

AI Maturity in Manufacturing

The state of AI ...



45

35

10 PTS



2025

The AI revolution in manufacturing

When announcing GM's expanding collaboration with NVIDIA, the carmaker's CEO, [Mary Barra](#), lauded AI's manufacturing benefits: "AI not only optimizes manufacturing processes and accelerates virtual testing but also helps us build smarter vehicles while empowering our workforce to focus on craftsmanship."

[GM](#) is already using AI-enabled digital twins to enable virtual product design, prototyping, and testing and to run production simulations. In the future, they plan to develop fully autonomous vehicles that don't require drivers.

Some forward-looking companies are taking it a step further by using digital twins powered by physical AI to improve intelligent warehouse performance. For example, [KION Group](#) trains warehouse robots to adapt to changing conditions such as demand shifts, inventory fluctuations, and layout modifications.

The AI race is on

GM and KION Group aren't alone. Most of the manufacturers we surveyed are already seeing benefits from AI adoption: 89% report higher productivity, 85% cite cost savings and revenue growth, and 84% have improved experiences and profit margins.

"Manufacturers have been grappling with the same problems for years: improving quality, increasing throughput, optimizing asset utilization, and reducing costs," says Allen Hackman, vice president of global manufacturing go to market at ServiceNow. "AI will transform how they identify and solve these problems by leveraging the power of every source of information."

[GE Aerospace](#), for example, uses predictive AI to cut factory downtime and identify maintenance issues before they become problems for customers. Companies such as [Kraft-Heinz](#) are creating a self-driving supply chain that adapts to disruptions in real time and even adjusts raw material orders.

At the same time, physical AI is fast becoming the connective tissue of tomorrow's factories. Humanoids are filling labor shortages and driving massive efficiencies on assembly lines. Cobots with sensors and vision systems now work with humans to boost productivity.



AI maturity is a fast-moving target

In 2024, ServiceNow launched its Enterprise AI Maturity Index to track the state of AI maturity across industries and countries. For [this year's Index](#), we surveyed 4,473 executives worldwide—including 1,428 automotive, industrial, and consumer goods manufacturers, with an average revenue of \$1.1 billion. We measured AI maturity across five dimensions: strategy and leadership, workflow integration, talent and workforce, AI governance, and realizing value in AI investment.

The results surprised us.

This year's average maturity score for manufacturers declined significantly—by 10 points—from last year.

Despite the performance gains from AI, most management teams realize their internal systems are not AI ready. "Many manufacturers don't have the data and IT foundation in place," explained Hartmut Mueller, chief transformation officer at ServiceNow. "They are not clear how to automate their value chain end-to-end in a customer-centric way. And they don't have a data fabric beyond technologies, which is critical for AI success."

Part of the explanation for why manufacturers have been slower to adopt AI is that they face so many fundamental business problems, from cost pressures and consolidation to supply chain disruptions and now widespread tariffs. "Unless there is clear ROI, manufacturers feel they can't invest right now," says Hackman.

Despite all these challenges, we recommend that manufacturers take a long-term view on ROI. "While investing in AI might be costly initially, the ROI really adds up over time," says Sridharan Subramanian, global head of GenAI for NVIDIA.

 **10pts**

the average AI maturity score in manufacturing dropped 10 points year over year, from 45 to 35

Rapid change brings challenges

Data is a roadblock for many manufacturers

Only 43% of manufacturers have made significant progress in acquiring the resources and technologies to integrate and optimize their data.

Filling the AI talent gap

Sixty-four percent of manufacturers are still in the process of identifying skills needed as they formalize their AI strategies. Says the CFO of an Australian automaker: "Finding AI talent is hard, since the demand for such people far exceeds the supply. It makes it a challenge to put together a team capable of developing and using AI solutions on a large scale."

Seizing AI opportunities

Despite the headwinds, manufacturers are pushing forward with AI. Many of the manufacturers in our study ramped up their AI spending over the past fiscal year, and 82% plan to do so in the next fiscal year. Nearly three out of five manufacturers rolled out 100 or more use cases last year. The most common ones include customer support, data management, predictive analytics, performance management, and customer and employee experience.

Manufacturers should look for major pain points that can be solved with AI and deliver quicker ROI. The unlocked ROI can then be used to finance additional AI investment.

