Microsoft

DESIGN TO DELIVERY:

Leading GenAI use cases to modernize manufacturing processes

Generative AI is transforming manufacturing

Manufacturing is an industry constantly in motion; one reshaping itself and its processes to deliver on the demands of the day. Generative AI is again redefining values chains, enabling manufacturers to work smarter, faster, and deliver value—with 3.4x ROI for every $1* spent (IDC). From material sourcing and warehouses, to product design and production, to frontline operations and customer engagement, AI is connecting the manufacturing industry to the possibilities hidden within its data.

This ebook explores the leading generative AI use cases transforming manufacturing today.

Take a deeper look

Support every organization, every function with Microsoft Copilot

Starting with AI is easy. Copilot Chat and Microsoft Copilot bring intelligence to every function in a manufacturing organization, from HR to Sales to Operations. Because Copilot works within the Microsoft 365 ecosystem, it seamlessly integrates with the tools you're already using—Word, Excel, Teams, Outlook, and more—leveraging existing enterprise data to deliver actionable insights, automation, and efficiency gains.

Microsoft Copilot enhances key business functions:

Finance

Automate reporting, analyze financial trends, and optimize budgeting and forecasting with real-time AI-driven insights.

Human Resources

Streamline hiring, improve employee engagement, and automate HR workflows to enhance workforce productivity.

Information Technology

Enhance IT support, automate ticketing, and optimize system management with AI-powered recommendations.

Marketing

Generate compelling content, optimize campaign performance, and gain AI-driven audience insights for better engagement.

Operations

Improve supply chain efficiency, enhance production planning, and automate routine workflows to boost operational agility.

Sales

Accelerate deal cycles, generate AI-driven customer insights, and personalize sales outreach for increased conversion rates.

This intelligence extends into the value chain, as Copilot and agents enable product development engineers, factory technicians, service professionals and beyond to complete the specialized work of keeping manufacturing operations running. We'll cover the five leading GenAI use cases in the rest of this ebook.

For more information: Using Copilot in Manufacturing

Drive manufacturing outcomes across the value chain

The manufacturing value chain depends on data to optimize every stage of the product lifecycle. Generative AI accelerates design by integrating real-world feedback, allowing engineers to refine models before committing resources. On factory floors, AI enhances efficiency, predictive maintenance, and supply chain resilience for smarter, more adaptive production. AI-powered agents further equip frontline workers with real-time insights into equipment health, production metrics, and supply chain dynamics.

Design visionary products

AI accelerates design by optimizing product development, simulations, and decision-making.

- Generate virtual prototypes for faster testing and refinement.
- Enable real-time collaboration between designers and engineers.
- Automate CAD modeling and create tailored designs, reducing lead times.

Build intelligent factories

AI improves efficiency by optimizing supply chains, automating workflows, and ensuring quality.

- Monitor production in real-time to detect and fix defects early.
- Use predictive maintenance to prevent unplanned shutdowns.
- Optimize material usage and minimize excess inventory.

Operate with excellence

AI extends beyond production to reduce downtime, improve sustainability, and enhance efficiency.

- Provide real-time monitoring for better decision-making.
- Identify energy-saving opportunities, lowering costs and impact.
- Streamline workflows, freeing staff for strategic work.

Establish an intelligent digital thread

Digital threads are the nervous system of industrial operations; they weave together information, processes, and people across manufacturing lifecycles. Decades of fragmented data and systems have long prevented most from connecting modern solutions to their aging infrastructure, further slowing operational visibility and collaboration.

Clarity starts with data unification. AI makes navigating the potential petabytes of manufacturing data easier, surfacing the OEE, TCO, and ROI insights essential to making the informed decisions that drive operational excellence.

Design

- Faster time to market with optimized designs.
- Deliver tailored products to meet customer needs.
- Cut design iteration time significantly.

Build

- Streamline production for faster turnaround.
- Reduce downtime with predictive maintenance.
- Improve product quality and consistency.

