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# Forging the future

AI outlook in manufacturing, transport and technology



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## Introduction

Companies are facing mounting pressure to improve environmental sustainability, address labour shortages and navigate fractured supply chains. These challenges are particularly pressing in industries shaped by modern innovation and defined by strong operational and logistics needs, such as manufacturing, transport and technology. However, emerging opportunities—such as electric vehicles (EVs) and low-carbon technologies—offer new paths for growth, bolstered by strong government support. The integration of artificial intelligence (AI) and next-generation robotics provides a promising beacon of hope.

An Economist Impact survey, commissioned by Databricks, polled 715 technical executives and 385 data and AI technologists with titles such as data scientists, data engineers and enterprise architects. The survey included 140 respondents representing the manufacturing industry. Alongside this, we also interviewed executives across leading companies in manufacturing, transport and technology.



We found:

- **Sixty-five percent of manufacturing respondents are exploring the use of generative AI (GenAI) for product design.**
- **Process optimisation is the leading use case for AI in manufacturing.**
- **The sector is also one of the best performing talent magnets, with 61% of manufacturing companies able to secure the data and AI skills they need. This places it second in our survey in this regard, a shift from past decades when the sector struggled to hire talent.**
- **Amid a fractious global trading system, optimised shipping and logistics is the leading means of measuring return on AI investment, cited by 59% of manufacturing executives, and tied with enhanced response to demand fluctuations.**

We'd like to thank the following executives for participating in interviews and sharing insights:

- **Wassym Bensaïd**, chief software officer, **Rivian**
- **Carol Clements**, chief digital and technology officer, **JetBlue**
- **Ken Finnerty**, president of IT and data analytics, **UPS**
- **Jon Francis**, chief data and analytics officer, **General Motors**
- **Scott Hallworth**, chief data and analytics officer, **HP**

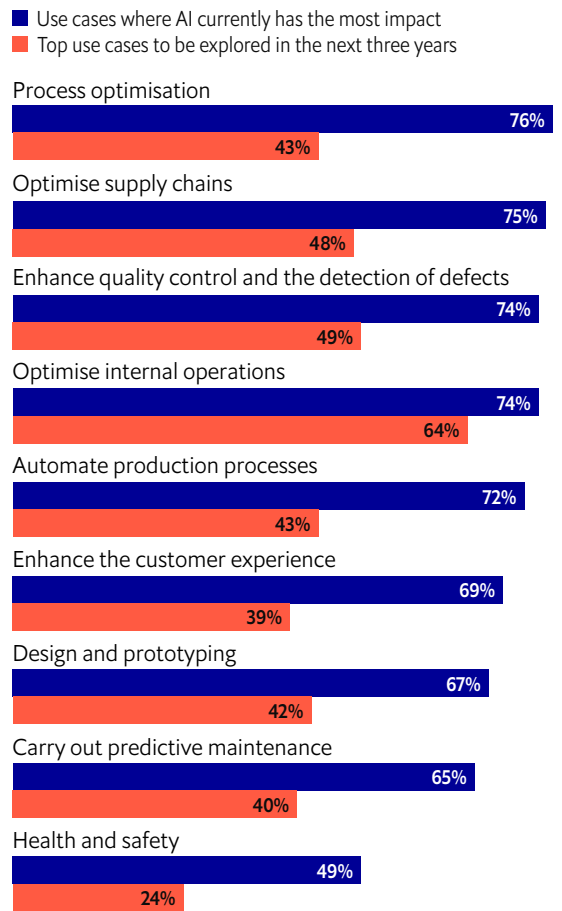
### Manufacturing: an industry in transition

The manufacturing sector stands at a pivotal moment. Geopolitical tensions and the lingering impacts of the covid-19 pandemic have upended global supply chains, rendering them vulnerable to political upheavals and material shortages. ‘Just-in-time’ production models are giving way to a ‘just-in-case’ approach, but this shift brings its own set of costs and logistical complexities. Our survey underscores these challenges, with 59% of manufacturing executives citing optimised shipping and logistics as a key metric for measuring the return on investment on AI, alongside improved responses to demand fluctuations.

Amid these disruptions, manufacturers face an urgent need to adapt and evolve and are turning to AI to drive changes. From process optimisation and product design to predictive maintenance and supply chain management, AI is unlocking new efficiencies, driving innovation and enabling manufacturers to thrive in a rapidly changing landscape (see figure 1).

