

Maximizing the Value of Manufacturing Data with IIoT Solutions

A manufacturers' guide to digital transformation with Industrial Internet of Things



The convergence of physical and digital technologies in manufacturing has given rise to the industrial use of Internet of Things. Its sophisticated sensors and advanced digital tools mean Industrial Internet of Things (IIoT) can vastly improve manufacturing operations and even transform entire manufacturing business models.

Even so, [a recent survey](#) of North American heavy and automotive manufacturers shows that these companies are struggling to scale their IIoT investments across their companies. Indeed, the vast majority of these manufacturers have deployed IIoT in only one small sector or department of their companies.

They've yet to realize the full benefits of IIoT across their entire manufacturing operations. These companies are losing millions of dollars in potential profits as a result, while falling behind their more sophisticated competitors. In the same survey, 80% of respondents agreed that they will face a competitive disadvantage if they fail to optimize their IIoT processes.

In this guide, we identify the latest developments in the IIoT field and determine how IIoT can best help manufacturers in their industry today. We identify 10 unique opportunities manufacturers can leverage to maximize the value of their IIoT investments as well. With these approaches, manufacturers can scale their IIoT solutions more effectively across their operations, realizing the full benefits of the technology.

What Is the Modern IIoT?

IIoT is a category of industrial technology wherein equipment generates and transmits data from machines to centralized systems for analysis, the creation of insights, and ultimately, the execution of meaningful operational changes. In these environments, sensors connected to equipment are linked to centralized digital systems such as analytics and ERP via wired or mobile connectivity.

In modern manufacturing environments, IIoT can include hundreds of sensors, each of which transmits data for deep analysis. Cloud computing makes managing these sensors possible by seamlessly storing vast amounts of data before it is passed on to data centers or processed via cloud applications, such as advanced analytics or even artificial intelligence (AI) platforms.

Consider this example: An operations manager receives an alert from a series of machines



that are networking properly. A cloud-based AI application may analyze the data generated by the alert and make recommendations to the operations manager. In this environment, the operations manager can diagnose a problem in real time or even anticipate future problems via advanced analytics, removing the need for a break-fix approach to operational maintenance.

IIoT also has applications within distribution channels, where containers and products themselves can be tracked even as they pass from one supply chain partner to another. IIoT has enormous implications for sensitive industries, including healthcare, where products often require unique care, such as temperature controlled environments that IIoT sensors can monitor in real time.

Why Is IIoT So Important Today?

The power of IIoT is scaling with the sophistication of sensor, cloud-based, and AI technologies, vastly expanding what's possible in manufacturing environments. New opportunities include:

Easily tracking the full sum of machines, containers, products, and personnel.

For example, IIoT software for device management means one application can track and manage physical devices—and even provide remote software and firmware updates

to device operating systems.

Eliminating both waste and downtime through greater visibility and efficiency.

Sensors can indicate when machines waste energy during unproductive periods, for example. They can also help prevent breaks through predictive maintenance.

Analyzing KPIs from the shop floor in real-time.

Sensors send machine performance data to centralized systems where AI can analyze that data and highlight improvement opportunities. Visualizing OEE and OLE metrics from a single dashboard, without manual processes. In addition to aggregating data on individual machines and personnel (i.e., personal equipment), sensors enable centralized teams to review operational metrics en masse through centralized systems.

Even so, nearly 66% of all IIoT projects continue to fail, according to a [January 2020 industry study](#).

Manufacturers require innovative technologies, targeted and well-planned use cases, and the right implementation partnerships to launch and scale modern IIoT successfully.

10 Ways You Can Maximize the Value of your IIoT Investment

Manufacturers must begin thinking like software firms if they hope to get the greatest value from IIoT. It starts with identifying the right use cases and then securing the right resources and partners as they begin. Here are 10 ways manufacturers can implement IIoT success for their own organizations.

1. Back-End System Integration

IIoT can enhance the capabilities of new or existing back-end systems, such as enterprise resource planning (ERP). That's because IIoT provides a great quantity and more accurate real-time data about equipment, processes, and personnel. Centralized analytics and AI solutions can also accelerate the time between insights and execution of new solutions by supporting human decision-making.