Operate

- Enhance efficiency with real-time monitoring.
- Reduce costs through energy optimization.
- Automate repetitive tasks to boost productivity.

Empower sales, service, and support teams

Accelerate product development

Transform factory operations

Streamline application lifecycle management

Improve safety and worker productivity

Real world impact

Bayer CropScience

Discover how **Bayer's Crop Science** division leverages GenAI to turn unstructured data into actionable insights, streamlining communication, and accelerating the discovery of potential insecticides, fungicides, and herbicide.

HARTING

Learn how **Harting** harnesses AI to improve customer satisfaction and internal efficiency by analyzing customer requirements in real-time, automating precise 3D model creation, and transforming design processes—streamlining workflows, optimizing components, and cutting costs.

Schneider Electric

Discover how **Schneider Electric** uses AI-powered PLC code generation to automate tasks, provide intelligent coding suggestions, and accelerate the creation of high-quality, validated code—streamlining development, driving innovation, and speeding time-to-value.

SCHAEFFLER

Read how **Schaeffler** using generative AI modernized data management and unlocked intelligence across diverse IT/OT systems enabling production visibility, conduct root cause analysis, and improve worker collaboration.

NetworkRail

Discover how **Network Rail** leveraged Generative AI to unify infrastructure data into a single platform, enabling engineers to proactively predict failures up to a year in advance, accelerate data analysis by 50%, prevent costly disruptions, and significantly enhance operational safety and efficiency.

Empower sales, service, and support teams through knowledge discovery

Automate and streamline high-value, high-cost customer engagements to better meet customer expectations and differentiate your organization in a competitive market. Learn how generative AI can improve service delivery, create better customer experiences, reduce costs, improve customer satisfaction.

Business outcome

- Improved customer satisfaction
- Material optimization
- Reduced design & engineering costs

Challenges addressed

- High customer service cost
- Time-consuming design & prototyping cycles
- Material waste

Microsoft Solutions

- Azure OpenAI Service
- Microsoft 365 Copilot
- Copilot Studio

Customer Story

Harting uses GenAI to improve customer satisfaction by analyzing customer requirements entered through speech or text, to improve product selection and speed up the custom design process.

The challenge

With over 27,000 product options, selecting the right industrial connector was a complex and time-consuming task, especially for customers under tight deadlines. Many lacked the technical expertise to navigate configurations efficiently, leading to delays and frustration. Harting, a global leader in industrial connectors, sought to simplify this process and enhance the customer experience.

An AI-driven solution

To address these challenges, Harting developed an AI powered configuration tool that allows customers to describe their needs in natural language. The AI agent then translates these inputs into precise specifications, providing clarity and confidence in product selections.

For non-standard and custom requests, this GenAI solution accelerates design prototyping by automating design layouts, verifying details and specs, and generating 3D models. This automation reduces design cycles from weeks to minutes, allowing engineers to focus on more complex challenges.

Transforming product design with AI

Harting's AI integration has enhanced customer engagement, making processes faster and more intuitive. It has also significantly improved product configuration and development. Configuration times have dropped from 15–20 minutes to just one minute, while prototyping, now takes minutes instead of a weeks long process.

Partner Solutions: SIEMENS

Siemens provided the engineering integration, embedding AI-driven automation into Siemens NX X and Teamcenter X to accelerate prototyping and product configuration. Microsoft enabled Azure OpenAI Service and Cloud for Manufacturing, ensuring seamless AI-powered product search, customization, and collaboration across teams.

Read the full story: Harting reduces design time with Siemens NX X and Copilot

Accelerate product development and engineering with generative AI

Automate design and engineering processes and eliminate bottlenecks to speed up product development. Learn how AI-driven generative design optimizes material usage, streamlines product modeling, and accelerates prototyping to reduce development cycles, lower costs, and improve efficiency.

