

Smart Manufacturing: Enabling Three Key Areas of Excellence

written by Lauri Moon | December 1, 2016

(IW - Jonathan Katz: 11-5-16) A disruptive force known as the fourth industrial revolution is already underway. Known as the Industrial Internet of Things (IIoT), the digital enterprise or simply “smart manufacturing,” it’s a phenomenon that’s creating a host of opportunities for manufacturers around the world.

This interconnected system of machines, products and parts can help manufacturers reduce costs and time to market, dramatically increase productivity and take machine reliability and performance to new levels. While the competitive advantages are clear, some manufacturers are slow to digitize their operations because they’re unaware of the technologies available to them or are concerned about the required time, cost and infrastructure investments.

This white paper explores three key benefits of IIoT and some practical steps manufacturers can take to make digitization a reality.

Benefit #1: Stamp Out Downtime

Repeated downtime leads to lost productivity, late deliveries and dissatisfied customers. Downtime costs plants an average of \$500 per hour, per stand-alone machine. Plants often struggle with reliability because they lack advanced predictive technologies. Traditional preventive maintenance is based on the assumption that machines will follow failure patterns as they age. But this only applies to 18% of assets, according to ARC Advisory Group. The majority of assets display random failure patterns.

Smart-manufacturing technologies can help manufacturers increase visibility into machine performance and reduce unexpected failures. For example, predictive asset analytics software can identify subtle deviations in operating behavior that are often the early warning signs of equipment problems. The software can be integrated with existing machinery sensors, historians, and control and monitoring systems for

increased data access and ease of implementation.

Toyota Motor North America has already achieved significant maintenance savings from a smartmanufacturing

program that it implemented at its North American plants. The company developed a system using smart technologies to capture data in real time, conduct automated analysis of the information and create visualizations for team members, including information displayed on mobile devices. Toyota Motor North America has slashed 40,000 minutes in downtime at one plant for a total cost savings of \$6 million.

Benefit #2: Supercharge Productivity

Knowledge is power. Employees who have more information at their fingertips also are more productive. But many plants are struggling to boost productivity as skilled workers retire. Smartmanufacturing technologies can help reduce the learning curve for new operators.

Referred to sometimes as the “augmented operator,” mobility tools enable operator autonomy and faster decision-making. Tasks that previously required two operators can instead be accomplished with a single worker. Sensors affixed to equipment or materials can feed critical information, such as energy usage, machine speed, maintenance or inventory, to employees’ mobile devices. Previously, such tasks may have required a second operator to inspect equipment and log data.

In fact, the primary benefits from IIoT technologies are productivity improvements, McKinsey & Co. reports. Several manufacturers are experiencing measurable productivity spikes related to IIoT implementations.

Stanley Black & Decker’s DeWalt Power Tools plant in Reynosa, Mexico, for example, has implemented a system of RFID (radio-frequency identification) tags working in sync with routers to form a real-time location system. The tags provide real-time location and line status to workers, shift supervisors and plant managers, helping them spot problems faster. The workers can signal an issue by pressing a button on the line, which sends data to a software system. The software system generates messages with the location of the issue and suggestions on how to correct

the problem. The system helped the plant improve line efficiency by 96%, increase throughput by 10% and reduce material inventory carrying costs by 10%.

Benefit #3: Boost Quality

Smart technologies can help manufacturers quickly identify and troubleshoot product quality issues during production and in the field. Quality is among the primary reasons why many manufacturers adopt IIoT solutions. In one survey, 58% of respondents said product quality is one of the top five reasons they're implementing IIoT technologies.

Manufacturers can embed smart technologies, such as sensors, into products to receive real-time, automated information about warranty claims or product defects. IIoT technologies also can help manufacturers with post-sales service, such as scheduled maintenance. For example, Xerox has a central data warehouse that logs data from its devices located at customer sites. The company has set parameters that signal maintenance needs or possible equipment failure. The result is fewer on-site trips and more efficient maintenance.

Sensing technologies also can help reduce scrap, rework and defects. In a machine-to-machine, or networked, environment, sensors affixed to equipment can communicate output variations to downstream machines, which automatically make adjustments to ensure the product is within specifications.

For example, MFC Netform, a producer of powertrain parts for the automotive industry, ties its automated quality inspections to standards specified within its cloud Enterprise Resource Planning system. If the system indicates a part failure, the operator has the option to shut down the machine. Also, communication between the company's vision and ERP systems allows operators to calculate the true cost of rejected parts.

The Next Steps

The path to smart manufacturing may seem daunting. Many manufacturers cite cybersecurity, integration and the management of business requirements as major challenges to implementing an IIoT infrastructure.

However, there are steps manufacturers can take to overcome these hurdles, including:

- Seeking devices that can integrate with existing legacy systems. This “wrap and reuse” approach minimizes the need for a complete infrastructure overhaul. Examine how well the sensors or actuators interact with the manufacturing execution or ERP system. Consider Ethernet-ready devices or sensors that can connect wirelessly to the cloud. Also, consult with an integrator who can design modular architectures that are easily adaptable for future upgrades.
- Partnering with IIoT experts and vendors who can help interpret the data generated by smart technologies. These experts can help identify gaps between business needs and current IT capabilities. Some experts, such as Schneider Electric, provide simulation services, asset performance consulting and energy-consumption assessments. They also may offer cybersecurity and workforce training services. Training is critical because it shortens the learning curve for employees and ensures they can maximize the benefits of IIoT technologies.

Conclusion

IIoT technologies offer game-changing potential for manufacturers. Schneider Electric research shows that manufacturers can save up to 40% on maintenance costs, 50% on machine downtime and 18% on energy consumption, and increase productivity up to 55% through the use of smart technologies.

But unlocking the full value of IIoT often requires *interoperability of multiple systems*.

In fact, in the worksite setting, 60% of the potential value of IIoT is dependent upon the ability to integrate and analyze data from various systems. In addition, most data companies are not using most of the data they collect from existing smart technologies, according to McKinsey & Co.

Strategic partners can help manufacturers design, install and integrate IIoT technologies with minimal disruption to their current operations. They also can

provide the support that manufacturers need to ensure they're gaining the full benefits from their smart operations.

Clearly, creating the digital enterprise doesn't have to be a cumbersome, disruptive process.

(Jonathan Katz is a journalist with more than 15 years' experience in the publishing industry, owner of JSK Communications, and former managing editor of IW magazine.)