Microsoft

# The Manufacturing Transformation

## Optimise operations and empower workers with digital technologies

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# Introduction

With supply chain issues and labor shortages chipping away at manufacturing profits and productivity, technology-driven strategies can help address the industry's most pressing challenges. Manufacturing enterprises can increase efficiencies and stay resilient during supply chain and workforce disruptions by employing tech-based solutions like cloud computing, IoT and advanced analytics – and then integrating AI to enhance their effectiveness even further.

## Manufacturing challenges at-a-glance

**High operational costs** lead to lower profit margins and drive customers to competitors.

**Manual processes** can cause frequent downtime, hurt product quality and cause resource inefficiency.

**Environmental and sustainability concerns** push manufacturers to utilise more sustainable resources and optimise their energy usage.

**Increasing competition for talent in a tight labour market** makes it challenging to find reliable new hires, while retraining current employees can strain organisational resources and negatively impact output.

## Top-of-mind goals for manufacturers:

- Optimise factory processes without a drastic overhaul
- Attract and train new workers and retrain existing workers
- Reduce costs to keep prices competitive
- Source sustainable materials without inflating costs or impacting lead times
- Lower energy usage and emissions to increase sustainability
- Stay informed on evolving environmental regulations across facility locations

Moving away from traditional practices can be a difficult transition for manufacturers. However, the benefits of embracing these cutting-edge technologies are too significant to ignore. Looking ahead, manufacturers who embrace advanced technologies will drive intelligent operations, enhance product quality and increase sustainability in ways that traditional methods cannot match.

This eBook will explore different scenarios in which advanced technologies can help manufacturers make their operations more agile and efficient – and ultimately more competitive. By applying the right tools to the right tasks, traditional manufacturers can transform their supply chains and factory floors to usher in a new age of productivity and profitability.

# Enable intelligent factories

Intelligent factories have emerged as a transformative solution to help manufacturers address some of their most critical challenges. Through the adoption of digital technologies like cloud computing, AI and data analytics (among others), these advanced manufacturing facilities offer more resource and cost optimisation capabilities that simply aren't possible in a traditional factory setting.

One key benefit of an intelligent factory is continuous insight into what's happening on the factory floor. Intelligent factories use data from sensors and machines to enable real-time visibility and monitoring, giving manufacturers a granular view of operations to enhance Overall Equipment Efficiency (OEE) and optimise resource utilisation.

Intelligent factory technology also makes it easier for manufacturers to maintain equipment proactively. Rather than waiting for equipment to fail, manufacturers can use machine learning and predictive analytics to anticipate where and when maintenance will be needed before a potential issue causes expensive downtime or negatively impacts product quality. Intelligent factories also facilitate sharing production insights with design and engineering teams, fostering innovation grounded in real-world feedback. Furthermore, intelligent factory frontline workers are empowered with communication and collaboration tools, digital workflows and remote assistance tools that ultimately enhance their skills, productivity and safety.

Traditional manufacturers often grapple with a complex and fragmented technology ecosystem across their factory locations. As a result, there is a wide range of maturity when it comes to manufacturers' ability to adopt and integrate advanced technologies. Nevertheless, the overarching goal remains to keep factories running smoothly and ensure production output is as high as possible.

## Factories of the future: What's possible?

**Connected and empowered workers**
Utilise digital tools to enhance factory workers' performance via seamless communication and collaboration, data capture and immersive training for onboarding and skills training.

**Optimised production monitoring**
Use data gathered from production line sensors, programmable logic controllers (PLCs) and enterprise factor systems to gain visibility into operations and identify opportunities for optimisation with AI.

**Enhanced maintenance and quality control**
Use applications and AI-based solutions to track materials within the factory, automate complex quality inspection processes and launch predictive maintenance solutions.