Business outcome

- Faster time to market
- Improved collaboration
- Enterprise-wide visibility
- Information sharing

Challenges addressed

- Knowledge worker inefficiency
- Information silos
- Workflow complexity

Microsoft Solutions

- GitHub Copilot
- Microsoft 365 Copilot
- Microsoft 365

Customer Story

Learn how Bayer Crop Science transformed its R&D process by integrating GenAI powered search and collaboration tools.

Bayer CropScience

The challenge

Bayer's Crop Science division needed a better way to manage research models for their work identifying potential new insecticides, fungicides, and herbicides. The primary obstacle was the overwhelming volume of unstructured data, which hindered efficient information retrieval and collaboration among researchers. This often resulted in duplicated work and extended development timelines, impeding Bayer's mission.

An AI-driven solution

To address these challenges, Bayer collaborated implemented an AI agent solution leveraging Microsoft Copilot. This integration utilizes natural language processing allowing researchers to search for information using everyday language. The solution provides an intuitive interface to Bayer's extensive knowledge repository, effectively bridging communication gaps between data scientists and laboratory researchers.

Outcome: Transforming the R&D process

By making decades of unstructured data easily accessible, Bayer has transformed R&D processes by enabling researchers to quickly locate relevant studies and predictive models by entering simple phrases, drastically reducing the time spent sifting through extensive data libraries and documents. The solution also identifies subject matter experts associated with specific models, facilitating direct communication and knowledge sharing among colleagues.

Read the full story: Bayer boosts productivity and collaboration with Microsoft 365 Copilot

Transform factory operations with real-time data access and AI agents

Break down information silos and gain real-time intelligence. Leverage generative AI to improve decision-making, problem solving, and collaboration while optimizing workflow, reporting, and productivity. Learn how integrated data solutions with GenAI empowers factory teams with instant access to real-time data and actionable insights.

Business outcome

- Faster time to market
- Improved collaboration
- Enterprise-wide visibility
- Information sharing

Challenges addressed

- Operational inefficiency
- Downtime and equipment failures
- Operational inefficiency

Microsoft Solutions

- Microsoft Fabric
- Manufacturing Data Solutions in Microsoft Fabric
- Factory Operations Agent in Azure AI Foundry

Customer Story

Learn how Schaeffler empowered its workforce with real-time data access and AI-driven insights.

SCHAEFFLER

The challenge

Schaeffler's manufacturing facilities generate vast amounts of data across multiple machines, systems, and locations. However, data silos across IT and operational technology (OT) systems made timely access to information and analysis difficult. The lack of integrated data management limited advanced factory reporting and troubleshooting, affecting machinery uptime, product quality, and productivity. Schaeffler needed a scalable solution to unify its data and provide actionable insights.

A GenAI solution

Schaeffler partnered with Avanade to deploy Manufacturing Data Solutions in Microsoft Fabric and an AI-powered factory operations agent to integrate data from IT and OT systems, including ERP, SCM, and MES, into a unified data platform. GenAI enables employees to query the data in natural language, providing instant, real-time actionable insights that empower factory engineers and plant managers to make data-driven decisions faster and quickly resolve production impacting problems.

Outcomes: Transforming factory operations

The AI-driven solution has transformed Schaeffler's operations by:

- Improving issue detection and response by enabling real-time data access,.
- Maximizing machinery uptime, enhancing product quality and yield.
- Fostering a data-driven culture, improving efficiency, and driving continuous improvement.

Partner Solutions: avanade

Avanade played a crucial role in this transformation by establishing data pipelines, deploying an AI agent, and providing guidance on leveraging Azure AI's deep capabilities. Their expertise in data harmonization and scalable IT services ensured that the solution was effectively integrated into Schaeffler's existing infrastructure.

Read the full story: Schaeffler unlocks factory insights with Microsoft Cloud for Manufacturing

Streamline application lifecycle management with coding assistance

Boost development efficiency by automating coding tasks, streamlining workflows, and enhancing collaboration across engineering teams. Learn how generative AI and intelligent coding assistants provide real-time insights, reduce errors, and improve code quality, accelerating application development and time to value.

