Feet on the floor, eyes on AI: Do you have a plan or a problem?

An executive insight report for manufacturing

Content

Contributors

Prasoon Saxena
President, Manufacturing and Commercial
Connect on LinkedIn

Wendy Collins
Chief AI Office, North America
Connect on LinkedIn

Sai Sekar
Senior Vice President, Head of Global Industries
Connect on LinkedIn

Andrew McNair
Director of Research and Benchmarking
Connect on LinkedIn

Cornelius Walter
CTO Automotive, Managing Director
GenAI Global Automotive
Connect on LinkedIn

Mari Labuschagne
Senior Research Analyst
Connect on LinkedIn

Executive summary

GenAI is more than simply the next wave in digital transformation. GenAI will reconfigure decision-making, operations and the workforce, redefining what is possible throughout the manufacturing value chain.

GenAI is top of mind for manufacturers as they look for ways to integrate intelligent models into core operations at scale. It promises to transform traditional operations with smart systems that improve production while fostering innovation, sustainability and workforce empowerment.

And, just as GenAI has performance-jumped more traditional AI, the rise of agentic AI is magnifying the impact of GenAI. Powerful autonomous decision-making, action execution and adaptability combine with orchestration, coordination and management to turbocharge GenAI.

To understand the opportunity and impact it has in global manufacturing, we interviewed more than 500 manufacturing decision-makers and influencers from organizations spanning 34 markets around the world.

Overall, our study found real excitement and positivity about GenAI.

- 64% of manufacturers already think GenAI is a game changer
- 95% say it directly improves efficiency and bottom-line performance
- 96% believe GenAI is delivering a new level of creativity and innovation

In fact, satisfaction with GenAI efforts has surged 79% in a single year, and organizations with more established capabilities are reaping the benefits. This satisfaction reflects the progress manufacturers have made in evaluating GenAI and preparing the business to take advantage of the opportunity.

- 94% expect the integration of IoT data into GenAI models to significantly improve the accuracy and relevance of AI-generated outputs
- 91% say combining digital twins and GenAI can improve both physical asset performance and supply chain resilience

At the same time, the advent of AI-driven shopfloor assistants and autonomous agents can improve operations and minimize disruptions. Exemplary use cases in automotive, for example, can boost resource utilization and lessen downtime. Reduced response time, human error, stock waste, work stoppages, urgent transports, online courts, and reworks all translate to greater efficiency and lower cost.

While excitement is high, progress may prove complex. Aligning AI and GenAI initiatives with business goals and infrastructure plans is key. However, connecting strategy and tactics can be challenging, especially for those who have not yet integrated GenAI at an enterprise level.

- 92% of manufacturers say outdated infrastructure is critically hindering GenAI initiatives, but fewer than half have conducted a full-scale infrastructure readiness assessment
- 88% worry about GenAI-related cybersecurity risks, but only 18% of Chief Information Security Officers (CISOs) feel their organizations have an adequate framework in place to balance risk and value creation
- 76% lack a formal GenAI usage policy for employees, with many manufacturers moving toward AI-driven operations without guardrails, training or clear guidelines

Manufacturers are at an inflection point. To improve their competitiveness, organizations must focus on blending human expertise with GenAI capabilities in a way that elevates productivity, quality and innovation.

This report provides insights to help manufacturers responsibly:

1. Establish governance and decision-making frameworks for GenAI
2. Fast-track GenAI implementation and value realization
3. Prepare and empower the workforce to thrive with GenAI