"We have found variations in priority use cases for automakers by region," says Subramanian. For example, in Asia automakers are heavily focused on in-vehicle innovation, such as AI-enabled voice assistance. But in Europe, they care more about enterprise transformation, such as process optimization across their value chains."

Manufacturers are investing more in AI

82%

of manufacturers plan to increase AI spending over the next fiscal year

AI boosts margins

Manufacturers in our study report an average 7.6% increase in gross margins from their use of AI over the past year.

For example, [GE](#) harnesses AI models within its industrial equipment division to adjust pricing based on demand forecasts and raw material cost variations. This has helped to enhance market responsiveness and safeguard its profit margins during volatile periods.

Half of manufacturers have seen significant ROI from using AI search capabilities across their value chain, from retrieving data from product manuals and customer databases to collecting information on suppliers, inventory levels, and market trends. Almost as many manufacturers gain hefty returns from using AI to drive process improvement and efficiencies, through predictive maintenance, quality control, automation, and supply chain optimization.

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Agentic AI moves center stage

Agentic AI—an advanced form of AI that can plan, decide, and implement tasks autonomously—is gaining ground among manufacturers. More than 20% have deployed agentic AI solutions. Another 45% may adopt agentic AI in the next 12 months.

We found business risk assessment to be the most common use case for agentic AI among manufacturers. For instance, by autonomously analyzing supply chain data, agentic AI can help identify potential supply disruptions and recommend alternatives to help mitigate risks in real time. “An AI agent can sift through all of the disparate data, identify the potential risks and impacts, and offer solutions before you even realize that there is an issue,” Hackman says.

How agentic AI boosts performance

Of the manufacturers in our survey that use agentic AI, 56% report both revenue growth and improved customer experiences. Agentic AI gives manufacturers the ability to customize product offerings and personalize customer experiences, while retaining the scale economies of mass production. “When you look at the most successful companies, what they have in common is a great customer experience,” Mueller says.

By optimizing processes, over half of the manufacturers employing agentic AI have also bolstered profitability and productivity. Whether it's in the supply chain or the production process, AI agents can root out the problems and find the efficiencies that humans simply don't have time to think about.

More than 20% of manufacturers employ agentic AI, and another 45% are considering adopting it over the next 12 months.



Real world AI impact

Integrating AI into Toyota's next-generation vehicles

The [Toyota Research Institute \(TRI\)](#) uses AI to accelerate vehicle design cycles slowed by multiple iterations between designers and engineers. TRI developed a generative AI model that incorporates engineering constraints early in the process, enabling faster creation of optimized vehicle concepts. For example, the AI model provides insights into reducing drag and optimizing aerodynamics, key to maximizing the driving range of electric vehicles. The solution is helping Toyota design electric vehicles more quickly and efficiently.

Autonomous vehicles and physical AI

Going forward, Toyota plans to build its next-generation vehicles on [NVIDIA's](#) autonomous vehicle platform. This will enable the company to deliver safe and advanced driving assistance capabilities and help position it at the forefront of the autonomous vehicle market. Toyota is already tapping into physical AI applications through NVIDIA [Omniverse™](#), a platform that enables physics simulation for robot motion and gripping to improve its metal forging capabilities

How Eaton transformed employee services with assistive AI agents

Eaton is an intelligent power management company that makes products for the data center, utility, industrial, commercial, machine building, residential, aerospace and mobility markets. To enhance the employee experience, Eaton built an online portal for access to HR and IT services. This self-service portal lets users search for HR and IT best practices and knowledge articles, submit and track service requests, and interact with ServiceNow AI agents—**cutting problem resolution time by 50%**.

Eaton is already seeing benefits. "Now we're starting to realize productivity gains through AI summarization, knowledge article writing, and search," says Sunil Tulyani, senior manager, IT at Eaton. AI has also helped Eaton create conversational interactions that have eliminated two years of backlog work and the need for future chat script maintenance.

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– Sunil Tulyani, Senior IT Manager, Eaton

Manufacturers cite multiple AI use cases across the value chain

Customer sales and service

Gathering customer feedback

"We use AI to conduct customer feedback analysis to enhance products or services."

- Director, German auto manufacturer

Accelerating customer response

"We implemented AI chatbots to provide immediate responses to customer inquiries."

- COO, French heavy manufacturer

Analyzing buying behaviors

"AI solutions improve customer loyalty by analyzing buying behavior."

