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Cutting-Edge Technology in Advanced Manufacturing: 2024 Eye on Innovation Winners

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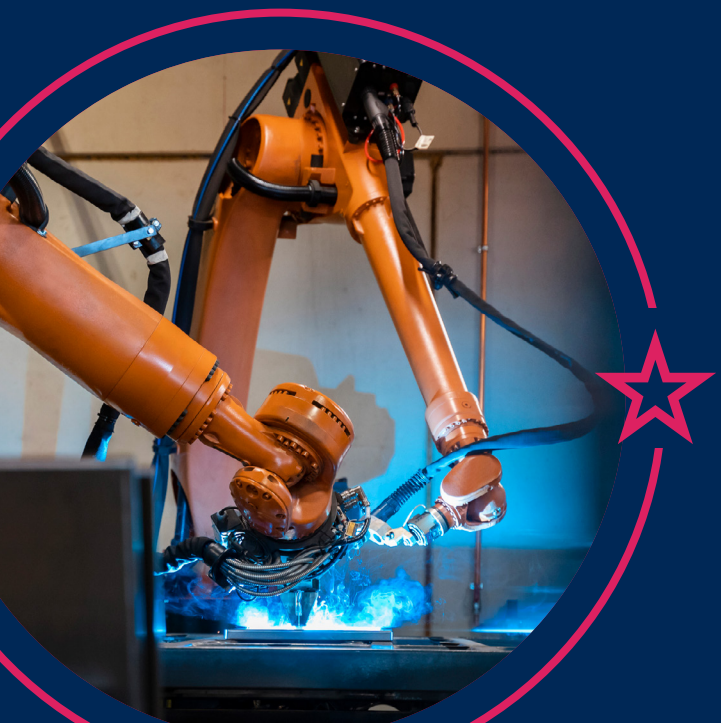

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Cutting-Edge Technology in Advanced Manufacturing: 2024 Eye on Innovation Winners

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Initiatives: Manufacturing and Transportation Industry Technology Insights

The Gartner Eye on Innovation Awards recognize firms worldwide for their best-in-class technological innovations. Manufacturing CIOs can use these insights to understand how innovations in data and analytics, artificial intelligence, and other areas are changing the industry.

Overview

Key Findings

- Data and analytics (D&A) and artificial intelligence (AI), such as machine learning (ML) and automation, are the most common technologies featured in this year's Eye on Innovation Awards for Advanced Manufacturing.
- Companies that manufacture products sought to achieve outcomes related to improved operational efficiency, process optimization and automation in this year's awards.
- Awards finalists for 2024 utilized digital twins and cloud platforms more frequently than nonfinalists, demonstrating the cutting-edge nature of these technologies and their potential impact on the future of the industry.
- Innovation finalists in the Americas emphasized automation and AI. In APAC, the focus was on digital transformation including integration. In EMEA, the attention was on customer-centric solutions delivery.

Recommendations

- Create a firm foundation for business case ROI calculations by measuring the current state of conditions before implementing solutions.
- Assess the quality of proposed solutions by measuring the effect of the implementation on each of those problem statements.
- Make a business case for investment by looking for solutions that can address a single pressing issue to start with, but can be expanded to other use cases over time.
- Explore combining several technology implementations at once, such as a data and analytics platform along with the implementation of a digital twin, as a single technology alone is unlikely to have the same effect.