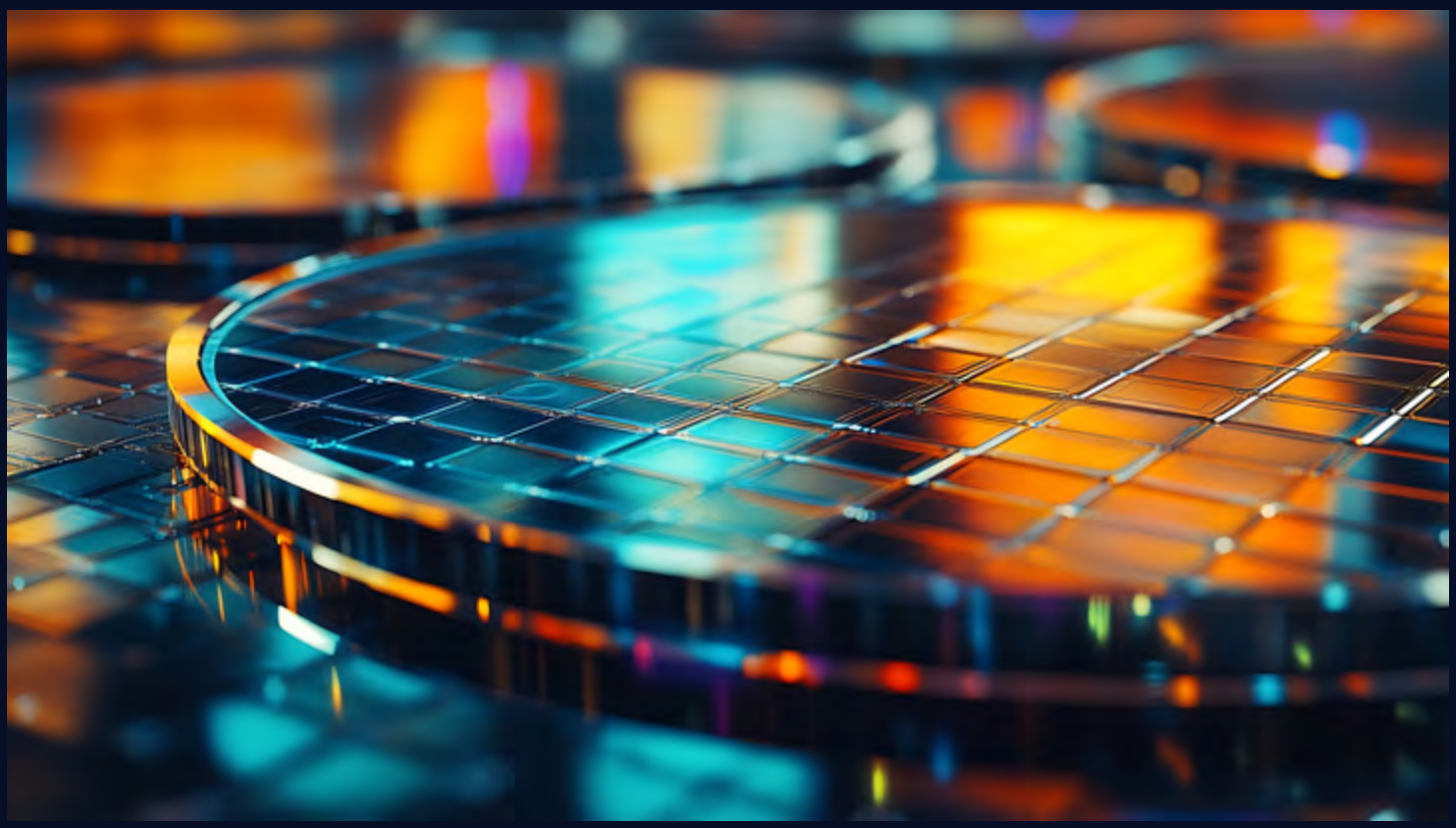
The GenAI landscape in manufacturing

Manufacturers are building smart factories to improve efficiency, productivity and resilience. These factories will provide a competitive advantage in an Industry 4.0 landscape, and GenAI is foundational in developing the smart capabilities manufacturers need.

When successfully integrated into core operations, GenAI provides powerful tools to improve operations, inform decision-making and deliver innovation. It enables manufacturers to automate complex processes, more accurately predict equipment failures, optimize supply chains and fast-track product development. Combined with agentic AI, the opportunities for positive change become nearly limitless.

Half of all manufacturers have already begun assessing the opportunity for GenAI across the enterprise. Over 9 in 10 will have done so by the end of 2025. Among users, 96% say GenAI is delivering a new level of creativity and innovation. More than 1 in 3 have evidence of it accelerating research and development (R&D) and product development.

However, global economic volatility, supply chain and technological disruptions, and inflationary pressures have created a challenging environment for manufacturers. The industry also faces a growing skills gap. In response, manufacturers are seeking new ways to increase efficiency, productivity and resilience.



Top 3 challenges

facing manufacturers in the next two years

1. Infrastructure complexity (such as modernization, performance/ integration and lifecycle management)
2. Assessing complementary technologies (such as IoT, 5G, edge computing and GPUs)
3. Establishing clear ethical and AI safety frameworks and ownership

Although GenAI helps companies address critical challenges, successfully integrating GenAI requires a human-centric approach. Manufacturers must seamlessly integrate AI and smart AI into their operations. They must also prioritize robust governance, ethical considerations, workforce development and augmenting human capabilities. The challenges are clear; defining best practices requires the same clarity.