The rise of AI in manufacturing echoes the spirit of past industrial revolutions, albeit with a 21st-century twist. Funding initiatives, forward-thinking policies and the emergence of disruptive innovators like Tesla and Rivian are reinvigorating the sector, making it an attractive destination for tech talent eager to build real-world solutions with tangible impact.<sup>1</sup> Our survey highlights the growing optimism and ability of manufacturers to attract and retain AI expertise, with 61% of survey respondents expressing confidence in their recruitment capabilities—second only to the financial sector.

Figure 1: Top use cases among manufacturing respondents, now and in the future



Source: Economist Impact

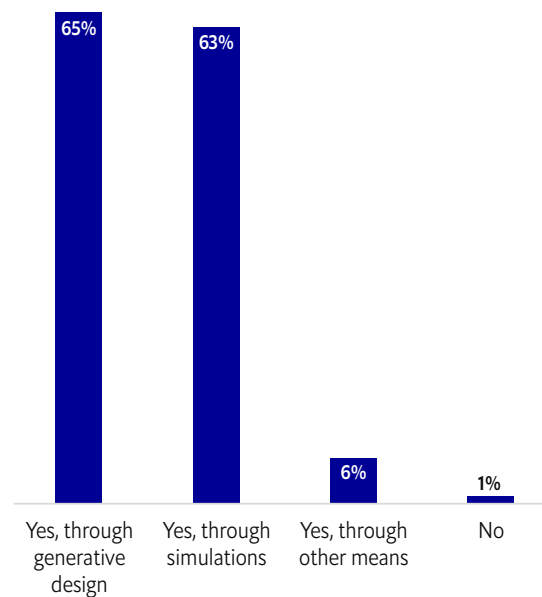
<sup>1</sup> <https://www-cnbc-com.cdn.ampproject.org/c/s/www.cnn.com/amp/2024/08/20/inflation-reduction-act-sparked-a-manufacturing-clean-energy-boom.html>

### AI: the engine of innovation

In the realm of product design and prototyping, AI is proving to be a game-changer. Nearly two-thirds (65%) of manufacturers that we surveyed are exploring the use of GenAI to reimagine products, while 63% are exploring the potential of simulations to streamline product innovation (see figure 2). Only 1% of respondents reported no interest in exploring AI for product design, underscoring its potential to drive innovation throughout the product lifecycle.

**Figure 2: Nearly all manufacturers are exploring the use of AI for product development**

Percentage exploring the use of AI to improve product design or prototyping



Source: Economist Impact

By leveraging AI to analyse market trends, customer preferences and competitor strategies, manufacturers can sharpen decision-making and craft products that meet evolving demands with precision and speed. Rivian, for example, was "born digital", according to Wassym Bensaid, the company's chief software officer,

with AI woven into the fabric of its enterprise systems, manufacturing processes, supply chain and direct interactions. This clean-sheet approach has enabled the company to make intentional, data-driven decisions that drive innovation and differentiation.

Similarly, companies across industries are leveraging AI to deliver products that are constantly updated and improved post-sale, shifting the paradigm from static goods to dynamic, continually enhanced offerings. These innovations can build on routine firmware updates, enhancing them with innovations that are tailored to an AI analysis of each user's engagement with the product.<sup>2</sup>

### Predict, then prevent

Manufacturing, transport and technology companies incur significant costs when their equipment undergoes downtime for maintenance or repairs. By leveraging predictive analytics and machine learning (ML), firms are substantially reducing such unplanned downtime:

**65% of manufacturing sector respondents say AI has had a high impact on predictive maintenance, and 76% point to major impacts on process optimisation.**

General Motors (GM), for example, uses AI-driven predictive analytics to boost vehicle production using a blend of past performance data and real-time insights from its robots and conveyor systems. The AI continuously monitors for unusual patterns that hint at potential issues.

<sup>2</sup> <https://www-cnbc-com.cdn.ampproject.org/c/s/www.cncb.com/amp/2024/08/20/inflation-reduction-act-sparked-a-manufacturing-clean-energy-boom.html>

Early detection algorithms allow for quick interventions, reducing the risk of unexpected breakdowns and keeping the assembly line running.

**“We just deployed some really powerful ML into manufacturing where we can now predict if an EV battery on the line is going to later have problems.”**

Jon Francis, chief data and analytics officer,  
General Motors

Such precision not only improves the quality of the final product for their customers but also reduces waste.

