The factory of the future

How manufacturers can boost productivity and savings with smart factory technology

verizon business

Industry 4.0, also known as the Fourth Industrial Revolution, represents a fundamental shift in how manufacturing operates. It leverages interconnected digital technologies to create intelligent, responsive and interconnected systems that optimize production processes and drive efficiency. In many cases, issues can be corrected prior to having an impact on production without the need for human involvement.

Technology plays a key role in creating this ecosystem, connecting, automating and monitoring all aspects of manufacturing. This allows manufacturers to boost efficiency.

Furthermore, physical automation of manufacturing can go a long way toward boosting efficiency even more. But surprisingly, it's less common than you might think. Consider:

54% of global data and analytics decision-makers in industrial products manufacturing who were surveyed reported that their organization uses at least one form of physical automation: 32% reported using one form; 12% use two; 6% use three; 2% use four; and 3% use five.[1]

Industry 4.0 also relies on the use of big data and analytics to optimize production, supply chain and logistics. These advancements address many of the challenges affecting manufacturers' productivity and bottom line, such as:

- Downtime from unexpected maintenance
- Incomplete visibility into supply chains
- Frontline labor shortages
- Sustainability
- Robotics deployment on the factory floor

Companies implementing Industry 4.0 are responding to challenges like talent retention and becoming more agile, resilient and innovative. Many manufacturers are expanding operations in the U.S. as we see an increase in reshoring. In terms of revenue, the global Industry 4.0 market was worth $149.3 billion in 2023 and is anticipated to witness a compound annual growth rate (CAGR) of 18.9%, forecasted to reach more than $1 trillion by 2034.[2]

Unfortunately, many manufacturers have been slow in adopting Industry 4.0. This hesitation is understandable, as embracing Industry 4.0 requires overcoming significant hurdles, with retaining high-performing talent being a primary concern. In fact, it was a top challenge for manufacturers in 2022, and 1 in 3 surveyed executives have made retaining high-performing employees their strategic priority for 2023.[3]

As most industries are working to do more with less, warehouse operations such as picking and packing are some of the last remaining labor-intensive steps of the supply chain.

Challenges preventing adoption of Industry 4.0 innovations include a shortage in technology-skilled employees, systems that lack interconnectivity and hesitancy to invest in Industrial Internet of Things (IIoT) technologies.

61%

of manufacturers surveyed say they plan to partner with tech companies as part of their growth strategy.[4]

1 in 3

surveyed executives have retaining high-performing employees as their strategic priority for 2023.[5]

Return on investment (ROI) on Industry 4.0

Companies that have already embraced these technologies are seeing benefits across the manufacturing environment. For example:

- Big data and analytics can reduce material waste or overuse and can be used to oversee the metrics of the entire factory.
- Predictive maintenance, simulations and digital twins can reduce unplanned downtime.
- Robots, sensors and automated processes can reduce operational risks and downtime.
- Internet of Things (IoT) and artificial intelligence (AI) allow dynamic scheduling, increased capacity and lower costs.
- Automating dangerous tasks and using real-time data for safety monitoring can significantly reduce workplace accidents and improve overall safety.

Industry 4.0 technologies allow factory machines to flag problems in real time so the manufacturer can mitigate them before they become more costly and result in serious consequences. The impact of recent disruptions was substantial. 80% of surveyed executives experienced a "heavy" to "very heavy" impact on their supply chains by at least one disruption over the past 12–18 months.[6] Organizational changes, including labor strategy, can be a game-changer for manufacturers, as labor is one of the highest costs of manufacturing.

Advanced technologies like computer vision applications using video cameras can help track staff compliance and safety rules. For example, when a system detects a worker entering an unsafe area, the system can alert the smart factory to immediately halt production to address the safety violation.

Data from sensors, edge devices and connective systems promote the safety and reliability of machinery and processes.

Drones and intelligent video analytics can monitor operations to reduce safety incidents.

Augmented reality (AR) and robots can reduce the need for workers in unsafe or hazardous areas.

Prevention of quality issues in real time lessens the need for human quality inspections.

Industry 4.0 also helps manufacturers manage unexpected crises, such as supply chain issues, labor shortages and skill gaps, and increasing competition and price pressure.

But with new technologies, manufacturers can combat issues such as supply chain shortages by receiving advance alerts of shortages, weather events and other issues and can program automatic ordering from alternate suppliers in the event of a problem.

Additionally, 3D printing technology can increase efficiency and flexibility while reducing manufacturing waste. Industry 4.0 technologies allow better monitoring of consumption, more efficient consumption, faster actions to address inefficiencies and faster information sharing with regulatory authorities. Surveyed manufacturers have benefited from undertaking these smart factory initiatives[7]:

+10%
Safety and sustainability

+20%
Asset efficiency

+30%
Product quality

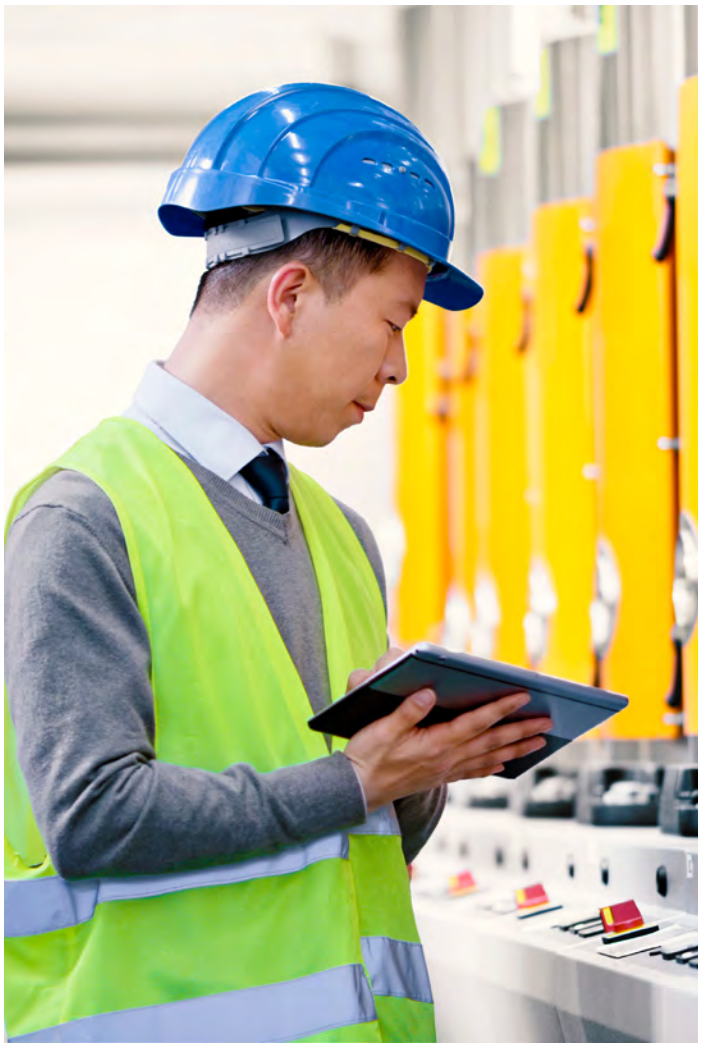
-30%
Costs

The Smart Factory by Deloitte @ Wichita

The Smart Factory by Deloitte @ Wichita, of which Verizon is a sponsor, is an ecosystem of innovative companies that works with clients on real business problems, helping them transform manufacturing operations.

The factory features an end-to-end working production line and demonstrates smart manufacturing capabilities in engineering, physical and process automation, factory synchronization, execution excellence, intelligent assets and maintenance, quality modernization, sustainability and safety, and the evolving workforce. It is 60,000 square feet of smart and sustainable innovation powered by a renewable energy smart grid and a fully connected and cyber-protected tech stack.

A team of industry leaders, solution providers, technology innovators and researchers offers applied-learning opportunities, helping organizations solve problems through smart factory use cases.

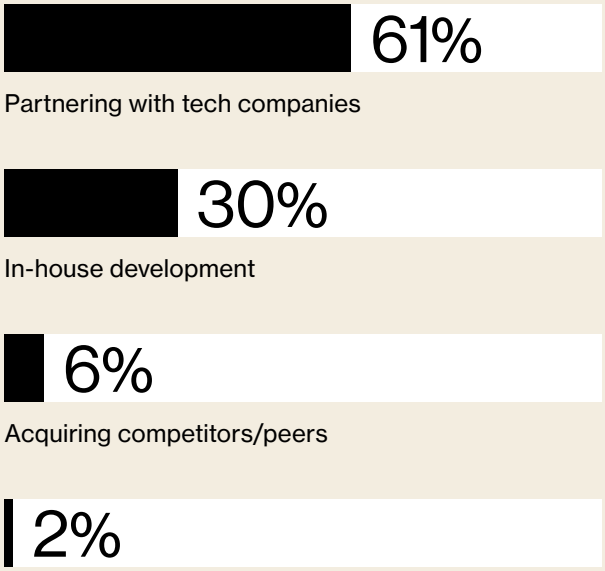


Future-proofing your factory

There are several steps that manufacturers should take to start the journey toward Industry 4.0. The first is investing in essential technologies that provide broad improvements to automation and visibility over the entire manufacturing operation. These include Verizon Private Wireless Network, mobile edge computing (MEC), fixed wireless access, AR and virtual reality (VR), the IIoT, LTE and mobile solutions.

Forrester identified eight forms of physical automation—including industrial robots, automated guided vehicles (AGVs) and drones—that directly support the core business in asset-intensive industries such as manufacturing.[8]

Additionally, here are the primary growth strategies of surveyed manufacturers for smart manufacturing initiatives in the coming years[9]:



Finally, working with a partner can help manufacturers access the network, insight, technologies and infrastructure needed to operationalize Industry 4.0. The low-latency data connectivity provided by Verizon Private Wireless Network and MEC solutions can power AI, AR and other technologies. Meanwhile, cloud-based solutions offer a fast, cost-effective way to connect facilities, manufacturers and suppliers.

With the right technology and the digital foundation to support it, manufacturers can boost efficiency, lower costs, and prepare for demand shifts and unexpected events on the factory floor and around the globe.

1. “Focus On The Use Case When Evaluating Physical Automation,” Forrester, June 9, 2023. https://www.forrester.com/report/focus-on-the-use-case-when-evaluating-physical-automation/RES179400
2. “Global Industry 4.0 Market, By Component, By Technology, By Industry Vertical, By Region & Segmental Insights Trends and Forecast, 2024–2034,” The Niche Research, June 2024. https://thenicheresearch.com/reports/global-industry-4-0-market-2024-2034
3. “2023 manufacturing industry outlook,” Deloitte, 2022. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-2023-outlook-manufacturing.pdf
4. Ibid.
5. Ibid.
6. Ibid.
7. “2024 manufacturing industry outlook,” Deloitte Research Center for Energy & Industrials, October 30, 2023. https://www2.deloitte.com/us/en/insights/industry/manufacturing/manufacturing-industry-outlook.html
8. Ibid., Forrester, 2023.
9. Ibid., Deloitte, 2022.