- CIO, Canadian auto manufacturer

Production and quality control

Improving manufacturing processes

"We used AI to optimize our production processes, which resulted in higher productivity, lower costs and fewer defects."

- SVP, Japanese consumer goods manufacturer

Identifying production problems

"We used AI to analyze production defects to identify root causes to prevent future issues."

- CTO, Canadian heavy manufacturer

Conducting predictive maintenance

"We developed an AI predictive maintenance system, which cut downtime by 32%."

- CFO, Spanish consumer goods manufacturer

Supply chain and logistics

Improving supply chain management

"We used AI to optimize supply chain operations, predict demand, and manage inventory."

- SVP, UK auto manufacturer

Gaining supply chain visibility

"AI gives full traceability from raw materials to final goods in order to ensure quality."

- Senior director, Canadian heavy manufacturer

Predicting supply chain disruptions

"We use AI to predict weather-related disruptions that could impact our supply chain."

- Senior director, Australian consumer goods manufacturer

MY TAKE

Riding the AI technology curve



Sridharan Subramanian

Global head of GenAI for automotive, NVIDIA

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Transforming the factory floor through AI typically unfolds in stages, reflecting the growing adoption and integration of AI technologies. As a manufacturing firm progresses through each stage, the sophistication of the AI tools deployed increases—from traditional AI to GenAI, agentic AI, physical AI, and beyond. As AI maturity grows, the level of human involvement decreases. The phases can be generally defined as follows:

Phase 1: Traditional AI and GenAI help the human working on the factory floor to reduce downtime and make things more efficient using chatbots, recommendation engines, root cause analysis, and other AI tools.

Phase 2: AI is leveraged to bring the physical factory floor into the digital space by creating a virtual version of the factory floor through a digital twin. In this phase, the digital twin is used as a decision-support tool by humans working on the factory floor.

Phase 3: An AI-driven co-pilot is layered on top of the digital twin to provide humans with greater support in running their everyday tasks and quicker access to data and information for decision-making.

Phase 4: Agentic AI replaces the human-in-the-loop by making decisions autonomously on core tasks. This might include an agent to power predictive maintenance or one to independently optimize the production line.

Phase 5: AI initiatives are expanded into the physical manufacturing environment. The use of physical AI brings an AI-enabled robot to the factory floor. Physical AI and telematics connect the products out in the field with the manufacturing line to help identify issues and make improvements.

Pacesetters lead the way

Pacesetters do it differently

Our research has identified an elite group of Pacesetters that are well ahead of the pack across all five pillars of AI maturity: (1) AI strategy and leadership, (2) workflow integration, (3) talent and skills, (4) data governance, and (5) realizing value in AI investment. Pacesetters had higher scores than other manufacturers in each of these areas. As a result, Pacesetters had an average score of 44.2 compared to an average score of 33.0 for other manufacturers.

Industrial manufacturers have an AI advantage

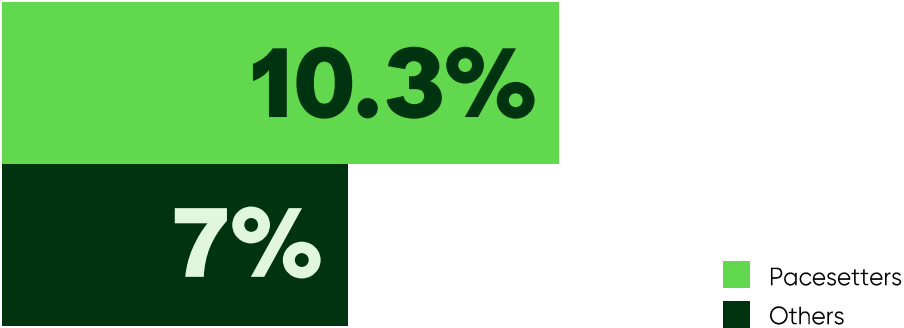
Eighteen percent of manufacturers in the survey are Pacesetters. However, there are variations among manufacturing subsectors: 15% of consumer goods companies are Pacesetters vs. 17% of automotive firms and 21% of industrial manufacturers. Notably, industrial manufacturers are the second most advanced sector in the overall survey, trailing only technology firms in their AI maturity.

Our research shows that the highest percentage of Pacesetters are in APAC, followed by the Middle East and North America, with Europe trailing behind. “Many manufacturers are more advanced in AI innovation in Asia, particularly China, thanks to government AI funding, growing AI talent from universities, and a regionwide appetite for experimentation,” says Subramanian.