> “A leadership position requires accepting GenAI as an ally, not simply an asset.”

Prasoon Saxena
President, Manufacturing and Commercial, NTT DATA North America

Case study: AI strategy and roadmap development

A leading aerospace company undertook an initiative to integrate AI into their core operations.

NTT DATA collaborated with the company to establish an AI strategy and roadmap, identifying 296 use cases.

The company projected $60 million in associated annual revenue opportunities.

Spotlight on automotive

The automotive industry is undergoing a profound transformation driven by the proliferation of electric vehicles (EVs), autonomous driving technologies and evolving consumer preferences. This transformation requires massive investments in R&D, new manufacturing infrastructure, and a fundamentally different approach to vehicle design and production. GenAI promises solutions to many of these challenges. Agentic AI hurries the pace at which solutions impact.

96% of automakers say that GenAI will have a material impact on improving their organization's R&D efforts

99% say that the integration of IoT data into GenAI models will significantly increase the accuracy and relevance of AI-generated outputs

93% say the combination of GenAI and digital twins can improve physical asset performance and supply chain resilience

At the same time, automakers must balance the need for rapid innovation with the strategic imperative of improving sustainability.

87% acknowledge that GenAI ambitions conflict with or negatively affect their sustainability goals

Balancing ambitions and sustainability with an enthusiastic yet responsible-by-design approach ensures that sustainability impact assessments and audits are the norm.

Case study: Better vehicle safety with GenAI

One of the world's largest automotive manufacturers was looking for ways to improve the safety of their vehicles.

NTT DATA jointly developed an AI-enabled mobility platform and telecommunications capabilities to help prevent traffic accidents.

The solution comprised high-speed, high-quality communication, powerful computing resources and robust AI models.

> "The timely convergence of EVs becoming mainstream and GenAI accelerating autonomy is redefining the entire automotive landscape."

Cornelius Walter
CTO Automotive, Managing Director GenAI Global Automotive, NTT DATA

Governance and guardrails

As AI becomes an intrinsic part of daily life and integrated within the DNA of manufacturing operations, balancing responsibility and innovation becomes both a moral imperative and a strategic necessity.[1]

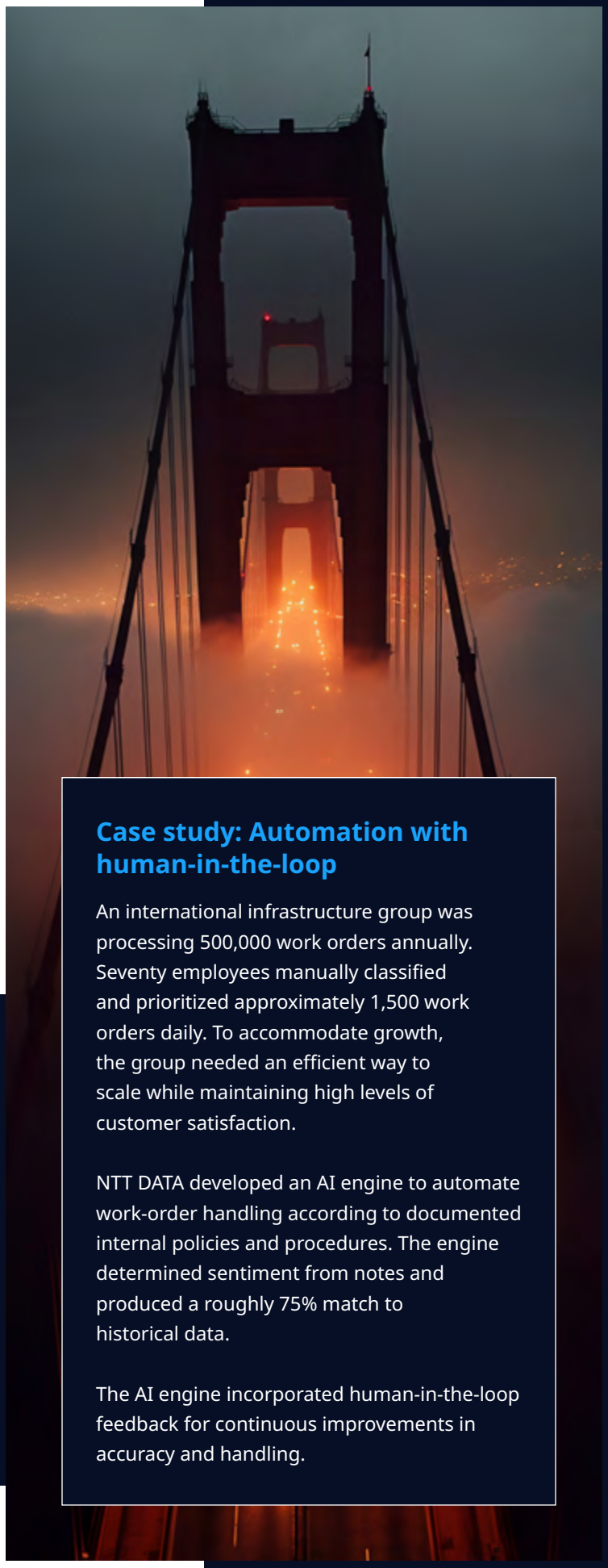
The balancing act is delicate. CEOs prioritize innovation, while CISOs sound alarms about security, compliance and governance risks.