Prediction and prevention are crucial to keeping vast logistics operations running smoothly, both in the factory and across supply and transport networks. At UPS, a larger program called Network of the Future incorporates both ML and GenAI to help orchestrate all activity throughout its global operations.

Meanwhile, US airline JetBlue has invested the returns from some of their more straightforward AI use cases to build a sophisticated digital twin model specific to their operations. Logistical challenges—from weather events to air traffic control—make the airline business complex.

**“The number of unexpected things that can come your way in a given day are almost limitless. Our digital twin has been an incredible source of value ... to be able to just anticipate what may be coming and have solutions ready rather than having to be in reactive mode.”**

Carol Clements, chief digital and technology officer, JetBlue

The vast data generated by these models requires sophisticated analysis tools and robust cybersecurity measures. As digital twins become more central to industries with a heavy logistics focus, ensuring their accuracy and security will be paramount. “We are very cautious in terms of where we let our data go,” says Ms Clements. “Anything that uses a lot of our proprietary and more high-risk data set, we approach that from an internal development standpoint.”

### **One data stream to rule them all**

The promise of AI is clear: faster production, fewer defects and lower costs. But the sheer amount of data being produced is becoming overwhelming. Developing more sophisticated intelligence solutions to sort through this noise will be critical. Experts point to the importance of unified data infrastructure to optimise decision-making, enhance productivity and democratise data-driven insights.

In 2019 as EV manufacturer Rivian scaled up, it faced the challenge of managing a fragmented data environment. By unifying its data infrastructure across product, supply chain, manufacturing and commercial operations, the company was able to significantly boost productivity and unlock business potential. “We increased overall productivity and effectiveness by converging to the same platform, the same infrastructure, the same tooling, and optimising our engineering, resources and usage,” says Mr Bensaid at Rivian.

**“It creates significant business value because in a unified data lake, we can have data from the product at the same time as the supply chain, or as manufacturing. You can imagine the use cases that unlocks. We might have a problem with a vehicle in service, and we can figure out if it’s linked to a specific supply batch or a specific sequence in manufacturing where we have an issue.”**

Wassym Bensaid, chief software officer, Rivian

Mr Hallworth at HP stresses the importance of reusable frameworks in building AI infrastructure to save time and ensure some consistency in its implementation throughout manufacturing processes.

**“Your foundation—your governance, quality control frameworks— the more you can recycle your frameworks as opposed to recreating, the better you are.”**

Scott Hallworth, chief data and analytics officer, HP

### Bolts and bots

While GenAI holds promise, it must be handled with care. “If you introduce products without high reliability, that may erode customer trust,” Mr Bensaid of Rivian warns. The risks of AI hallucinations—when the technology generates incorrect or nonsensical output—are real, and many companies are erring on the side of caution. “We only introduce products once we’ve addressed all the safeguards from a quality and reliability standpoint to ensure the technology will be a trusted assistant for our customers,” Mr Bensaid says.

A cautious approach appears to be more common across the manufacturing industry when it comes to actively implementing AI: 14% do not use AI technologies yet, compared with just 5% across other industries. For GenAI, the difference is more pronounced: 27% of manufacturers are not using it, compared with just 13% in other industries. However, over the next three years this gap is expected to close, with all but 1% of manufacturing executives planning to use or pilot GenAI.

At the same time, companies must avoid the siren call of technology for technology's sake. The focus should be on the return on investment and a disciplined approach to experimentation. For instance, GM prioritises AI and ML initiatives that promise significant incremental revenue or cost mitigation, a strategy that involves piloting proofs of concept to gauge impact before fully committing.

**“ It has to be tied to value and impact for the organisation. Part of the journey also just needs to be a bit of that experimentation cycle, to get a quick read before you make a big investment.”**

