

# IoT IN MANUFACTURING - APPLICATIONS, BENEFITS AND CHALLENGES



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This Impact Brief distills a wide range of reports and analysis on the Internet of Things (IoT) in manufacturing – exploring its applications, benefits, challenges and risks. **Brought to you through the objective lens of InsightBrief.**

## OVERVIEW

- ▶ The Industrial Internet of Things (IIoT) is experiencing explosive growth. There are expected to be close to one billion internet-connected machines in manufacturing environments by 2020 - nearly 400% increase relative to 2015. <sup>1</sup>
- ▶ IIoT is a central part of the 'Smart Factory,' building flexibility, responsiveness and granular monitoring into the fabric of the manufacturing process. Data outputs can power both performance optimization as well as enhanced forecasting.
- ▶ There is an almost unanimous acceptance among industrial executives surveyed that IIoT technology will transform the commercial landscape. Nevertheless, when asked, 60% of industrial equipment companies told Accenture that they had not yet made significant investments in the technology. <sup>2</sup>

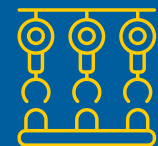
## APPLICATIONS & BENEFITS

- ▶ The most commonly cited applications of IoT in manufacturing relate to the movement of goods along the supply chain. Manufacturers stated that there were good or excellent opportunities to leverage IoT in warehousing (78%), shipping/logistics/transportation (78%) and document management (76%). <sup>3</sup>
- ▶ Cost reduction is a prime driver for IIoT innovation, with 89% of individuals surveyed agreeing. Savings come via:
  - Better forecasting of inventory requirements
  - Reduced maintenance costs
  - More consistent operations, with fewer errors
  - Staffing efficiencies <sup>4</sup>
- ▶ IIoT connectivity makes it far easier for manufacturers to monitor:
  - Factory assets
  - Inventory and stock levels
  - Quality issues with materials
  - Employee efficiency
  - The overall functionality of facilities

This translates into dramatically more responsive businesses, drawing on historical data to find opportunities for optimization.



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**Definition:**  
The 'Industrial Internet of Things' (IIoT) is the application of the Internet of Things (IoT) technologies in manufacturing, harnessing sensor data from machine-to-machine (M2M) communication and enabling automation technologies.

## APPLICATIONS & BENEFITS (cont.)

- ✓ Networked sensors help manufacturers identify and replace faulty components. IIoT can reduce the time from detection to correction by a reported 50%-90%.<sup>5</sup>
- ✓ IIoT devices can precisely gauge the condition of machinery by comparing its performance to that of a 'Digital Twin'- a mathematical model calculating expected output and the effects of workload and stress. This can flag issues before they become problems, forecasting maintenance requirements and preventing mechanical failure and stoppages.
- ✓ IIoT technology doesn't just allow manufacturers to collect data, but it can also be used to send commands - for example, remotely changing machine settings. If connected to AI, the output can then be automatically adjusted based on performance or based on events such as new orders processed.
- ✓ By optimizing manufacturing processes and the use of assets and resources, IIoT can:
  - Reduce unplanned downtime
  - Reduce maintenance
  - Reduce waste
  - Increase throughput
  - Extend the lifetime of assets
  - Increase the quality of output and reduce the number of recalls
  - Accelerate turnaround time from months to days
- ✓ Increasing transparency across the assembly line and reducing the potential for human error means that IIoT technology should prevent accidents and improve worker safety. At the same time, increased operational efficiency potentially minimizes the environmental footprint of manufacturers that deploy IIoT.
- ✓ A leading electronics company launched a Smart Factory program to improve industrial processes via connected manufacturing. Using IIoT technology, automation and integrated machine control, it was reportedly able to:
  - Reduce costs
  - Achieve shorter lead times for customers
  - Increase production capacity by 25%
  - Produce 50% fewer defective products<sup>6</sup>
- ✓ Airbus's 'Factory of the Future' manufacturing initiative saw sensors deployed on tools and equipment; workers were provided with wearable technology, such as smart glasses. The objective of the program was to streamline operations, to increase safety and to reduce mistakes and it resulted in a reported 500% boost in productivity.<sup>7</sup>