Pacesetters drive performance through AI

As a result of their efforts—and their significantly larger investments in AI—Pacesetters in the manufacturing industry saw greater improvements in productivity, profitability, stakeholder experiences, and speed of innovation than other companies. Pacesetters reported 10.3% growth in profit margins, compared with 7% for other manufacturers.

Pacesetters saw higher margin growth from AI last year



Pacesetters outperform others in achieving target outcomes



Pacesetters lead with an innovation mindset

Manufacturing has always been about continuous improvement. But becoming an AI-powered manufacturer requires a step change and an innovation culture that gives their staff the permission to take risks and explore new ideas.

Almost two-thirds of Pacesetters encourage a culture of AI experimentation to engage employees, and more than half operate with a shared AI vision for transformation. "Manufacturers need to combine an innovation culture with a clear AI vision that brings their people along," Mueller says. "The vision should show the relevance of AI solutions to your company. And it should include a set of metrics to gauge whether your AI strategy is working."

Organizing for innovation

More than half of Pacesetters install chief AI officers to implement their AI vision. For example, [GM](#) recently appointed a chief AI officer to drive the use of AI across the enterprise, from product development and autonomous systems to manufacturing, supply chain management, and logistics.

In addition, over half of manufacturing Pacesetters maintain AI innovation centers. One example is the [Bosch Center for Artificial Intelligence](#). The center partners with business divisions to transform their products, services, and value propositions using the latest AI solutions.

51% of Pacesetters have made significant progress creating an AI innovation center that pilots next-generation AI solutions vs 38% of others

Pacesetters prefer platforms

These platforms allow Pacesetters to deploy advanced AI tools quickly and at scale. Compared to other manufacturers, Pacesetters are twice as likely to invent new workflows that draw on AI's predictive and analytical capabilities.

Supercharging AI results through a modern platform

Mueller believes modern platforms are a prerequisite for successful AI transformation. "Manufacturers can drive their innovation roadmap through the platform and adapt it to changing business conditions, as is happening now with trade tariffs," he says. "Such a platform enables manufacturers to leverage out-of-the-box AI capabilities and technologies with their underlying data—it allows them to connect the dots between everything."

70% of Pacesetters employ a platform approach, vs 50% of others

Pacesetters nurture AI talent and skills

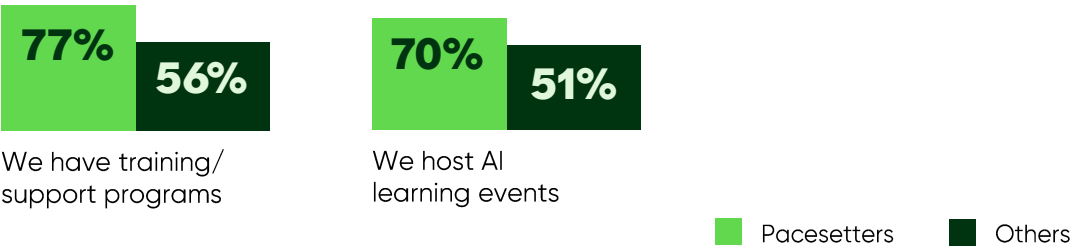
Pacesetters are 1.6 times more likely to strongly agree they have the right mix of talent and skills in place to execute their AI strategies.

They take decisive steps, such as hiring AI specialists from outside the organization and offering effective training and upskilling programs for employees. We found that 77% of Pacesetters conduct AI training programs, and 70% host training events.

Preparing staff for the AI revolution

Pacesetters embed upskilling into their AI strategies. For example, [Bosch](#) recently announced a €2 billion plan to retrain a portion of its 400,000 employees for the AI era. Led by the [Bosch Center for Artificial Intelligence](#), these training opportunities include an 18-month program in which employees build expertise in data engineering and data science.

Pacesetters develop needed AI skills



Pacesetters prioritize data governance and management

Because of their extensive supply chains, intricate production processes, and use of IoT, manufacturers have greater access to data than most industries. Now with AI and agentic AI, they have the tools to extract extraordinary value from their data.