65%
say there is a significant gap between innovation and responsibility

49%
say internal guidelines and policies on responsibility are unclear

> “Success depends on recognizing that AI governance isn’t a regulatory checkbox, but a competitive advantage.

Sai Sekar
Senior Vice President, Head of Global Industries,
NTT DATA Group Corporation



Case study: Automation with human-in-the-loop

An international infrastructure group was processing 500,000 work orders annually. Seventy employees manually classified and prioritized approximately 1,500 work orders daily. To accommodate growth, the group needed an efficient way to scale while maintaining high levels of customer satisfaction.

NTT DATA developed an AI engine to automate work-order handling according to documented internal policies and procedures. The engine determined sentiment from notes and produced a roughly 75% match to historical data.

The AI engine incorporated human-in-the-loop feedback for continuous improvements in accuracy and handling.

Get it right or get left behind

Manufacturers need to establish common GenAI usage policies that allow production initiatives to thrive. These include using governance advisory services and proven techniques with secure repositories, as well as reiterating the importance of preparation, assessments and audits.

Just
47%
strongly agree that their organization follows a robust framework that balances risk with value creation

76%
of manufacturers do not have a GenAI usage policy in place for employees (for example, to protect intellectual property)

Only
45%
strongly agree that they regularly review GenAI processes and their impact on user experience

Manufacturers must develop digital dexterity by seamlessly integrating data, AI and automation across all business functions. Doing so helps create AI frameworks that actively guide decision-making, which builds trust, accountability and strategic alignment.[2] Smart AI can similarly power such frameworks.

From pilot fatigue to scaled impact

Among manufacturers, 9 in 10 are tired of experiments. They want results. The most successful organizations already embed GenAI into core functions like supply chain forecasting, quality assurance and process automation. The industry is at a pivotal moment where the focus is shifting from proving the efficacy of GenAI to demonstrating its scalability and widespread impact.

Examples of core functions enhanced by GenAI

1. **Supply chain and inventory management:** Warehouse optimization, demand forecasting and logistics
2. **User guidance and knowledge management:** Document automation (such as SOPs and manuals), on-the-job support and personalized training
3. **Quality control:** Defect detection, root cause analysis and waste minimization
4. **Product/service design and development:** Prototyping, design optimization, 3D modeling and simulation, and materials research
5. **Process automation:** Data-collection, process mapping, predictive maintenance and enhanced robotics

Considering the needs of your industry, what are the top use cases for GenAI?

Basis: Manufacturing and automotive respondents, excluding "don't know" responses (n=508)

Act urgently to operationalize

Balancing immediate gains with long-term scalability

98%
agree that while short-term gains are sought, they are emphasizing GenAI's long-term potential

87%
say investment in GenAI infrastructure is a given, but the return on investment will be unclear for the foreseeable future

81%
say it is very important to have a solution that has proven scaling (can accommodate growth)

By strategically selecting GenAI initiatives that deliver quick wins and can scale to deliver long-term gains, manufacturers position themselves for sustained success. Ultimately, results may materialize faster with hybrid solutions such as coupling GenAI with agentic AI.

Making GenAI accessible across business operations

The number of GenAI tools and use cases is growing, offering an expanding variety. This increases complexity for organizations seeking to vet, integrate and implement these tools.

>9 in 10
say cloud-based solutions offer the most practical and cost-effective means to support GenAI

95%
say the demand for GenAI solutions is driving a review of cloud strategies

96%
say the demand for GenAI solutions is driving a review of their network architecture (including edge)

Successful manufacturers solve these challenges with expert partners offering integrated AI asset and accelerator capabilities, along with hyperscaler consulting and advisory services.

