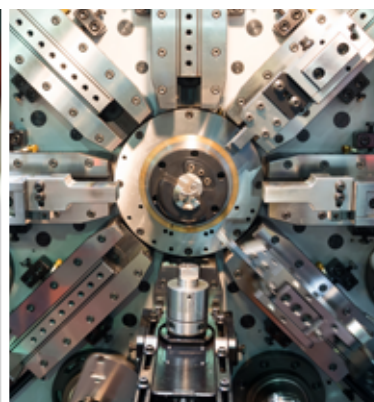




A Practical Approach to IoT: 3 Manufacturers Explain How



IQMS
Manufacturing ERP



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Real-world use cases demonstrate best practices for applying IIoT and Industry 4.0 concepts to optimize manufacturing operations

Everyone is talking about the promise of the industrial Internet of Things (IIoT) and the related concept of Industry 4.0. But discussions are often broadly conceptual, giving manufacturing operations managers and executives little real-world guidance on how to leverage new information and operational technologies to drive efficiencies in their facilities.

Moreover, the roadmap to applying IIoT and Industry 4.0 concepts can be daunting. There's a plethora of smart shop floor devices to consider in processing information and digitally communicating data to applications for further analysis (see related side bar). Then manufacturers need to understand the structured approach of applying Industry 4.0 concepts to a system of data capture, aggregation, application processing and high-level analytics. Also central is the concept of connected manufacturing that leverages the internal and cloud-based exchange, storage, and analysis of data from these smart devices.

Then there are several data management considerations manufacturers face. Historian database repositories are needed to manage structured, long-term historical data, and increasingly these are complemented by "data lakes" of loosely-structured historical data stored on a cloud platform. Business intelligence (BI) tools are important for the delivery of reports and dashboards of key performance indicators (KPIs) summarized from transactional data for use by management. Finally, diagnostic, predictive, and prescriptive analytics, which increasingly incorporate machine learning and even artificial intelligence, are being implemented to study classic structured data and unstructured data streams.

How IoT Improves Efficiency for 3 Manufacturers

With all of these concepts being used in so many conversations, it can be difficult for manufacturing technicians, managers and executives to sort out if and how any of them should be applied to their businesses. However, when we studied successful early adopters of manufacturing IoT who are now enjoying strong benefits, we found some common characteristics in their approaches.

- They innovated with a purpose—starting with a specific problem and a fix in mind.
- They looked past the hype around IIoT and focused on how specific technologies could address their need, helping to save time and money.
- They piloted one process or cell at first to gain experience with IIoT.
- They kept the initial scope simple and evolved it to become more sophisticated over time in an iterative fashion.
- They created an investment and roll-out plan in phases and analyzed the return on investment (ROI) from each project phase.

Following are three examples of manufacturers that have taken a practical approach to IIoT and Industry 4.0 innovation by starting modestly and growing thoughtfully into large-scale deployments that are delivering a strong ROI. Their experiences can provide useful insights on how other companies can apply these concepts to their own manufacturing operations.

1. Lights-out Production Becomes a Reality

Visionary manufacturer Plastics Components Inc. (PCI) has applied the concept of smart, connected manufacturing through its use of a comprehensive enterprise resource planning (ERP) system with production and process monitoring. The business now runs fully automated facilities where no direct labor is involved in the manufacturing process. In fact, the newest facility literally runs “lights out” and has received a U.S. patent for its process design.