2. Improve Cybersecurity

IIoT technologies require their own cybersecurity, but the sophisticated security protocols of modern IIoT devices can also improve overall cybersecurity. That's because

“IIoT empowers manufacturers with greater visibility into KPIs, events, and potential maintenance issues, among other features.”

IIoT data is often secured using standardized security protocols purpose-built for enterprise-grade systems. Manufacturers can better protect IIoT sensors, other devices, and centralized digital resources as a result.

3. Increase Operational Visibility

Because IIoT produces more data about manufacturing operations, IIoT empowers manufacturers with greater visibility into KPIs, events, and potential maintenance issues, among other features. This visibility even supports manufacturers in negotiations with business partners—they can differentiate themselves from competitors by clearly demonstrating their operational success.

In some cases, manufacturers can continue monitoring the performance of equipment sold to their customers and anticipate maintenance issues via remote sensors. They can also prevent breaks and optimize outcomes for their clients as a result.

4. Connectivity and Remote Management

As described, IIoT enables a “connected factory” where tools, devices, machines, and personnel can be monitored in an automated and centralized way. IT managers can therefore deliver real-time insights to onsite personnel and even field workers, and they can also empower users to manage equipment and processes remotely. This is especially useful when field workers are onsite working on customers' equipment, for example, or when an employee needs to interface with an expert who must see the same real-time information as that employee.

5. Improve Automation

IIoT makes automating processes and even decision-making faster, better, and more accurate. Improved automation and visibility means operational leaders can have more trust in those systems; they can focus their efforts on adding value in other areas instead.

6. Human-Robotic Collaboration

Just as IIoT connects personnel to real-time data, IIoT can empower both conventional robots and “cobots.”

Real-time IIoT data ensures automated robots

with direct manufacturing roles (e.g., automotive assembly) can intelligently shut down or modify their behavior when a problem arises, for example. Robots that support humans directly (i.e., cobots) can notify humans about potential inefficiencies or perform other supportive actions.

7. Alignment Between ICT and Production Teams

With IIoT, information and communication technology (ICT) professionals can take a more active role in manufacturing processes. Because ICT will share real-time visibility of machines and software involved in the manufacturing process, they can better collaborate with operations technology personnel.

“IT-OT integration is considered one of the most difficult tasks,” according to [SME](#). But manufacturers can “ensure clear collaboration between IT and the business by leveraging a step-by-step approach that ... has clear near-term and long-term objectives to scale.”

8. Reduced Risk

Remote monitoring and robotic automation alone mean less staff on the factory floor, thereby reducing the risk of physical harm to humans. Sensors can provide real-time readings on risky measurements—such as temperature, vibrations, and fluid levels—freeing human beings to focus on other and often safer ways of adding value.

IIoT can also support systemic risk reduction through the use of digital twins—functioning digital replicas of physical manufacturing environments. Digital twins enable ICT-OT teams to take data from the real, physical system and feed it into the digital twin, thereby visualizing real-world scenarios without putting real-world systems at risk. As a result, these teams can anticipate any number of future issues or optimize countless processes.

9. Efficiency and Cost Savings

IIoT improves efficiency and creates cost savings. It also allows operational leaders to better visualize wasteful processes, material waste, or functional decline within their factories. When ICT-OT teams eliminate downtime for equipment, they improve both operational efficiency and the bottom line.

10. Better Business Decisions

Above all, IIoT is designed to provide more accurate, real-time information to support better business decisions. And although IIoT does a great job of doing this at the operational level, its results and possibilities also support high-level business opportunities and decision-making.

How to Get Started

Even manufacturers who struggle to scale IIoT often begin with the right approach: They start with a single use case and prove its potential before investing in future growth. But even building the most basic IIoT requires expertise in engineering, software, IT financing, and others.

Rather than hiring additional talent, manufacturers can turn to a certified implementation partner. These partners help take manufacturers' business goals and transform them into worthwhile IIoT investments, and they provide IIoT strategies that will help them realize meaningful, company-wide success.

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