## Strabag SE enables seamless collaboration for rolling out new AI models

Strabag SE partnered with Microsoft to build a Data Science Hub that would centralise the company's data and use data-driven insights to detect at-risk construction projects.
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"By using data and AI to pinpoint which projects are a potential risk for us, we can save the organisation huge amounts of money and time. It's a perfect example of the power of data."

**Dr. Marco Xaver Bornschlegl**
Head of Innovation and Digitalisation
Strabag SE

## Microsoft ISV partner solution: PTC Digital Performance Management

PTC empowers manufacturers worldwide to drive double-digit efficiency gains with ThingWorx Digital Performance Management (PDM). ThingWorx provides a single source of truth for real-time performance monitoring to frontline and c-suite team members, helping them achieve transformational problem solving at scale.
**Learn more ›**

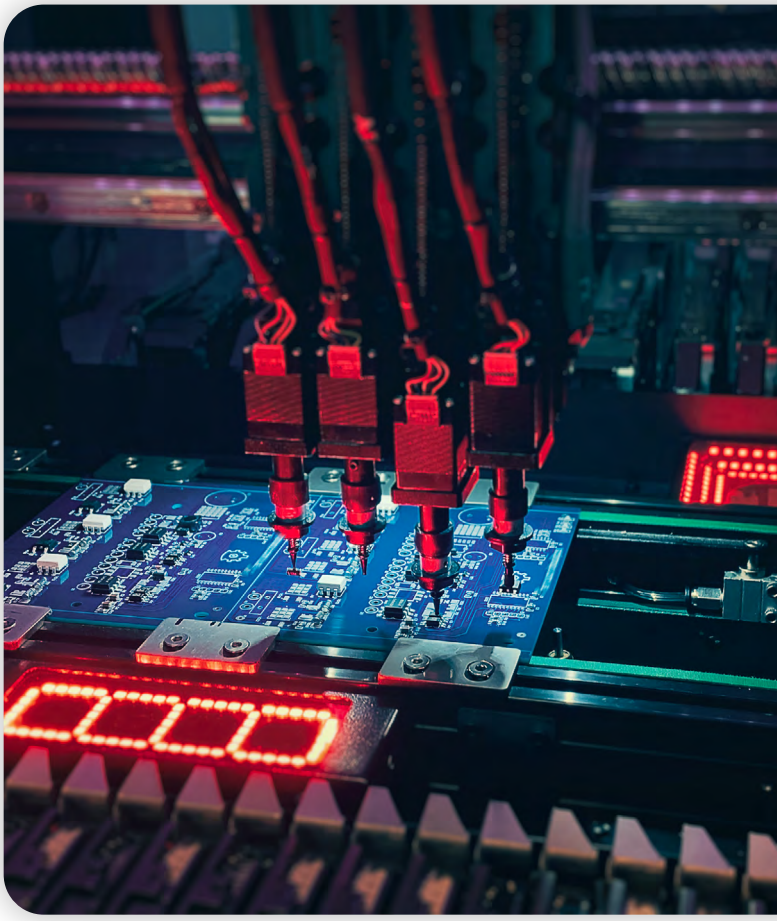
# Unlock innovation and introduce new products

Manufacturers actively seek to stay competitive by embracing innovation in developing new products. Using IoT, AI and robotics to create smarter, more responsive products can help manufacturers enhance product quality, reduce production costs and accelerate time-to-market. Moreover, by embedding sustainability features and eco-friendly practices into their products, manufacturers can more easily align themselves with growing consumer preferences for environmentally and socially conscious solutions.

In the past, designing a new product meant having the people and the materials in the same room. Today, digital twins and simulations make it possible to create virtual models that accurately represent physical objects that team members can study and work with from opposite sides of the globe. Manufacturers can bridge the digital and physical realms by using edge computing, sensors, mixed reality, data analytics, AI and connected products like industrial IoT devices, allowing engineers to collaborate globally to optimise products for performance, materials, sourcing and monetisation.