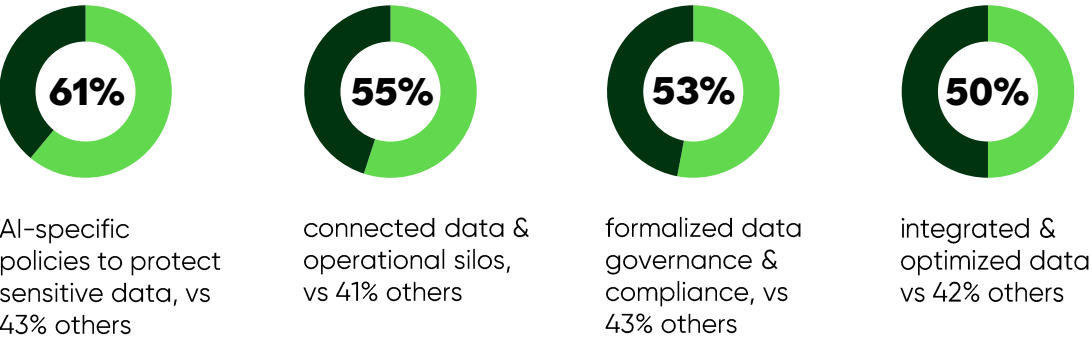
Focus on data quality

Pacesetters understand that AI solutions are only as good as the data they run on. That is why Pacesetters start their AI journeys by building AI-ready data management systems that clean, standardize, integrate, and optimize data from across the enterprise.

Pacesetters develop data governance frameworks and policies to ensure the data fed into AI models is secure, reliable, and compliant with data protection regulations. They also build controls on the data generated by AI models to minimize risks from bias, misinformation, and security and privacy breaches.

Pacesetters are ahead when it comes to managing data

% who have made significant progress



Pacesetters embrace agentic AI

[Honeywell](#) has partnered with Google to develop agentic AI solutions to create smart factories that autonomously monitor and adjust processes. The AI agents make real-time decisions to optimize process parameters, detect anomalies, and manage production schedules.

Similarly, [Lockheed Martin](#) is accelerating AI transformation across its business by using an AI factory, powered by NVIDIA DGX SuperPOD.™ This state-of-the-art AI factory, which supports agentic AI reasoning and other AI workloads, provides staff with the tools to develop and deploy AI applications and models at scale.

Our research found that Pacesetter manufacturers are more than twice as likely as others to be very familiar with agentic AI, and many are already putting agentic AI to use. We found that 45% are now piloting or actively using agentic AI to write and edit code. Nearly as many are leveraging AI to assess and address business risks. In addition, 42% are using AI agents to build bespoke products and services, 39% to monitor and interact with internal systems, and 38% to manage cybersecurity risks.

Putting agentic AI to work

30% of Pacesetters are already using agentic AI, vs. 19% of others.



Calls to action

Start now. Fail fast.

Build an innovation culture where people are encouraged to experiment with various AI ideas, take the wins, and learn from mistakes.

The experiments should help identify the manufacturing areas that will have the biggest impact on your performance, and the effectiveness of individual process domains within your value chain. "Early wins will build confidence in your AI strategy," Mueller says. "Importantly, be willing to kill your existing darlings and move forward."

Focus on value and profitability

Break through performance plateaus with agentic AI.

Generating a return on AI investments may take time, but manufacturers need early proof that future investments will drive long-term profitability. "Agentic AI can unlock progress that simply wasn't possible before," says Hackman. "Think about its ability to analyze vast data sources and spot trends. Manufacturers can use it provide early warnings of risks to production, supply chain, or to customers - before those risks become a reality." These use cases create measurable value and lasting impact on the bottom line.

Leverage all available data

To get accurate, high-impact results from generative and agentic AI, manufacturers need to tap into every data stream.

To drive AI transformation, manufacturers should draw on all accessible data. This includes data from the factory floor and from the product itself—such as the telematics data from a vehicle. "You then want to be able to correlate that with external data from the customer and from the internet, including multimodal data parsed from data charts, tables, images, text, and audio files," says Subramanian.



About Aelum Consulting

Aelum helps automotive manufacturers, suppliers, and dealer networks modernize operations with AI, intelligent automation, and connected enterprise workflows. From manufacturing and supply chain optimization to dealer operations, workforce transformation, and IT-OT convergence, we help organizations improve efficiency, reduce complexity, and scale digital transformation with measurable business outcomes

See how AI can transform your operations from the factory floor to the customer experience.

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