Ensuring effective data management

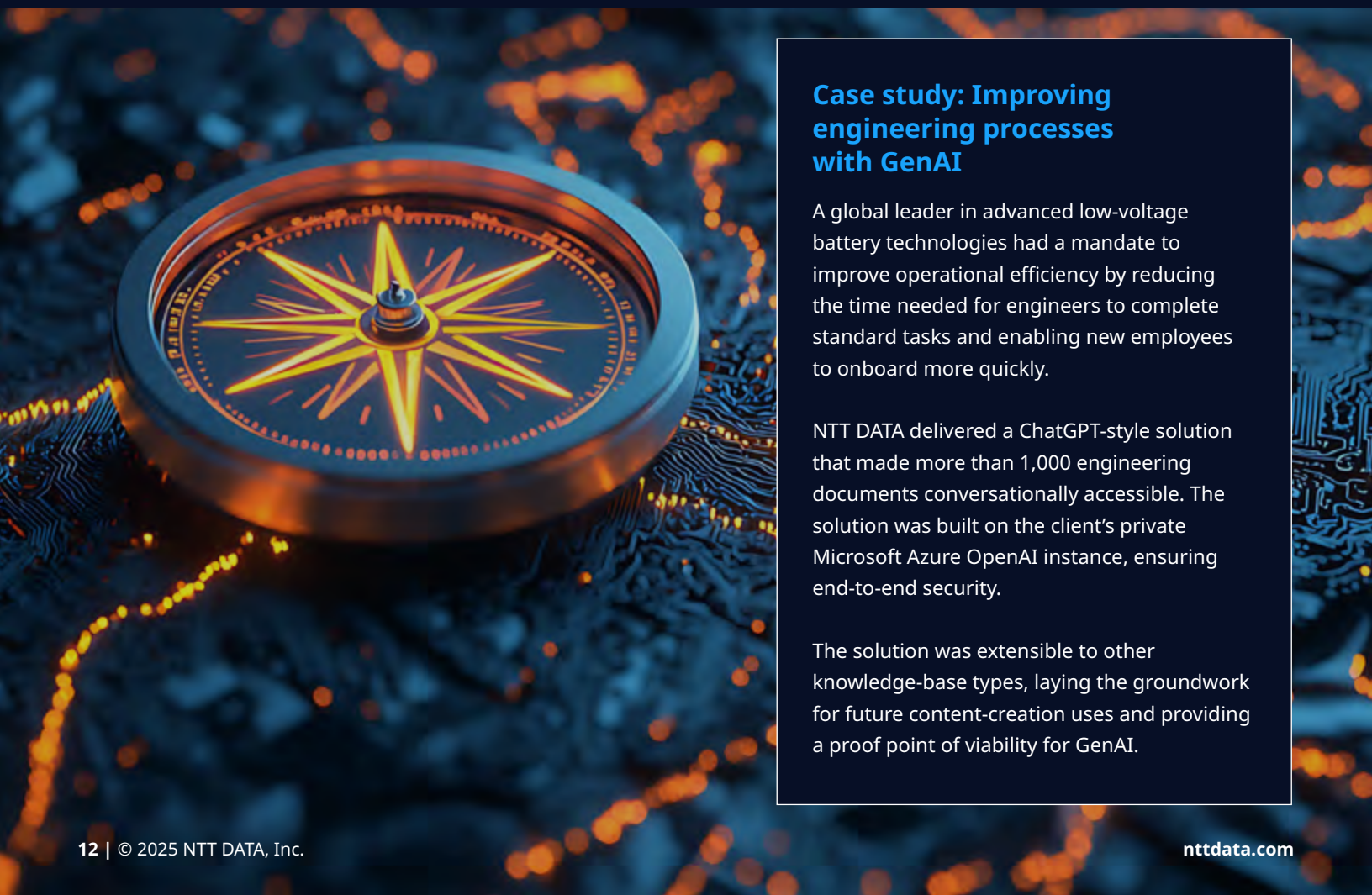
To fully use the power of GenAI, manufacturers must ensure that the data feeding their AI applications is organized, accessible, validated and of high quality. By proactively addressing data requirements, types, quality considerations and security measures, organizations can lay a solid foundation for success.