As engineers work in the virtual realm to create new products, product lifecycle management (PLM) is also modernising to track the product's progress from design to deployment.

Running PLM applications in the cloud helps keep disparate teams connected from design to deployment, offering a centralised space for collaboration and a repository for proprietary and public data. In this way, future innovation will be like a continuous thread of connected physical and digital experiences, allowing for a seamless flow of ideas, designs and simulations that culminate in game-changing new products.

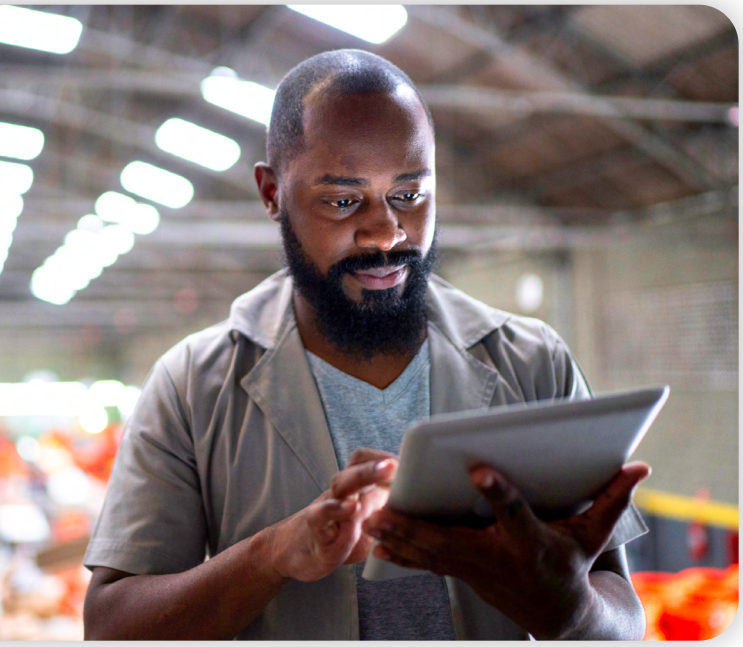


## Innovating new products: How can manufacturers stay competitive?

**Connect the physical and virtual worlds**
Digital twins and simulations allow engineers to build and interact with virtual representations of new products and test them against real-world scenarios, accelerating design optimisation and minimising material waste.

**Shift PLM and computer-aided design (CAD) to the cloud**
With a centralised platform for resource planning and CAD tools, manufacturers can use real-time data to capture and optimise every detail of a product's lifecycle.

**Embed intelligence into products**
Open new revenue streams with intelligent Products-as-a-Service and enhanced digital features.



## EKK enables global knowledge sharing with a centralised PLM

EKK adopted a cloud-based solution with Teamcenter on Azure to unify its PLM servers, enabling a highly collaborative design process by international teams while significantly reducing costs.
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"Azure allows us to start small and scale up easily, and we can save on unnecessary cost by sizing and according to usage."

**Shingo Okazaki**
Manager, IT Section 1, IT Department,
Planning and Administration Office
EagleBurgmann Japan Co., LTD.

## Microsoft ISV partner solution: Siemens Teamcenter

Siemens' Teamcenter® software for Product Lifecycle Management helps streamline operations by providing tools that connect people, processes and products across the entire product lifecycle. The platform has integrated AI-powered capabilities to enhance factory automation, problem reporting and quality inspection.
**Learn more ›**

