eBook

Microsoft

Factory of the Future

Achieving digital excellence in manufacturing, today

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Transforming manufacturing beyond Industry 4.0

A look at the pioneers who are making the factory of the future a reality today

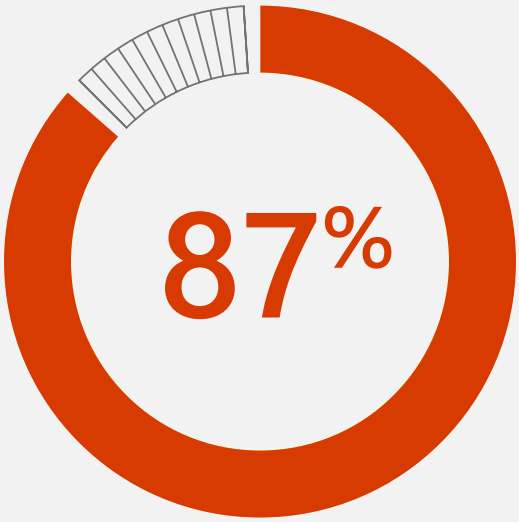
Far from just a concept based on long-standing aspirations of Industry 4.0, the factory of the future means going beyond the walls of production to optimise digital operations and transform the entire connected manufacturing ecosystem.

Where we once imagined a factory focused on the digital, robot-driven production floor, reality has transcended the factory floor to include the entire manufacturing ecosystem – connecting employees, processes, machines, data and customers – far beyond what was once envisioned.

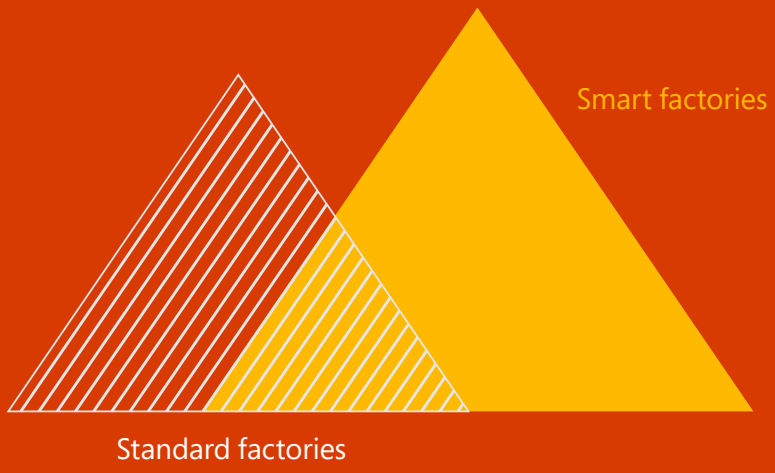
Among enterprise manufacturers, 87% say they have at least one IoT project in the learning, proof of concept, purchase or use phase.[1] And manufacturers who have implemented smart factories are seeing 17–20% productivity gains.[2]

The "factory of the future" does involve machines, products and factories. But contrary to past fears of automation and robots replacing people, the factory of the future is actually empowering people, including:

- **Manufacturing business leaders** using data from hyperconnected networks to develop customised, meaningful products and services
- **Factory workers** using continuous insights to predict and prevent machine failures and improve operational effectiveness
- **Customers** providing real-time usage data and experiential sentiment to inform how manufacturers innovate to support valuable experiences



Enterprise manufacturers who have at least one IoT project[1]



17-20%

Productivity gains[2]

Our challenge in the coming years is to manufacture more aircraft faster, and for that, we need to enable our workers to be much better equipped and to be much more effective in what they do. We need to raise the bar.

Jean-Brice Dumont

Executive Vice President of Engineering, Airbus

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Empowering digital leaders in manufacturing

Connected intelligent machines and IT systems provide continuous insights, enabling manufacturing leaders to make better informed decisions with objective, up-to-date market data; manage inventory in near-real time; and revise processes and drive new innovations to meet demand. Such hyperconnected networks of free-flowing data will enable manufacturers to work with shorter lead times, forge a tighter link between supply and demand, develop new business models as market demand and opportunities arise and accelerate new product introductions to market.