Only
41%
strongly agree that they have invested sufficiently in data storage and processing capabilities to support GenAI workloads

95%
plan to assess their organization's data-readiness within the year

59%
say the key lesson learned from GenAI deployment is that high-quality, diverse and clean data is paramount for effective GenAI models

Poor-quality source data
and unreliable information are top factors that negatively affect employee adoption of GenAI solutions



Case study: Improving engineering processes with GenAI

A global leader in advanced low-voltage battery technologies had a mandate to improve operational efficiency by reducing the time needed for engineers to complete standard tasks and enabling new employees to onboard more quickly.

NTT DATA delivered a ChatGPT-style solution that made more than 1,000 engineering documents conversationally accessible. The solution was built on the client's private Microsoft Azure OpenAI instance, ensuring end-to-end security.

The solution was extensible to other knowledge-base types, laying the groundwork for future content-creation uses and providing a proof point of viability for GenAI.

Partnering for successful implementation

The manufacturing industry is moving toward AI adoption. However, the relative maturity of AI processes in organizations across the industry is diverse. Waiting it out is not an option. Choosing the right combination of vendors, suppliers and partners will have a material impact on success. More than any other industry, manufacturing (excluding automotive) considers co-innovation skills (such as the ability to create custom solutions) as a key criterion.

Partner selection

Top 2 factors in selecting a GenAI partner

1. **GenAI safety capability** (such as ethical, reliable and secure design)
2. **End-to-end GenAI service offerings** (full-stack capability)

Which, if any, of the following are your organization's top 3 criteria when assessing GenAI technology partners?

Base: Manufacturing and automotive respondents, excluding "don't know" responses (n=508)

Implementation

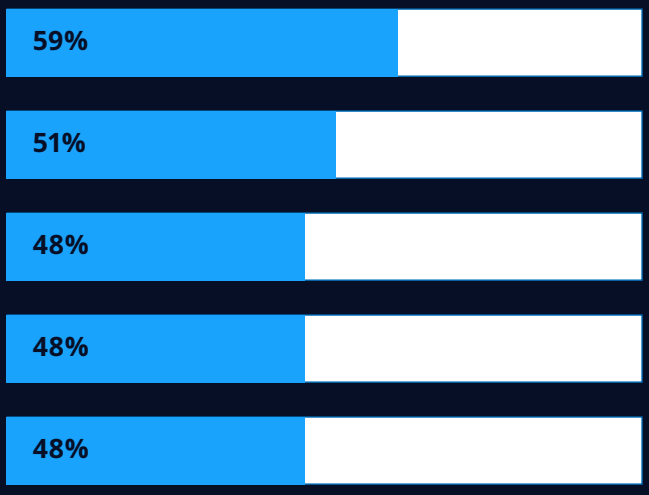
Top 3 preferred approaches to GenAI implementation

1. **GenAI partnership** (high-level goal agreement with fixed pricing and specified timelines)
2. **Customized solution** (for a project or specific need)
3. **Dedicated team** (for the time that you need it)

How would your organization rank its preferred approach for implementing GenAI?

Base: Manufacturing and automotive respondents, excluding "don't know" responses (n=508)

Top 5 approaches to deploying GenAI solutions in the next 2 years



Which of the following statements best describe your organization's approach to GenAI deployments in the next two years?

Base: Manufacturing and automotive respondents, excluding "don't know" responses (n=508)

> "Moving beyond isolated AI wins to a fully AI-enabled enterprise requires a bold vision, clean data and decisive leadership."

Wendy Collins
Chief AI Officer, NTT DATA North America

A workforce at a crossroads

Significant opportunities remain for manufacturers to prepare the workforce for AI. Fully two-thirds of manufacturers admit their employees don't have the skills to work with GenAI, but less than half are actively investing in upskilling programs. This isn't sustainable. The future belongs to manufacturers that use AI to empower their workforce, not sideline it. Human-centric AI will be the norm. Manufacturers must proactively implement responsible GenAI practices that ensure fairness, transparency and accountability.

Plan to augment, not replace

Three key elements of a human-centric approach

1 **Investing in workforce development**

- 81% say it is very important to have the required skills in-house to deliver a GenAI strategy
- Nearly half are implementing GenAI employee training platforms

Manufacturers must lean into organizational literacy by fostering a culture of continuous learning and implementing comprehensive training programs that cover both technical and ethical aspects of GenAI use.

2 **Fostering a culture of employee engagement**

- Only 45% strongly agree that they regularly review GenAI processes and their impact on user experience
- Only 44% strongly agree that IT and ops teams collaborate to define opportunities and design GenAI initiatives

Involving employees in GenAI-related decisions is critical to creating a supportive environment for human-GenAI collaboration.