Analysis

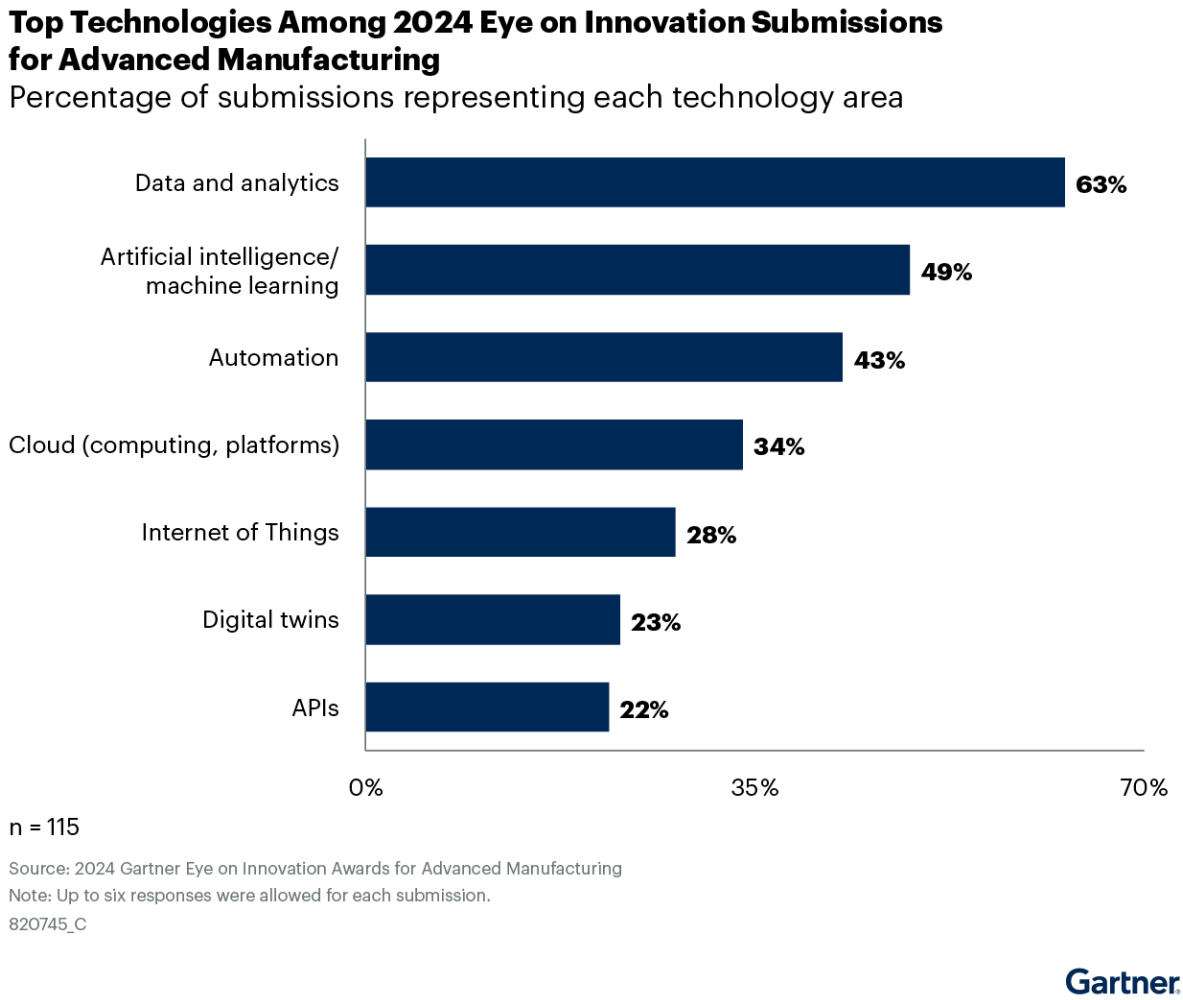
Gartner Eye on Innovation Awards for Advanced Manufacturing

Many manufacturing organizations ask the question, “How can we best use technology to improve our products, our plants and our interactions with customers?” We answer those questions with the 2024 Gartner Eye on Innovation Awards for Advanced Manufacturing. We collected 115 unique innovation projects from 79 enterprises across the globe in 2024. By analyzing design patterns, including what finalists and winners did differently from others, manufacturing CIOs across subsectors such as automotive, aerospace and defense can make faster and better decisions about allocating resources to support innovation and maximize business outcomes.

Data and Analytics Is Fueling a New Wave of Innovation in Advanced Manufacturing

D&A, along with AI such as machine learning and automation, are the most popular technologies submitted in this year’s Eye on Innovation Awards. These results indicate an industrywide focus on D&A, AI and automation in an effort to achieve mission-critical outcomes (see Figure 1). Manufacturing companies produce huge volumes of data and often there are insights on how to operate more effectively, with less waste, hidden in information that is stored in various systems. Results from the 2025 Gartner CIO and Technology Executive Survey confirm the trend of using this stored data — 82% of manufacturing respondents reported plans to increase their funding for business intelligence/data analytics, 83% for AI and 59% for automation technology. Manufacturing organizations have focused their efforts on developing capabilities for these technologies as they can help firms improve operational efficiency, product quality and drive innovation.