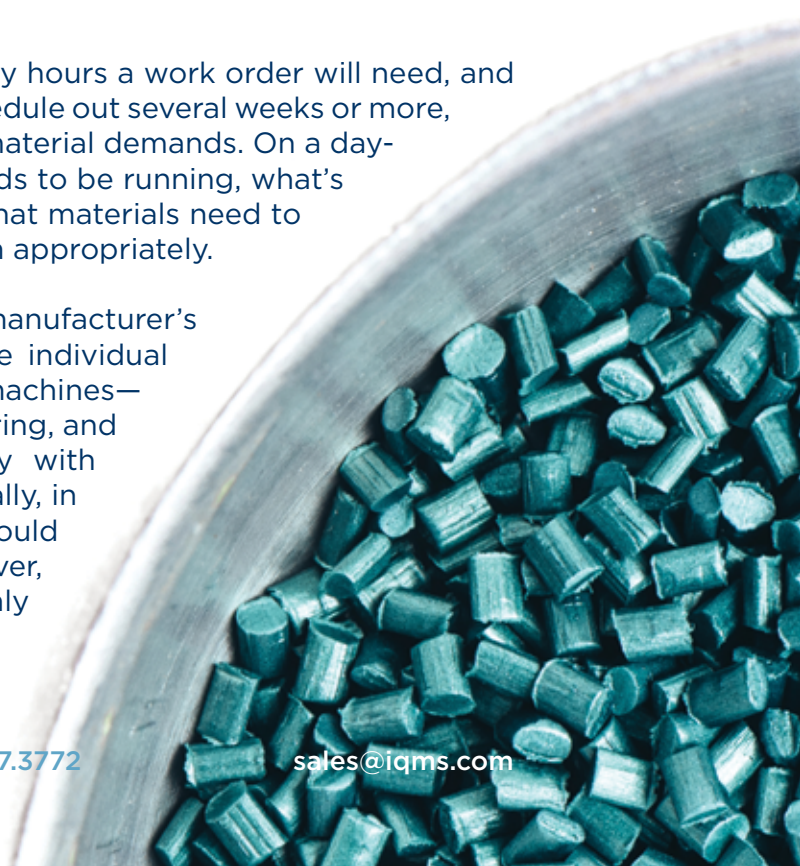
Like many manufacturers, the company originally relied on a potpourri of Excel spreadsheets, Access databases, and legal pads—leaving it without a clear picture of production scheduling, inventory, and true manufacturing costs. Now with its IQMS ERP system in place, this innovator has 60 fully automated cells, including over a dozen in a remote facility that can run 24 hours a day, seven days a week.

The manufacturer’s head of production observes, “That level of automation allows us to set up the process and the job, then run for prolonged periods of time. We’re able to consolidate the scheduling function into a single role, in which one person is able to schedule 60 machines, 10 to 15 setups per day, as well as all the raw material requirements needed for the day, week, or month for that run.”

The process is automated from the minute a sales order is generated, typically by an electronic data interchange (EDI) transaction from a customer’s ERP system directly into the demand system. Once the order is received, the schedule runs updates on a single scheduling function that recalculates demand. The system builds the buckets and work orders for every job and determines when raw material is needed based on run times and required ship dates from the customers. Then, all the functions are scheduled on the floor.

The ERP system knows exactly how many hours a work order will need, and the real-time scheduling module can schedule out several weeks or more, including forecasts from customers for material demands. On a day-to-day activity basis, it is clear what needs to be running, what’s going to be scheduled tomorrow, and what materials need to be available for that schedule to function appropriately.

Even though the complexity ratio in the manufacturer’s products is high—with some 300 active individual part numbers, 120 raw materials, and 60 machines—the comprehensive functionality, monitoring, and planning logic manage this complexity with very limited input from managers. Typically, in a company of its size, these functions would be handled by four to six people. However, in this automated mode of operation, only one person manages it all.



2. Up-to-the-Moment Production Visibility for Smarter, Efficient Use of Resources

Tessy Plastics, which has multiple plants across the United States, is an injection molder that produces high-volume medical, disposable medical, and consumer products in 24/7 operations. Previously, the company maintained paper folders with static product and process information at work centers on the plant floor. However, with challenges in taking timely action when after-the-fact performance data analysis indicated quality inconsistency, the leadership team identified continuous improvement of quality and delivery through process and information automation as the business' most pressing need.

The solution was to implement a comprehensive ERP and manufacturing operating system from IQMS, which was integrated with Tessy Plastics' equipment to enable real-time monitoring and reporting. The company also used real-time work center tablets to create information podiums at each work center. To make key information available to all employees, the team also deployed large-screen information centers on the plant floor.



Today, managers see colorized, up-to-the-second status updates on work center job schedules and KPIs along with a layout view of the entire shop floor. All team members have up-to-the moment work center status and performance information at a glance. This clarity and accuracy mean fewer man-hours are needed to capture and analyze production data. Team members can confirm that the correct components are being used as specified every time, and technology placed in key areas along the assembly automation line verifies that the components are produced without defects.