3 **Prioritizing ethical AI development and deployment**

- 99% say it's important for leadership teams to provide guidance on balancing innovation with responsibility

Top 3 responsibilities in developing GenAI

1 **Educating and training employees on ethical GenAI use**

2 **Integrating responsible considerations into strategic decision-making**

3 **Maintaining human oversight and regularly reviewing GenAI policies**

Which of the following should be key responsibilities for business leaders in developing GenAI?"

Base: Manufacturing and automotive respondents, excluding "don't know" responses (n=508)

Case study: Employee empowerment with GenAI

A major Japanese home-goods manufacturer operating globally needed a way to share senior-level expertise and tacit knowledge across the workforce. This knowledge would supplement official policy and manual training as staff responded to customer inquiries.

NTT DATA worked with the manufacturer to glean senior-level insights and then used GenAI to extract, compile and convert them into actionable data the workforce could use.

The quality of responses to customer inquiries improved by more than 30%.

Strategy alignment is an imperative between innovation and responsibility. But where organizations claim innovation matters more than responsibility, 54% of CISOs globally say that it's due to internal policies on responsibility being unclear.

> "The question isn't whether AI can drive efficiency — it can — but how effectively we can align AI systems with human expertise to maximize their potential."
>
> **Prasoon Saxena**
> President, Manufacturing and Commercial, NTT DATA North America

Here are the four steps we recommend to boost your success:

01

Involve and unite complementary technologies

As manufacturers refine architecture and delivery model approaches, there must be greater focus on assessing and incorporating IoT, 5G, edge and GPUs into GenAI/AI infrastructure and solution development. Edge AI can deliver real-time operational efficiencies using always-on monitoring and analysis. It can also generate savings that would otherwise be missed in less advanced manufacturing strategies. The opportunities inherent in these technologies magnify with AI and GenAI. Successful adoptions are integrated into a full-scope strategic plan.

CEO to-do: Stay abreast of ancillary technologies critical to success on the floor and in the supply chain. Ensure a unified GenAI/AI business, technology and infrastructure strategy. Look to the experts ahead of you on the path for guidance. Use infrastructure modernization assessments, solution-ready platforms and next-level agentic AI systems advisory.

02

Responsibly innovate for competitive advantage

Waiting to be told how and when to implement ethical governance for AI and GenAI in manufacturing is not an effective strategy. Beyond regulatory mandates, projects and people will never produce optimal business outcomes if efforts are siloed, short-sighted and inequitable. Concise, proactive and judicious work to deploy AI in a responsible, thoughtful manner — from the bottom to the top of the stack and across the enterprise — is fundamental now and always. Ensure clear use policies. When bigger demands arise, you'll be ready.

CEO to-do: Maintain a corporate reputation for robust governance that exceeds regulations. Leadership must collaborate and be visible on the topic of responsible AI innovation within the business and the broader manufacturing industry. Be willing to address the topic on a global stage.

03

Sustain success with discernment

The pace of change in AI solutions is remarkable and can feel overwhelming. However, the tenets of success in the powerful new wave of GenAI and agentic AI remain the same. Take care to position the business for sustained success in a rapidly evolving manufacturing industry. Aim for measurable outcomes and continual improvement.

CEO to-do: Create a vetted and hybrid strategy that allows you and your business to innovate safely following a variety of milestones and timelines. Take advantage of service and solution partners and platforms. Keep the trifecta of business impact, responsible reinvention and scalable results as guides to every decision.

04

Honor, engage and adapt the workforce

Manufacturers must calibrate their workforce to the reality of AI across all areas. This includes factory assistants who help inform the workforce, multimodal language models that optimize IoT environments and engineers who create with newfound knowledge and speed. The priority must be upskilling, informing and managing staff in an ever-changing environment.

CEO to-do: Solve and re-solve what will be constant, wholesale shifts in workforce planning, roles and application. Focus on clear communication. Lead by example. And be sure the business and the workforce have a clear path forward. All while acknowledging an era of operational change as sweeping and fast-moving as the industrial revolution.

About the research

The research in numbers

A balanced sample of 508 GenAI decision-makers (97%) and influencers (3%) from the manufacturing (including automotive) sector participated in the research.

Coverage spans 34 countries in five regions.

Among respondents, 78% were from large enterprises with more than 10,000 employees.

Participants included 74% from the C-suite; 23% at the vice president, head of or director-level; and 3% in the senior manager or specialist ranks.

Those in IT roles accounted for 38% of participants, while 62% held non-IT roles.

