

What the Internet of Things (IoT) Means to the Future of Discrete Manufacturing



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Who's it for?

Discrete manufacturers looking for ways to drive long-term profitable growth, enhance the customer experience, improve overall quality, and expand their range of products and services.

Summary:

Microsoft reports that 79 percent of today's manufacturing leaders are using Internet of Things (IoT) technologies, with 82 percent of them reporting increases in operational efficiency and improved product quality. Are you leveraging the IoT to your best advantage? This eBook explains the benefits manufacturers are realizing in many areas of their operation by using the IoT—and what it means to you.

Author:

Mark Stevens
Partner
Manufacturing and Distribution
Consulting and Technology Integration

To be a valuable asset for your customers, you need to continually innovate. You must look for ways to drive long-term profitable growth, enhance the customer experience, improve overall quality, and expand products and services. The question is: How do you do it all quickly, efficiently, and without disruption? The answer lies in technology, specifically the Internet of Things (IoT).

Manufacturers leveraging the IoT to its best advantage are realizing benefits across their operations, including:

- Production enhancements
- After-sale performance improvements
- Customer relationship development

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1. Production Enhancements

In the industrial sector, IoT refers to real-time communication (machine-to-machine, machine-to-person and person-to-machine) and networks of data-gathering sensors. Technologies based on IoT have the potential to drastically improve data visibility and, with the intelligence that's gathered from all those sensors, improve nearly every aspect of manufacturing.

Capturing and analyzing data generated by equipment, systems, and people provides insights that enable you to improve virtually everything you do. Think of IoT as giving your equipment a voice. When you embed a microcomputer or sensor into a piece of industrial equipment, a product, a conveyor system, or just about any other physical device involved in the manufacturing process, you suddenly have the ability to improve the performance of each component, their interaction—and the quality of your processes and products.

On the plant floor, IoT creates a network linking a variety of equipment, parts, meters, automation controls, tools, workers, trucks, smart shelves, and others. Every product, in fact, can be given a digital identity so the company knows its exact location and condition in real time throughout the supply chain. The information generated can then be used to:

- **Track assets.** With real-time, continuous visibility into the location and status of assets like parts, fixtures, tooling, and goods in transit, you can accurately identify and anticipate issues that need intervention.
- **Monitor equipment.** Regular equipment “health checks” minimize downtime and failure risk. IoT-enabled sensors automatically trigger alerts and initiate the appropriate response from maintenance immediately when any issues occur.
- **Ensure quality.** IoT makes it possible to monitor items down to a very granular level. Sensors embedded in a torque wrench used in assembling a complex part, for example, can capture the precise amount of torque applied to a part, the wrench used, when that wrench was last calibrated, and the employee who used it. With this information, faults can be detected in real time, and flaws in either the wrench or the product are identified and can be resolved immediately. Historical data can reveal patterns that might indicate production issues which require adjustment.
- **Improve safety.** When shop floor workers use wearable technologies (think Fitbit), they receive real-time machine and production information to help them anticipate and resolve issues before they’re compounded. These devices can also be designed to detect obstacles in the path of a forklift, for example, greatly minimizing the risk of injury.

These are just a few of the examples of the kinds of monitoring that are possible with IoT on the shop floor. Keep in mind, though, that all this data has little value unless it’s analyzed and used to make better decisions.

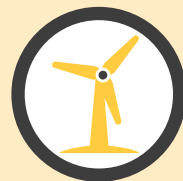


Notable Examples of How Some Leading Manufacturers Are Using the IoT



CISCO

A leader in IT, Cisco developed a way to monitor tire inflation systems on tractor-trailers. The trailer is equipped with a sensor that alerts the driver of low tire pressure; because the sensor is connected to other systems, it also alerts nearby maintenance yards, warranty systems, and all the other relevant points, automatically. With this capability, drivers no longer had to be counted on to report and handle incidents, and any delays were relayed to the customer immediately.



GENERAL ELECTRIC (GE)

This multinational conglomerate is using data from sensors attached to equipment in the field, like wind turbines, to monitor their health and provide diagnostics and prognostic insights. By analyzing the data coming from the sensors and feeding it into virtual representations of the equipment, GE identifies when a piece of equipment is ready for preventive maintenance, in turn prolonging its life. The data can also be used to ensure maintenance is performed only when needed. If, for example, a part on a piece of equipment is slated to be replaced every four years, data generated might show that in fact the part can last seven years, dramatically reducing operating costs.

2. After-Sale Performance Improvements

The visibility and opportunity IoT technologies provide isn't limited to the manufacturing floor. Real-time IoT data makes it easier for manufacturers to gain a better understanding of after-sale maintenance requirements, thereby moving beyond the traditional break-then-fix and/or routine biannual maintenance model and toward proactively predicting failure. The resulting internal efficiencies can in turn be extrapolated into time and cost savings for customers, including recouping downtime and related expenses.

Machines That Learn and Predict

Proactivity is the key, and it's safe to say that improvements in processes and performance will be driven more and more by machines themselves, not by people analyzing the data that comes from them. IoT represents opportunities the manufacturing world is just beginning to fully appreciate. One such opportunity is in leveraging solutions like Cortana, a Microsoft digital assistant, as part of a framework for intelligent equipment systems, with each machine being capable of "learning" normal and abnormal behaviors. With that insight, they'll communicate to both upstream and downstream equipment, signaling when processes need to change to account for actions taking place.

What Does It Mean for Discrete Manufacturing?

While you may not be quite ready for machine-learning algorithms that reengineer your production processes, you may be ready for predictive maintenance that helps extend the life and enhances the performance of your products, while also generating additional income in the way of guaranteed-uptime arrangements for which your customers are willing to pay premium rates.

The concept of creating a revenue stream around your ability to monitor and better maintain the products you make is one customers are readily embracing, since they can't afford downtime and repairs if they want to stay competitive.

3. Customer Relationship Development

IoT technologies are being widely used to improve product design and performance, but they're also being tapped to improve the overall customer experience with enhanced, expanded, and revenue-generating services:

- **Self-directed customer service:** Beyond the product, customers equipped with a data dashboard could view the overall health and performance of a system and, independently or in tandem with your team, set corrective actions in place before a small issue becomes much larger and more costly.
- **Practical pricing options:** Monitoring and tracking customer equipment usage —duration, frequency, and seasonality of use—give you the information you need to offer pricing models that align with needs rather than relying on set pricing. This approach may result in greater revenue from some customers and less for others, but it differentiates you among manufacturers and will help make you more attractive to most as you take the extra steps to prioritize their needs and budgets.
- **Better products:** IoT monitoring tells you how customers use your products, how often, when, why, and just about anything else you want to know. With this information, you can continually modify and fine-tune equipment to function in the way that's most cost-effective for customers.

At Wipfli, We Know Manufacturing

IoT makes nearly all things possible for manufacturers, and the possibilities of today will be the expectations of tomorrow. Are you ready? Talk with one of our manufacturing experts about the potential for IoT to extend your value to customers and about simple, cost-effective ways we may be able to help you get started.