple networks to improve data collection, analysis, and action. Enabled by almost ubiquitous Internet connectivity, the IoT covers traditional productivity endpoints like PCs, smart phones and tablets, as well as other common devices, such as thermostats, reactors, production equipment, filling lines, and manufacturing tools. It also employs beacons, sensors, and apps in an effort to make employees more productive.

The goal: seamless connectivity among devices that can then leverage real-time data to create new business efficiencies, speed decision making, and take advantage of opportunities as soon as they arise. Chemical manufacturers are continually seeking the means to improve efficiency in the safest way possible, which is the ultimate goal of the IoT for this industry.

A recent Frost & Sullivan survey of almost 2,000 IT decision makers around the world reveals that manufacturing companies are very concerned with aligning IT with business strategies and automating and streamlining business processes. To help with these high-priority challenges, half of all surveyed organizations are turning to the Internet of Things—almost 40 percent already have internal deployments; 34 percent have extended their IoT initiatives to customers, suppliers, and partners; and 22.5 percent have embedded IoT into their business processes. Furthermore, 35 percent of manufacturing firms report that Big Data and analytics—a significant element of the Internet of Things—have a significant impact on revenues.

USE CASES FOR IoT IN THE CHEMICALS INDUSTRY

Chemicals producers share many of the same concerns as other manufacturers, and there are many areas in which these companies can benefit from the IoT. Here are five scenarios that are especially relevant right now:

**Supply Chain Management** Using the IoT lets chemicals manufacturers immediately respond to hiccups in the supply chain, which often involves multiple raw materials from multiple suppliers, many of which require specific temperature and environmental controls. By leveraging the data provided by sensors throughout the manufacturing process—monitoring equipment, materials, processes, environment, and employees—companies can cut costs and
drive productivity in response to real-time information, allowing them to fulfill the dream of just-in-time manufacturing all along the supply chain. The IoT can also help chemicals manufacturers work more closely with their suppliers to monitor their specialty products, many of which are in limited supply, found or manufactured in remote regions, and/or require extreme care in shipping and handling.

**Enterprise Resource Planning** There are many areas of ERP that will benefit from integrated data collection and analysis, but for chemicals manufacturers, remote monitoring and control is one of the most compelling use cases for the Internet of Things. In today’s global business environment, plant managers aren’t always in the same place as the devices, components, and manufacturing processes that need monitoring. But with the IoT, they can get real-time updates on performance metrics, productivity gaps, equipment failures, and personnel issues, without having to be on the production floor or even in the facility itself.

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<th>Opportunities for IoT</th>
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<td>Real-time operational efficiency</td>
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**Energy Efficiency** All manufacturers can benefit from smart metering to better maintain temperature within a production plant, allowing them to run high-energy manufacturing operations in ways that save money and boost output. But this is especially important to chemicals producers, since the ingredients and end products are often extremely sensitive to variations in temperature, humidity, and other environmental factors. Smart meters analyze historical and real-time data to proactively respond to changes in behavior and other factors. In a production facility, they might start by analyzing the time of day, anticipated employee count, outdoor temperature, expected output, and building design to set the temperature at a level that keeps workers comfortable and materials fresh, all while maximizing conservation. They can then adjust to changing conditions on the fly — if, say, there are fewer employees on the premises than expected or the larger grid is experiencing heavy demand. Smart meters also interact with other devices to balance energy use, including lighting, A/C systems, pumps, belts, and other devices that can be cycled less often during peak usage or high-rate times. Lighting, ventilation, locking mechanisms, and appliances can all be connected to the Internet so that settings automatically reset in response to what’s happening on site at any moment.

**Product Lifecycle Management** Within manufacturing firms, managing the product lifecycle can be critical to success. This is notoriously true in the chemicals industry, in which the manufactured products have a usable lifespan, as do many of the ingredients that go into them. The IoT gives visibility into what happens to the products once they leave the production floor and make it onto store shelves or the warehouses of commercial customers. This makes it much easier for companies to track and manage everything from out-of-date products to recalls, service, and support. That, in turn, allows chemicals companies to be proactive when it comes to their products, rather than waiting to hear from buyers about problems or concerns. The result: better outcomes and customer experiences for both B2B and B2C organizations.

**Asset Management** Some production environments are entirely automated; others rely on employees to monitor and manage key assets. Either way, real-time insights into the equipment companies and employees are responsible for reduce accidents, spills, and manufacturing mistakes, and generally improve outcomes. The IoT can help with predictive maintenance, facilities planning, inventory optimization, and better operational decision making.
By analyzing real-time data on asset utilization, plant conditions, staffing, and customer demand, the IoT can help managers mitigate risk while increasing reliability and operational efficiency. These measures can also improve safety, compliance, and sustainability.

**Strengths for IoT:**

- Ubiquitous sensing
- Increased Productivity
- Speed and accuracy of information
- Ability to immediately affect targeted change in the physical world

**BEST PRACTICES FOR EMBRACING THE IoT**

The data show that many chemical manufacturers have already taken the first steps toward leveraging the IoT, but there is significant room for expansion and growth. Frost & Sullivan recommends these strategies for IoT success:

- **Start small** Most companies are better off launching an IoT program in one plant or location, with a small collection of suppliers or around one product line or process area. This lets managers test and tweak the technology, processes, and responses without putting the entire operation at risk. You will see success in one area slowly expand to another, until you can safely deploy IoT across the organization—and ultimately extend it to partners and suppliers, too.

- **Pay attention to privacy** Frost & Sullivan research shows that concerns about privacy create one of the biggest roadblocks to the Internet of Things. As you embrace the IoT, keep in mind that all data collection must respect the privacy rights of employees, partners, suppliers, and customers. Companies that track and monitor employee movement and behavior must do so only during those employees’ working hours, after conferring with counsel about the current laws on data privacy, overtime requirements, and so on (these vary across and within countries). Tracking materials and products requires vigilance around partner and customer data.

- **Spotlight on security** The convergence of plant operations and IT creates risk with data management and software upgrades, especially as many systems are moving to the cloud. Most businesses struggle to secure traditional devices such as PCs and phones. Adding connected sensors and beacons, a lack of clear public policies, the extraordinary volume of data, and the fact that the use of the IoT will likely cross multiple jurisdictions only increases the challenge. It’s important to work with a provider that understands these risks—and can help mitigate them—before launching any new IoT initiative.

**CALL TO ACTION**

The Internet of Things (IoT) is intended to seamlessly connect sensors, networks, data, and devices to improve business efficiency and change the way chemical companies operate. The IoT can improve processes from supply chain management and enterprise resource planning to asset and product lifecycle management. Manufacturers that leverage Big Data on smart networks and devices can collect better, more reliable information, and then use it in real time to improve decision making, increase smart automation, and see a measurable competitive advantage. Frost & Sullivan strongly recommends that chemicals companies embrace the IoT to improve manufacturing processes, drive worker productivity, increase revenues, and positively impact the bottom line.
Schedule a meeting with our global team to experience our thought leadership and to integrate your ideas, opportunities and challenges into the discussion.

Interested in learning more about the topics covered in this white paper? Call us at 877.GoFrost and reference the paper you’re interested in. We’ll have an analyst get in touch with you.

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MELANIE TUREK
Vice President | Enterprise Communications | Frost & Sullivan
P: 970.871.6110
E: melanie.turek@frost.com

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Frost & Sullivan
3211 Scott Blvd
Santa Clara CA, 95054