![UScellular BUSINESS logo]

THE FUTURE OF SMART MANUFACTURING: CURRENT BUSINESS CONNECTIVITY TRENDS

How improved connectivity for manufacturing businesses can automate the plant floor and drive the success of a smart factory

The manufacturing industry continues to face a number of challenges, from supply chain disruptions to factory floor productivity slowdowns and transportation delays. However, one solution increasingly being adopted by manufacturers is mobile technology—specifically the use of Industrial Internet of Things (IIoT) devices powered by 5G technology.

With the rapid transformation brought on by Industry 4.0, reliable and secure connectivity solutions that ensure smooth and efficient operations are in high demand.

91%

of manufacturers believe 5G connectivity will be important to the overall future of their business and indicate speed of 5G deployment will have a positive impact on their ability to compete globally.[1]

Industry 4.0 and Industrial Internet of Things (IIoT)

According to a recent report by MarketsandMarkets, the IIoT market is expected to grow from $77.3 billion in 2020 to $110.6 billion by 2025, at a compound annual growth rate (CAGR) of 7.4%[2]. This growth is driven by a number of factors, including the need for increased operational efficiency, the rise of smart factories and the adoption of private cellular networks.

The rise of Industry 4.0, **IoT**, AI and automation has also led to a growing demand for government support, including the CHIPS Act,[3] the Made in America Act,[4] the Revitalize American Manufacturing and Innovation Act,[5] and the Promoting United States Wireless Leadership Act,[6] among others. These initiatives aim to support the development and adoption of advanced technologies, such as 5G and IoT, which are essential to manufacturing's future success.

According to Industry Week, "Manufacturers are finding that they can use IoT to reduce unplanned downtime, speed up production, improve product quality and ultimately increase profitability."[7]

Smart factories can leverage the capabilities of IoT technology to create a highly efficient and automated environment. The real-time tracking of raw materials, equipment and finished products reduces waste and increases efficiency. IoT devices enable data collection from various sensors,[8] including vibration sensors, temperature sensors and air quality sensors, which provide valuable information that can be used for predictive maintenance—which can identify potential equipment failures before they occur, reducing downtime and maintenance costs.

Benefits of Undertaking a Smart Factory Initiative:

20%
Improved asset efficiency

30%
Improved product quality

30%
Reduced costs

10%
Improved safety and sustainability[9]

Key Challenges

One of the key challenges facing the manufacturing industry is supply chain disruptions. The COVID-19 pandemic highlighted the risks of relying on global supply chains, leading to a growing interest in bringing production back to the U.S. and reducing dependence on foreign suppliers.

UScellular® manufacturing solutions help to increase supply chain visibility through IoT sensors powered by a private cellular network that provides ultimate control. By reducing downtime and increasing on-time delivery, manufacturers can keep costs low and customer satisfaction high.

Manufacturing Business Technology reports that "manufacturers who adopt Industry 4.0 technologies are better positioned to leverage their data to drive business growth."[10]

The adoption of private cellular networks for smart manufacturing has a significant advantage in that the private network can be customized and scaled to meet the specific needs of the manufacturing facility. The **private cellular network** can offer the top-of-the-line security features and insights into everything moving in a plant. Private cellular networks can also offer low latency, high bandwidth and improved coverage in rural areas.

Growing Trends in Manufacturing

Private Cellular Networks

Private cellular networks are becoming increasingly important to manufacturers, and USCellular is at the forefront of providing these solutions. In partnership with the Connected Systems Institute (CSI) at the University of Wisconsin-Milwaukee, **UScellular is delivering a private cellular network solution** that addresses the challenge of reliable and secure connectivity within the manufacturing industry. The partnership with CSI aims to bring together cutting-edge research in technology and telecommunications with practical experience in advanced manufacturing and Industry 4.0 applications. This partnership is expected to provide UScellular's manufacturing customers with innovative and robust solutions for their manufacturing needs.[11]