Research methodology

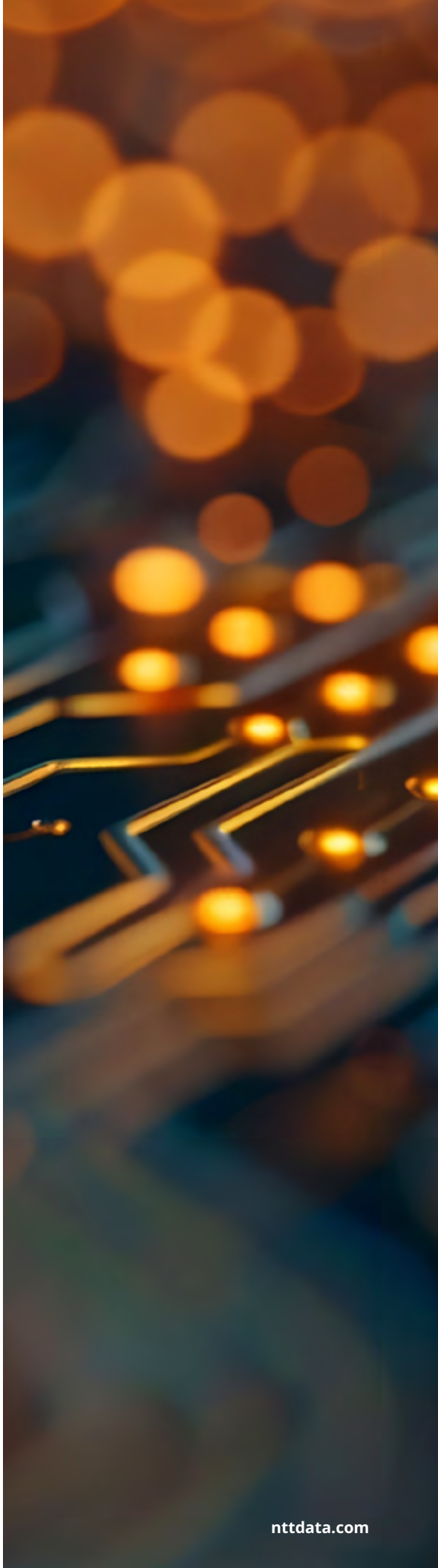
This report is based on independently sourced research data.

Participants were selected via random sampling on the basis that they had a direct or indirect influence on their organization's GenAI requirements or decision-making authority in that regard.

The research data was gathered via an online questionnaire that ran in September and October 2024. Research was conducted for NTT DATA by Jigsaw Research, an international strategic-insight agency with an exclusively senior team.

Data integrity, validation and analysis were performed by NTT DATA's specialist in-house Primary Research and Benchmarking Team in conjunction with Jigsaw Research. Data and outliers were validated in accordance with standard research-industry rules, disciplines and best-practice approaches. The data is presented at a 98% confidence level with a 3% margin of error.

Data points presented in this report are based on responses from all manufacturing and automotive respondents unless indicated otherwise. C-suite and CEO statistics are based on manufacturing and automotive respondents that hold those titles.



Let NTT DATA help

Meet the mandate head-on. Find out how leaders around the world are mastering their GenAI destiny in 2025 with your own copy of our Global GenAI Report. Learn from data-led analysis and insights on GenAI-related strategy and transformation; technology and innovation; people and culture; and safety, ethics and responsibility.

Visit our website to download our report and chart a path forward with GenAI.

About NTT DATA

NTT DATA is a $30+ billion trusted global innovator of business and technology services. We serve 75% of the Fortune Global 100 and are committed to helping clients innovate, optimize and transform for long-term success. As a Global Top Employer, we have diverse experts in more than 50 countries and a robust partner ecosystem of established and startup companies. Our services include business and technology consulting, data and artificial intelligence, industry solutions, as well as the development, implementation and management of applications, infrastructure and connectivity. We are also one of the leading providers of digital and AI infrastructure in the world. NTT DATA is part of NTT Group, which invests over $3.6 billion each year in R&D to help organizations and society move confidently and sustainably into the digital future.

Sources

1. Abhijit Dubey. The AI responsibility gap: Why leadership is the missing link. NTT DATA, 2025.
2. Siva Gurupackiam. Digital dexterity and the coming business resilience paradigm shift. NTT DATA, 2024.

List of Abbreviations

Abbreviation	Meaning
AI	artificial intelligence
GenAI	generative AI
CISO	Chief Information Security Officers
EV	electric vehicle
PaaS	platform as a service
MaaS	model as a service
R&D	research and development

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