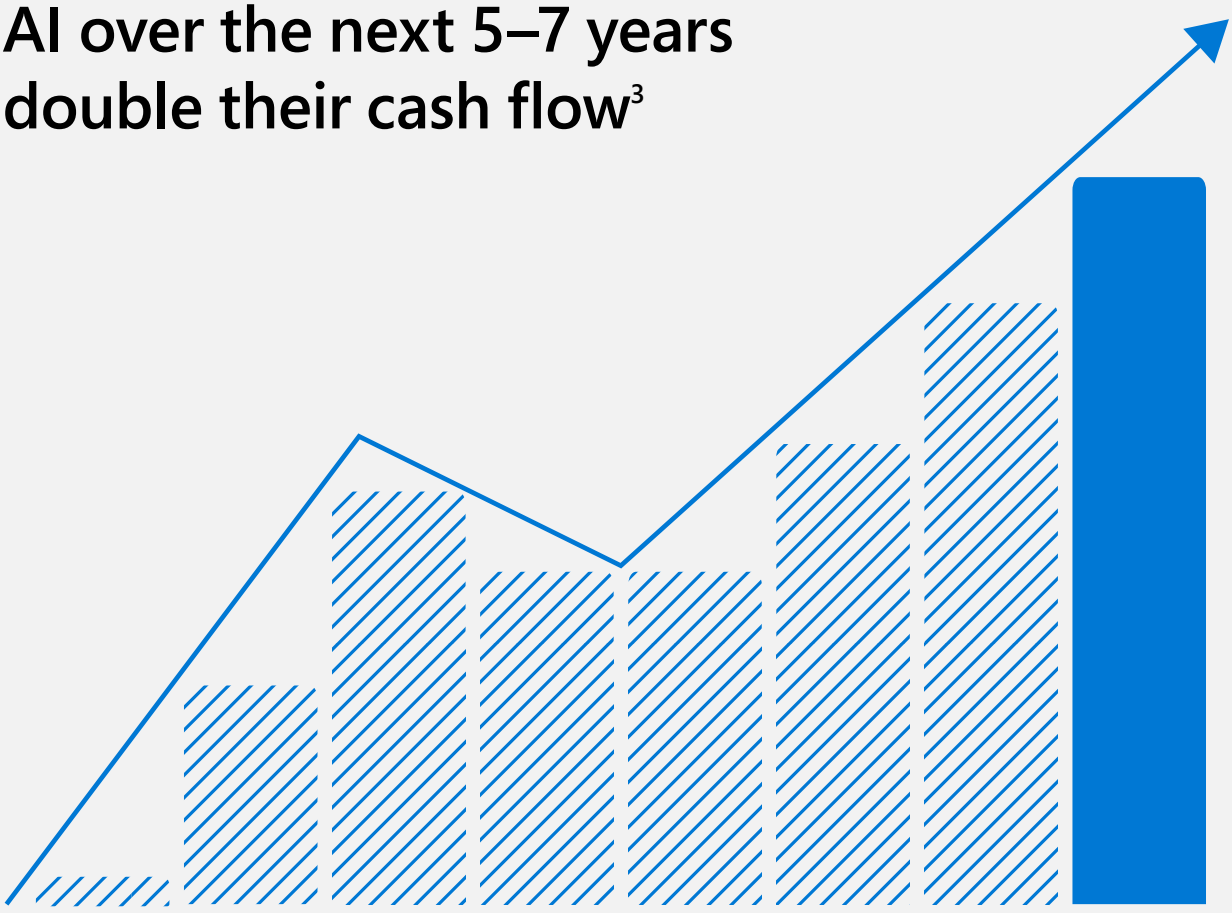
McKinsey estimates that 50% of companies that embrace AI over the next 5–7 years may double their cash flow.[3]

Empowering manufacturing leaders hinges on supporting real-time insights, and one way Microsoft enables this is Remote Monitoring. Developed for the Microsoft Azure platform, Remote Monitoring enables manufacturers to make targeted improvements to business processes by getting real-time use, performance and asset health updates from nearly anywhere, and use that data to optimise performance securely, anticipate problems and solutions and boost customer satisfaction.

The result? Improved visibility to support proactive response across the business; the ability to make targeted improvements to business processes to save time, money and resources; and new business insights to spot trends and opportunities to advance the business.

50%

of companies that embrace AI over the next 5–7 years double their cash flow[3]



The ability to automate these transactions across thousands of machines and countless miles is transformational for this industry. Now all parties involved can have immediate electronic records of transactions, real accountability in these remote locations, immediate awareness for maintenance and diagnostics and new levels of information about every transaction.

Doug Weber

Business Manager – Remote Application Monitoring, Rockwell Automation

03 /

Connecting specialists in new ways across the organisation

Today, immersive human-to-machine collaboration and advanced analytics are enabling specialists – from R&D, to the production floor, to logistics and supply chain management—to prototype new designs faster and more affordable, build more useful products faster and continually support meaningful customer experiences. In fact, 85% of manufacturing executives expect human-to-machine-centric environments to be commonplace by next year,[4] with an estimated 40% of operational processes being self-healing by 2022.[2]

One technology at the heart of this vision is the digital twin, which enables manufacturers to simulate and iterate through the end-to-end stages of design, production and service with a digital representation of the plant floor, supply chain and product life cycle.

Gartner estimates that, by next year, there will be more than 20 billion connected sensors and endpoints, and that digital twins will exist for potentially billions of things. And by 2021, half of the large industrial companies will use digital twins, resulting in those organizations gaining a 10% improvement in effectiveness.[5]

What used to be considered technologically abstract or out of reach is now tangible and available, supporting advanced problem-solving and reasoning with machines, simultaneous work across virtual and physical models and effective cross-team collaboration on a global scale.

Microsoft is redefining the digital twin through HoloLens 2, which allows users to interact with and improve full-scale models in immersive mixed reality. Now, manufacturing teams can create safe and flexible holographic training scenarios in the real world, give clients 3D prototypes to visualise and inspect and identify and address problems before work starts. Processes that once took weeks can now take days through this reduction in physical prototyping.