83% of manufacturers believe smart factory solutions will transform the way products are made in five years.[12]
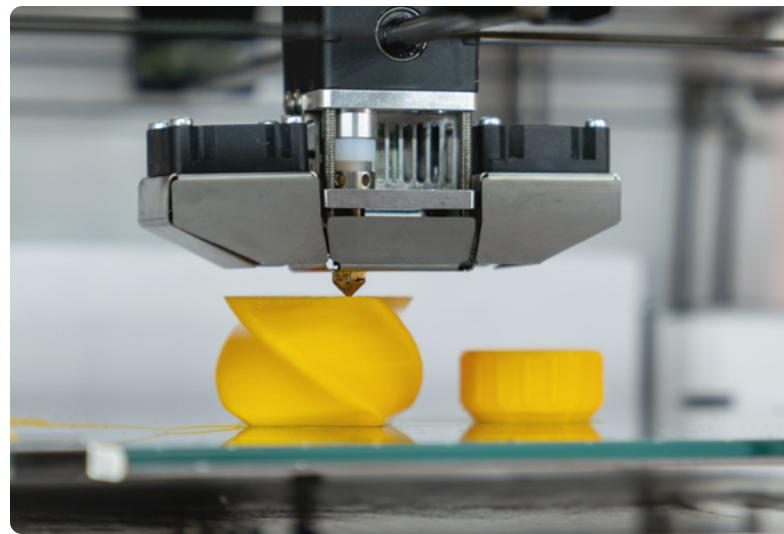
3D Printing

The integration of advanced technologies like IoT and AI is not the only aspect of Industry 4.0. According to Forbes, additive manufacturing or 3D printing is experiencing significant growth and innovation, transforming the traditional manufacturing industry.[13] 3D printing enables manufacturers to produce complex and customized parts on demand, with greater accuracy, speed and cost-effectiveness, making it an attractive option for many industries. In addition, the use of digital twins in smart manufacturing can help manufacturers improve efficiency and predict performance, enabling them to make data-driven decisions. This is in line with the main points presented in an article published on Deloitte Insights[14] that discusses the use of digital twins in Industry 4.0.

Cybersecurity

Cybersecurity is also a significant concern in smart manufacturing, especially with the increasing use of IoT devices and cloud computing. As manufacturers collect more data, they become more vulnerable to cyberattacks, which can lead to data breaches, intellectual property theft and even physical harm to employees and equipment. It is crucial for manufacturers to implement strong security measures, such as encryption and network segmentation, to protect their sensitive data and prevent cyber threats.[15]

Sustainability and Environmental Responsibility

Another trend in smart manufacturing is the growing emphasis on sustainability and environmental responsibility. Manufacturers are under increasing pressure to reduce their carbon footprint, conserve resources and implement sustainable practices. Smart manufacturing technologies[16] like IoT and AI can help manufacturers optimize their energy consumption, reduce waste and improve their environmental impact.

The Fourth Industrial Revolution is transforming the manufacturing industry, and the integration of advanced technologies like IoT and AI is driving the evolution towards smart manufacturing.

Improved connectivity, 3D printing, digital twins, cybersecurity and sustainability are among the many trends to watch in smart manufacturing in 2023 and beyond. As the industry continues to evolve, it's important for manufacturers to embrace the latest technologies and solutions to remain competitive and meet the demands of the future.

Why UScellular® for Manufacturing

UScellular manufacturing solutions are designed to address the challenges of the industry while taking advantage of the opportunities presented by new technologies and growing export markets. With Industrial IoT devices powered by 5G technology, manufacturers can optimize efficiency, reduce downtime and increase on-time delivery. With seamless connectivity, private cellular networks and business security solutions, manufacturers can maximize output, reduce costs and keep their assets secure, ultimately leading to growth and expansion.

Sources:

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4. Congress.gov. "**Made in America Act**".

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7. "**IoT: The Key to Unlocking Smart Manufacturing**".

8. "**The Future of Smart Manufacturing: 10 Trends to Watch**"

9. "**Smart Factory for Smart Manufacturing**"

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11. **UScellular Supports UWM CSI with Private 5G Cellular Network**

12. "**Smart Factory for Smart Manufacturing**"

13. "**What is Industry 4.0? Here's A Super Easy Explanation For Anyone**"

14. "**Industry 4.0 and the digital twin**"

15. "**The Role of Cybersecurity in Industry 4.0**"

16. "**How Smart Manufacturing Can Help Save the Planet**"

Learn more about how UScellular's connectivity solutions can help you optimize your industrial manufacturing operations, Call your local Business Solutions Expert at **866-616-5587** or visit **our website** to get started.

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