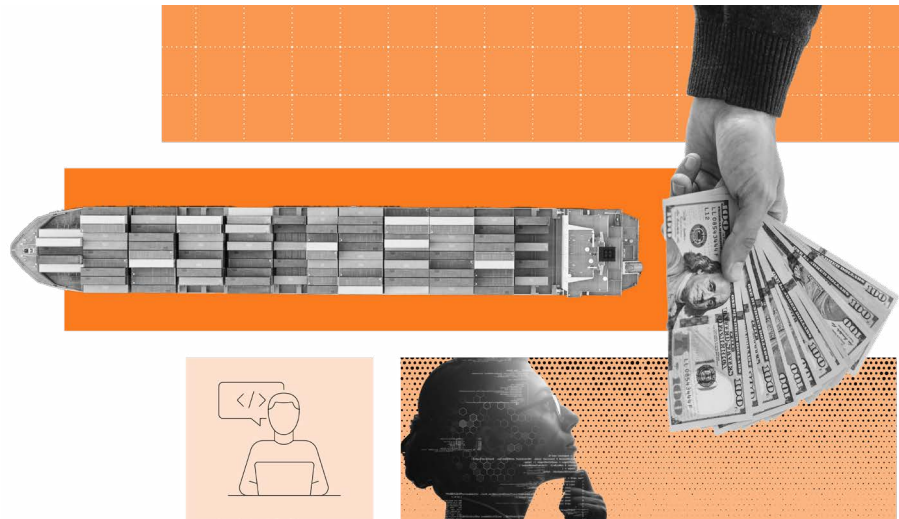
Jon Francis, chief data and analytics officer, General Motors

As we look to the future of AI in industries such as manufacturing, transport and technology, changes will affect stakeholders across the entire supply chain.

**“ Society needs to build intuition, understanding and common sense around AI as a technology. It's not by doing courses on AI, but by practising, by doing— developing AI products.”**

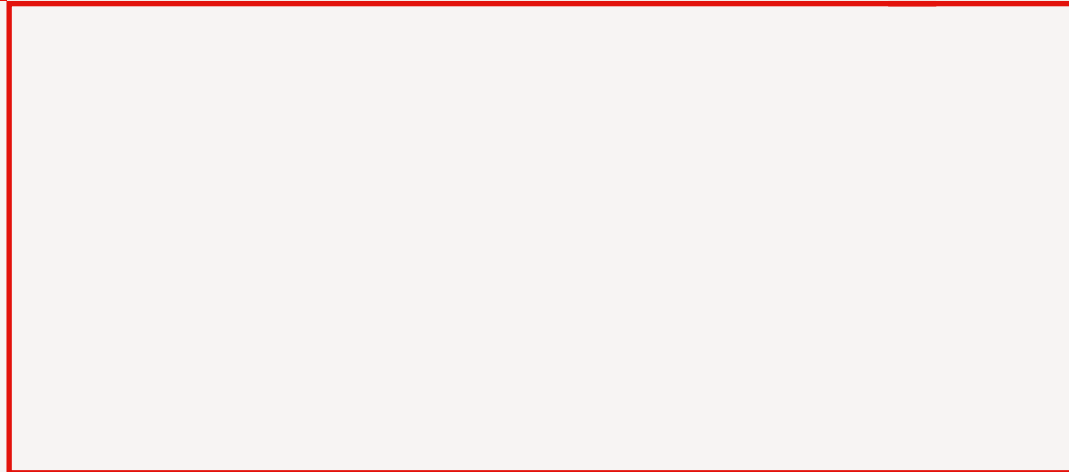
Scott Hallworth, chief data and analytics officer, HP

This type of holistic, hands-on approach to AI understanding and integration will be crucial for building the workforce of the future in these industries.



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**LONDON**

The Adelphi  
1-11 John Adam Street  
London WC2N 6HT  
United Kingdom  
Tel: (44) 20 7830 7000  
Email: london@economist.com

**GENEVA**

Rue de l'Athénée 32  
1206 Geneva  
Switzerland  
Tel: (41) 22 566 2470  
Fax: (41) 22 346 93 47  
Email: geneva@economist.com

**SINGAPORE**

8 Cross Street  
#23-01 Manulife Tower  
Singapore  
048424  
Tel: (65) 6534 5177  
Fax: (65) 6534 5077  
Email: asia@economist.com

**NEW YORK**

900 Third Avenue  
16th Floor  
New York, NY 10022  
United States  
Tel: (1.212) 554 0600  
Fax: (1.212) 586 1181/2  
Email: americas@economist.com

**DUBAI**

Office 1301a  
Aurora Tower  
Dubai Media City  
Dubai  
Tel: (971) 4 433 4202  
Fax: (971) 4 438 0224  
Email: dubai@economist.com

**WASHINGTON DC**

1920 L street NW Suite 500  
Washington DC  
20002  
Email: americas@economist.com

**HONG KONG**

1301  
12 Taikoo Wan Road  
Taikoo Shing  
Hong Kong  
Tel: (852) 2585 3888  
Fax: (852) 2802 7638  
Email: asia@economist.com