The insights and efficiencies gained at Tessy Plastics have translated into savings of between \$1.2 million and \$2.5 million annually.



3. Mistake Proofing with Synchronized Production and Just in Time Barcode Labels

Nissen Chemitec is a manufacturer and assembler of components that require individual vehicle part sequencing and just in time (JIT) shipping to its automotive customers. Six years ago, the company printed barcode labels in batch from a central location. The labels were then carried to the production line and manually applied to product containers, which opened risks of mislabeling product containers.

The Nissen Chemitec team sought a new process for ensuring the delivery of the correct product in the correct container with the correct label in the correct order and quantity at the correct time, just in time—with 100% consistency. Their approach was to connect floor devices, including real-time computer tablets, wired fixed-location and handheld barcode scanners, and line-side label printers, to ensure that floor process execution and packaging would always stay in sync with the master production schedule.

Now, at job setup, the solution conducts automatic mistake-proofing to confirm that the raw materials, components, containers, and tools are the ones specified for the run. It then prints a test label, which is scanned to verify that the format and content match specifications. Only then can the production job start. As a result, Nissen Chemitec's deliveries are now virtually 100% accurate, leading to high customer satisfaction.

The company's solution also automatically updates the job status for right and left side product processes in the IQMS ERP and MES systems, and it automatically calculates and refreshes overall equipment effectiveness (OEE) stats and KPIs—all in real time.

“Thirty-eight percent of manufacturers plan to implement Internet of Things technology in the next 12 months. Seventy-two percent plan to do so within the next three years.”

Aberdeen Group

Roadmap for Success

The three manufacturers demonstrate that Industry 4.0 and IIoT have moved far beyond conceptual discussions to practical implementations, which are enabling manufacturers to realize significant business gains. Industry 4.0 is here, and IIoT is seeing rapid adoption. In fact, the Aberdeen Group research firm reports that 38% of manufacturers plan to implement IoT technology in the next 12 months, and 72% plan to do so within the next three years. Clearly, it is time for all companies to start looking how they can take their manufacturing operations to the next level by applying these approaches.

By using ERP as a foundation, your organization can integrate key technologies to revolutionize the way it operates. To begin this journey, technology analysts from the Aberdeen Group offer the following recommendations:

- Don't wait. Your competitors have already begun their journeys to the new industry landscape. Every day they are benefiting from the innovation of Industry 4.0. Inaction will only cost you in the long run.
- Identify opportunities. Where are your processes lacking? Is it taking too long to get products to market? Are you unable to react to demand trends? Are your resources overburdened? Prioritize the biggest challenges that your organization faces, and think about how cloud, analytics, and the Internet of Things can fit into a new business reality.
- Start small. Wholesale change is disruptive. Many manufacturers begin their journeys with something small, such as deploying sensors on their machinery and seeing what type of intelligence they can derive. (For example, how does temperature impact your ability to perform predictive maintenance?)
- Work with your ERP vendor. Your vendor interacts with industry peers and works to incorporate best practices in its solution. This business partner can be a valuable resource in organizational innovation.
- Continuously improve. Industry 4.0 is just the next segment of your journey. Ensure that your employees, processes, and technology are flexible enough to integrate industry change as it happens.

With the right tools and project plans in place, Industry 4.0 and IIoT Initiatives are within your reach. The path of thoughtful innovation will lead to higher customer satisfaction, smarter and more efficient use of resources, and measurable boosts to the bottom line.

About IQMS

Since 1989, IQMS has been designing and developing ERP software for the repetitive, process and discrete manufacturing industries. Today, IQMS provides a comprehensive real-time Manufacturing Execution System (MES) and ERP software solution to automotive, medical, packaging, consumer goods and other manufacturing markets. The innovative, single database enterprise software solution, EnterpriseIQ, offers a scalable system designed to adeptly grow with the client and complete business functionality, including accounting, quality control, supply chain, CRM and eBusiness. With offices across North America, Europe and Asia, IQMS serves manufacturers around the world.

To learn more about IQMS' comprehensive ERP and MES solution, please visit www.iqms.com.