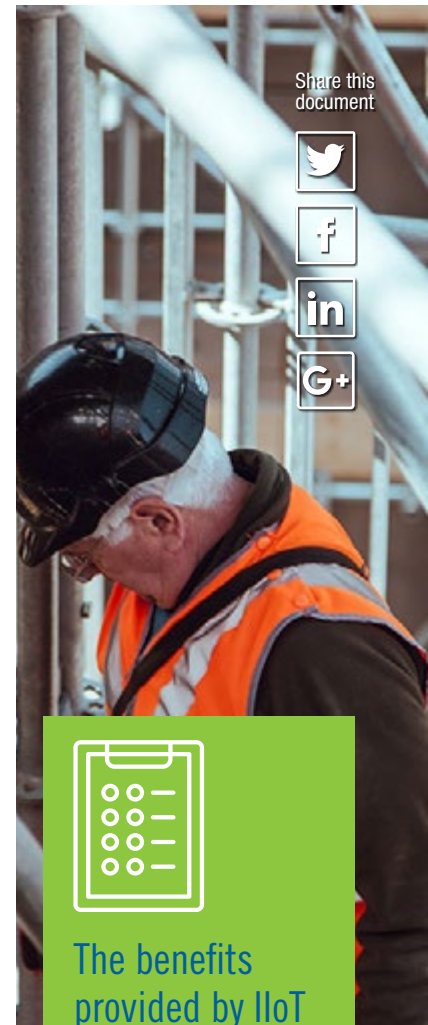
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## CHALLENGES

- ✓ The benefits provided by IIoT technology to manufacturers will rely on the ability of the organization to refine, process and act on new data inputs, as well as the availability and quality of baseline historical data.
- ✓ Among the leading concerns regarding IIoT are the lack of industry-wide standards, the potentially poor interoperability of technology and the high costs of deploying new hardware and processes.
- ✓ Successfully adopting IIoT in manufacturing requires:
  - Integration of technology into the existing workflow
  - Increased agility of IT infrastructure and processes
  - Cross-functional collaboration and the deconstruction of organizational silos

The greatest benefits will be achieved when IIoT is deployed across the breadth of the organization's supply chain.

- ✓ When using third-party IIoT technology, manufacturers should be clear about the ownership and portability of data. They should also consider the fact that assets may have a far longer service life than their digital equivalents, creating the risk that devices may someday lose support and become unreadable.
- ✓ By adding networked devices, IIoT greatly increases businesses' exposure to cybersecurity threats and their potential impact. Data security was identified as a key concern by 70% of respondents in a recent survey.<sup>4</sup>
- ✓ Security should be imperative for the commercial use of IoT technology. Yet 81% of respondents from the fields of corporate governance and risk management said that they believed a data breach caused by unsecured IoT devices was likely and 97% of all respondents said that such a breach could be catastrophic.<sup>8</sup>
- ✓ 56% of corporate governance/risk management professionals surveyed reported that their organizations did not inventory IoT devices. With reports such as that of a casino hacked via an internet-connected fish tank, the absence of such logs presents a potentially huge gap in security.<sup>8,9</sup>
- ✓ Approaches to securing IIoT networks include:
  - Encrypting all transmitted data
  - Putting standard network security and firewalls in place
  - Patching devices as soon as updates become available
  - Investigating API-level security
  - Deploying comprehensive system monitoring, potentially augmented by machine learning technologies
  - Using Public Key Infrastructure Security



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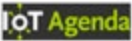









Experts emphasize that the Smart Factory is not an end state but a process - incorporating agility, connectivity and transparency into the industrial workflow.

## FUTURE

- » Manufacturers are faced with a rapidly changing and ever more complex marketplace. IIoT technology can assist, enhancing corporate agility and providing a crucial point of competitive differentiation.
- » For its benefits to be fully realized, IIoT and the Smart Factory will require a cross-functional workforce - able to not only install and manage networked devices but also to connect equipment to big data analytics and AI.
- » It is forecasted that as IIoT becomes more widely accepted, businesses will be able to access a marketplace of general-use industrial apps, customizable for their specific needs. Using this software will minimize both internal and external compatibility issues and hence discourage data siloing.<sup>10</sup>
- » Experts emphasize that the Smart Factory is not an end state but a process - incorporating agility, connectivity and transparency into the industrial workflow.



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