Temperature
280°
Output

With Immersive Competency, technicians can easily take a new or refresher training in a safe environment just before doing a procedure. For a critical task that might only be done every two or three years, this focused training model is ideal.

Vincent Higgins

Director of Technology and Innovation, Honeywell Connected Plant

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Developing a truly customer-centric manufacturing process

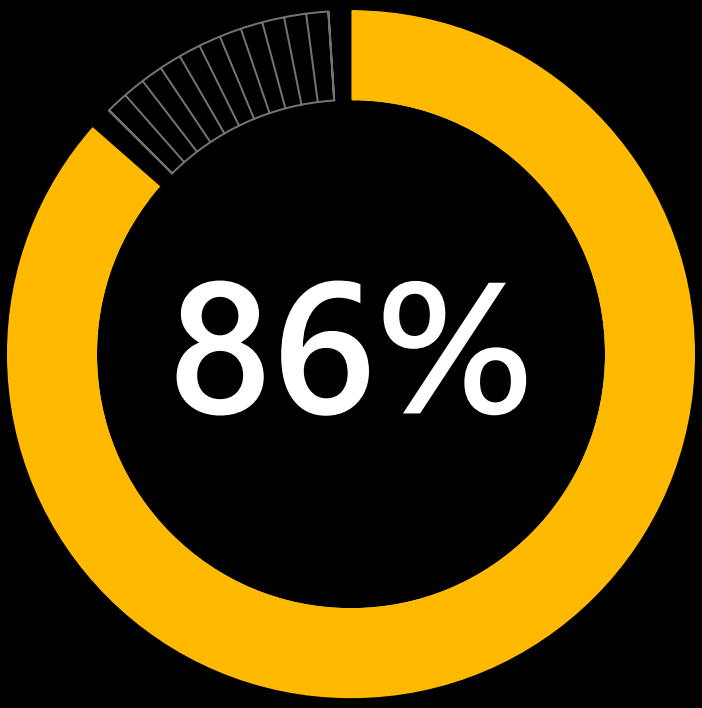
While factory workers, machines, processes, data and other elements of production support smart factories, empowering transformative customer experiences is truly at the heart of the factory of the future. An estimated 86% of buyers will pay more for a better customer experience and greater transparency.[6]

The desire to adapt to quickly-evolving customer demands is nothing new, except now technology trends such as AI and IoT are being adopted and integrated into ways that finally deliver on this real-time, customer-centric vision.

One example of how the customer experience is being completely transformed by these advancements is Predictive Maintenance, in which manufacturers boost equipment reliability and stay ahead of the unexpected issues that can easily derail production. By capturing customer sentiment, usage and other data and analysing it with machine learning algorithms, manufacturers can gain the insight to fine-tune processes and make modifications that improve product quality and increase customer satisfaction.

Going forward, IoT-driven data and AI will bring new levels of performance insight directly from customers for customer-driven product design and faster innovation cycles.

Buyers who pay more for a better customer experience and greater transparency[6]



The Microsoft Azure platform makes it a lot easier for us to deliver on our vision without getting stuck on the individual IT components. We can focus on our end solution and delivering real value to customers rather than on managing the infrastructure.

Richard Beesley

Sr. Enterprise Architect – Data Services, Rolls-Royce

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From our factory to your factory of the future

Through a robust technology platform, preconfigured solutions and long-standing experience as both a services provider and manufacturer, Microsoft is empowering people to capitalise on the unprecedented opportunities of the factory of the future in three fundamental ways.

First, empowering organisations to achieve breakthrough productivity with intelligent, mixed reality and cognitive services by bringing together humans, machines and AI.

Second, building broader ecosystems through partnerships that include telecommunications, network, hardware and software partners.

And third, delivering a highly-flexible, robust software platform that allows the hyperconnected world to operate in hybrid models, supporting IoT, people and services working together.

Jabil has seen at least an 80% accuracy rate in the prediction of machine processes that will slow down or fail.

Clint Belinsky

Vice President of Global Quality, Jabil

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Learn more

To learn more about Microsoft smart factory solutions and the growing number of manufacturers innovating with them:

→ Explore solutions for intelligent manufacturing

This eBook is based on Microsoft analysis of third-party data. Sources include:

[1]Hypothesis Group: IoT Signals: Summary of Research Learnings. 2019

[2]IDC FutureScape: Worldwide Digital Transformation 2017 Predictions Jan 2017 Doc # US42259317 Web Conference By: Michael Versace.

[3]McKinsey: Digital Manufacturing Capturing Sustainable impact at scale. June 2017

[4]Eric Schaeffer et al., Machine Dreams: Making the most of the connected industrial workforce. Accenture. February.

[5]Gartner: Gartner Identifies the Top 10 Strategic Technology Trends for 2019. 2018

[6]Walker, Customers 2020: A Progress Report, Undated https://www.walker-info.com/knowledge-center/featured-research-reports/customers2020-1