# Resilient manufacturing supply chain

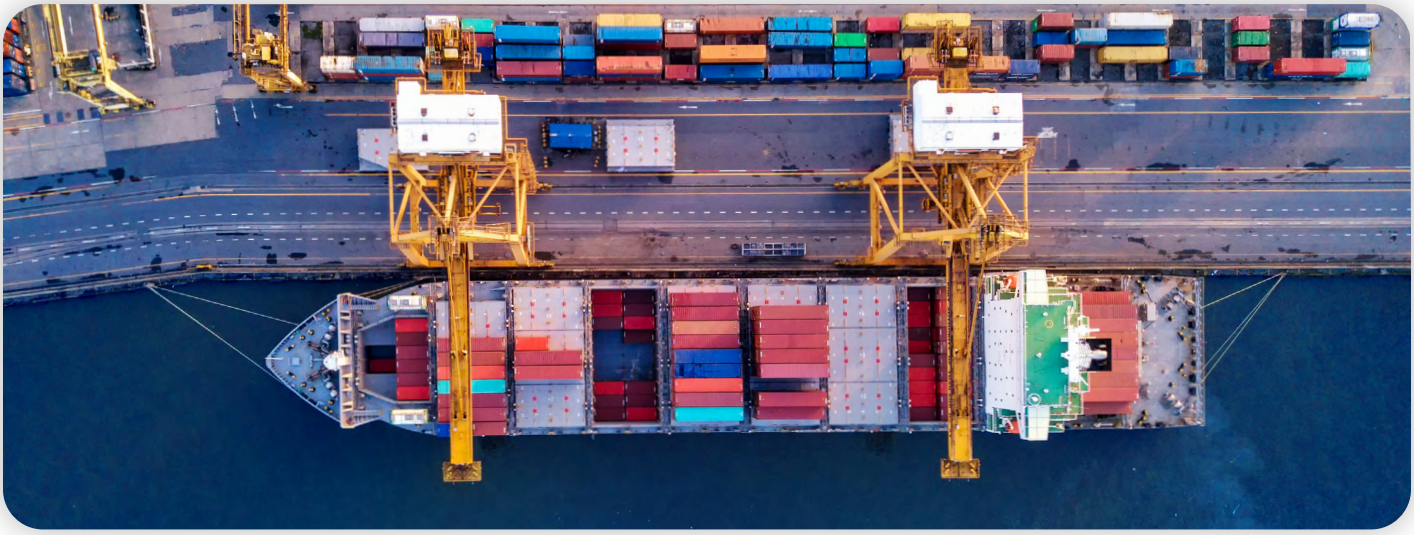
Manufacturers have been restructuring their supply chains to be more resilient in global disruptions. Accordingly, they need an end-to-end solution to ensure their factories have what they need, when they need it.

The key to supply chain resiliency is establishing real-time visibility so manufacturers can maintain a proactive posture. Migrating data and applications to the cloud is the first step to establishing an end-to-end supply chain management solution – but that's just the beginning.

The next stage of building resilience comes from using low-code or no-code tools to develop AI solutions. These solutions let you extract data from your supply chain resources and use it for fast analysis and decision-making.

For instance, you could build an AI tool that analyses vendor contracts to assess risk and identify areas that require attention or mitigation strategies.

To help manufacturers create a more resilient supply chain, they must become more operation and finance-focused while still providing crucial functionalities like track and trace, warehousing solutions and other tools relevant to supply chain management (SCM). Moving to the cloud also provides the best infrastructure for manufacturers running their enterprise resource planning (ERP) applications, as it allows them to share resource knowledge quickly and take advantage of extensive data analytics capabilities.



## Sandvik develops a remote monitoring system to optimise predictive maintenance

Mining equipment supplier Sandvik uses data and AI to generate insights on the state of their machines to improve predictive maintenance and drive sustainable transformation.

**Read the whole story ›**

> "We see this digital solution as our way to provide visibility and sustainability to an operational environment that has long been hard to understand and forecast."
>
> **Esa Mattila**
> Reliability and Productivity Centre Manager
> Sandvik

## Maintaining a resilient supply chain: What should manufacturers aim for?

**Intelligent demand forecasting and planning**
Utilise supply chain, customer and market data to develop advanced demand forecasting models and optimise planning.

**Real-time visibility and risk**
Enable continuous supply chain visibility to allow for rapid decision-making, mitigate disruptions and more effectively manage risks.