Business outcome

- Faster time to market
- Reduced design costs

Challenges addressed

- Excessive development time
- Poor code quality
- Integration complexity

Microsoft Solutions

- Azure OpenAI Service
- Azure Machine Learning

Customer Story

Discover how Schneider Electric accelerated innovation in manufacturing by leveraging AI-powered solutions to enhance productivity and sustainability

Schneider Electric

The challenge

Schneider Electric faced challenges in scaling AI due to traditional, time-consuming coding processes that slowed AI model deployment and collaboration. Without a unified development environment, AI adoption was fragmented, limiting efficiency gains in manufacturing. To accelerate innovation, they needed a streamlined, scalable approach coding and deployment to accelerate adoption.

An AI-driven solution

Schneider Electric leveraged Azure Machine Learning and Azure OpenAI Service to streamline development and deployment. By adopting a low-code/no-code approach and automation tools, the company accelerated AI model training, testing, and deployment across its manufacturing operations. This enabled faster coding iterations, improved collaboration between engineers and data scientists, and enhanced AI-driven insights for optimizing production. With a unified AI environment, Schneider Electric could rapidly scale and deploy GenAI solutions, improving efficiency and decision-making across its global facilities.

Outcomes: Transforming manufacturing operations

By integrating AI across manufacturing, Schneider Electric:

- Expedited its innovation process, moving swiftly from research to real-world applications
- Improved internal efficiencies, allowing teams to focus on higher-value tasks
- Facilitated more efficient energy management and automation, reducing costs and improving results

Read the full story: Schneider Electric fast-tracks innovation with Azure OpenAI Service

Improve factory safety and frontline productivity with real-time insights

Enable real-time monitoring, predictive maintenance, and faster issue resolution, reducing downtime and improving workplace safety. Learn how with GenAI-driven automation, manufacturers can streamline workflows, empower frontline workers with instant access to critical data, and drive operational efficiency across the factory floor.

Business outcome

- Improve customer satisfaction
- Increase asset uptimes
- Automate repetitive tasks

Challenges addressed

- Frontline workers inefficiencies
- Workflow complexity
- Worker safety

Microsoft Solutions

- Azure Machine Learning
- Power BI
- Azure Databricks
- Azure Data Factory

Customer Story

Learn how Network Rail improved worker productivity with data analytics and predictive maintenance.

The challenge

Network Rail manages vast railway infrastructure and collects nearly half a petabyte of data every week. However, siloed data and complex analysis processes slowed maintenance engineers, leading to inefficiencies and delays in decision-making. Without a unified system, workers struggled to access critical insights, hindering proactive maintenance and operational efficiency and safety.

An AI-driven solution

Network Rail leveraged generative AI and Azure Databricks to unify vast railway infrastructure data into a central platform, "insight." Using machine learning and predictive analytics, engineers could detect anomalies, predict failures up to a year in advance, and automate maintenance planning. AI-powered automation and natural language processing (NLP) streamlined data analysis, reducing manual workload and enabling faster, data-driven decision-making. This improved maintenance efficiency, minimized downtime, improved worker safety, and enhanced productivity across the railway network.

Outcomes: Transforming product data management

By enabling their frontline with AI-powered analytics, Network Rail:

- Accessed and interpreted data 50% faster, reducing analysis and decision-making time
- Identified potential failures up to 12 months in advance, reducing unexpected disruptions and risk
- Avoided emergency speed restrictions, saving £250,000 for busy sections of the network

Partner Solutions: cognizant

Cognizant, a global technology services firm, collaborated closely with Network Rail to develop and optimize its AI-driven infrastructure. By leveraging Microsoft Azure's scalable and interoperable cloud services, Cognizant ensured seamless integration of advanced analytics and predictive maintenance tools into Network Rail's existing systems, enhancing operational efficiency, productivity, and safety.

Read the full story: Network Rail embraces a more efficient data-driven future with Microsoft Azure