**Seamless warehousing and fulfilment**
Use supply chain data to enhance inventory allocation and attain error-free order fulfilment while modernising warehouse operations through innovative digital solutions.

## Microsoft ISV partner solution: Blue Yonder Supply Chain Planning

Blue Yonder Supply Chain Planning solutions help build high-accuracy plans across the supply chain. Using AI, ML and real-time data, these tools identify potential issues and improvement opportunities early on, allowing planners to respond quickly and minimise risks so they can boost agility and optimise costs.

**Learn more ›**

# Modernise the manufacturing customer experience

Customers today expect fast delivery and customised designs that suit their exact needs. The pressure to meet these expectations is high, and manufacturers who can deliver are rewarded with a larger market share, happier clients and higher profitability. By prioritising customer-centric strategies, manufacturers retain existing customers and attract new ones, fostering brand loyalty and staying ahead in a highly competitive landscape.

To navigate these complexities and manage customer relationships more effectively, advanced sales tools tailored to the B2B sector are crucial. Using a customer relationship management (CRM) system designed for B2B interactions can help manufacturers gain deeper insights into their customers and optimise sales management. Marketing also plays a pivotal role, and manufacturers are increasingly investing in data-driven tools and AI to deliver highly personalised marketing materials that speak directly to individual customers' needs.

Lastly, service is paramount, especially for manufacturers producing long-lifespan products. Service teams in the field can use AI assistance and mobile apps to provide in-the-moment expert support to customers, enabling fast and effortless frontline productivity.

## Providing superior manufacturing customer service: Where to start?

**Connect field service agents**
Provide agents in the field with mixed reality tools and live-remote assistance so they can solve product issues quickly and efficiently.

**Engage B2B customers**
Create 360-degree customer profiles and craft highly personalised sales and marketing experiences that address specific needs.

## Mid-Continent Instruments and Avionics enables real-time sales assistance

Mid-Continent Instruments and Avionics adopted Microsoft Dynamics 365 to support sales teams in the field and enhance its e-commerce and online services capabilities.
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"The Dynamics 365 web offering is perfect for working from anywhere. When our sales team is travelling, they can readily pull up information, get to the data required and make an informed decision while they're remote."

**Mike Sanders**
Director of IT
Mid-Continent

## Microsoft ISV partner: Annata 365 for Field Service

Built on Microsoft Dynamics 365, Annata 365 for Field Service provides a 360-degree view of customer devices so technicians can quickly detect, troubleshoot and resolve issues. The solution offers instant service scheduling and OEM reporting, helping customers minimise downtime, maintain warranty and extend the lifetime value of their devices.
**Learn more ›**

# Conclusion

While many manufacturers have traditionally relied on established methods for continually improving their operations, adapting to new technologies and managing change is critical for success in today's rapidly evolving landscape. This shift involves adopting cutting-edge tools to enable intelligent factories, fostering a culture of adaptability and recognising that technology is not merely an add-on, but a core driver of competitiveness. Adopting this new mindset will allow manufacturers to discover unprecedented efficiencies and cost savings, maximise ROI and ensure long-term success in an increasingly digital world.

**Discover Microsoft Cloud for Manufacturing ›**

## Industrial metaverse solutions from Microsoft Cloud for Manufacturing

- IoT sensors that stream real-time operational technology (OT) data help optimise overall equipment effectiveness (OEE).
- Operations with digital twins provide different ways of visualising, interacting with and testing new products for optimal efficiency in multiple scenarios.
- Microsoft Teams and Power Platform integrate with Azure OpenAI Service to create a digital feedback loop that empowers frontline workers to solve complex problems.
- Azure Arc provides cloud-to-edge visibility and control, enabling governance and compliance across on-premises, multicloud and edge devices.
- Microsoft Dynamics 365 offers mixed reality apps that provide step-by-step holographic instructions so workers can look through the eyes of experts thousands of miles away.