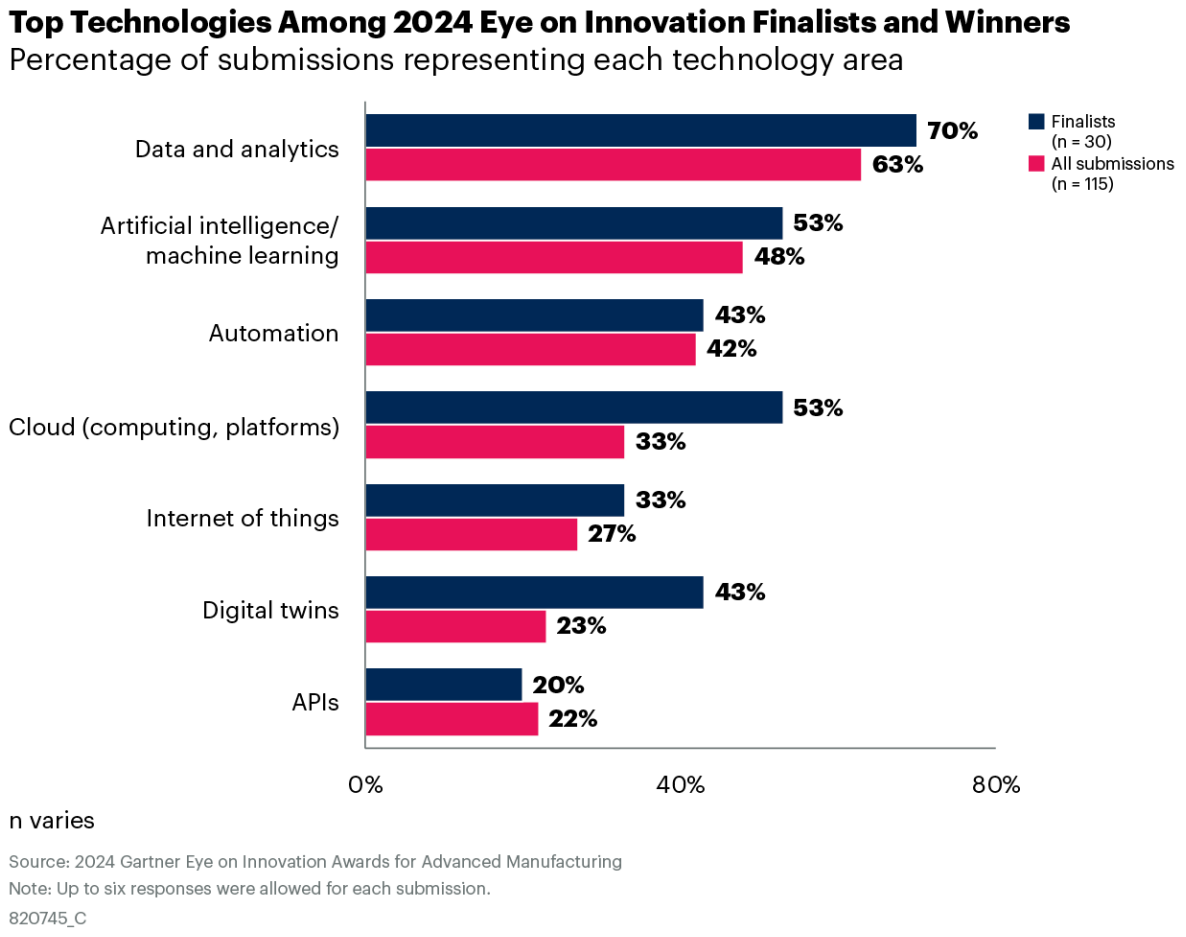
Figure 1: Top Technologies Among 2024 Eye on Innovation Submissions for Advanced Manufacturing



Both Mainstream and Niche Technologies Fueled Innovation Among Finalists and Winners

While the popularity of D&A and AI technologies underscores their importance as building blocks of innovation in manufacturing, an additional set of technologies distinguishes cutting-edge innovations. As an example, digital twins have the potential to produce impressive results, but require supporting technologies, patience and expertise to create effectively. Forty-three percent of finalists and winners utilized digital twins, while only 23% of overall submissions featured the technology. Additionally, 20% of finalists leveraged APIs, while only 12% of overall submissions featured them (see Figure 2).

Figure 2: Top Technologies Among 2024 Eye on Innovation Finalists and Winners



The disparity between the technology utilized by finalists versus all others is not due to lack of investment, however. Seventy-eight percent of manufacturing respondents to the 2025 Gartner CIO and Technology Executive Survey have either invested or plan to invest in digital twins. Despite high levels of investment, this gap suggests that a limited segment of manufacturers have successfully leveraged digital twins. This dynamic suggests there may be challenges to effectively utilizing this technology.

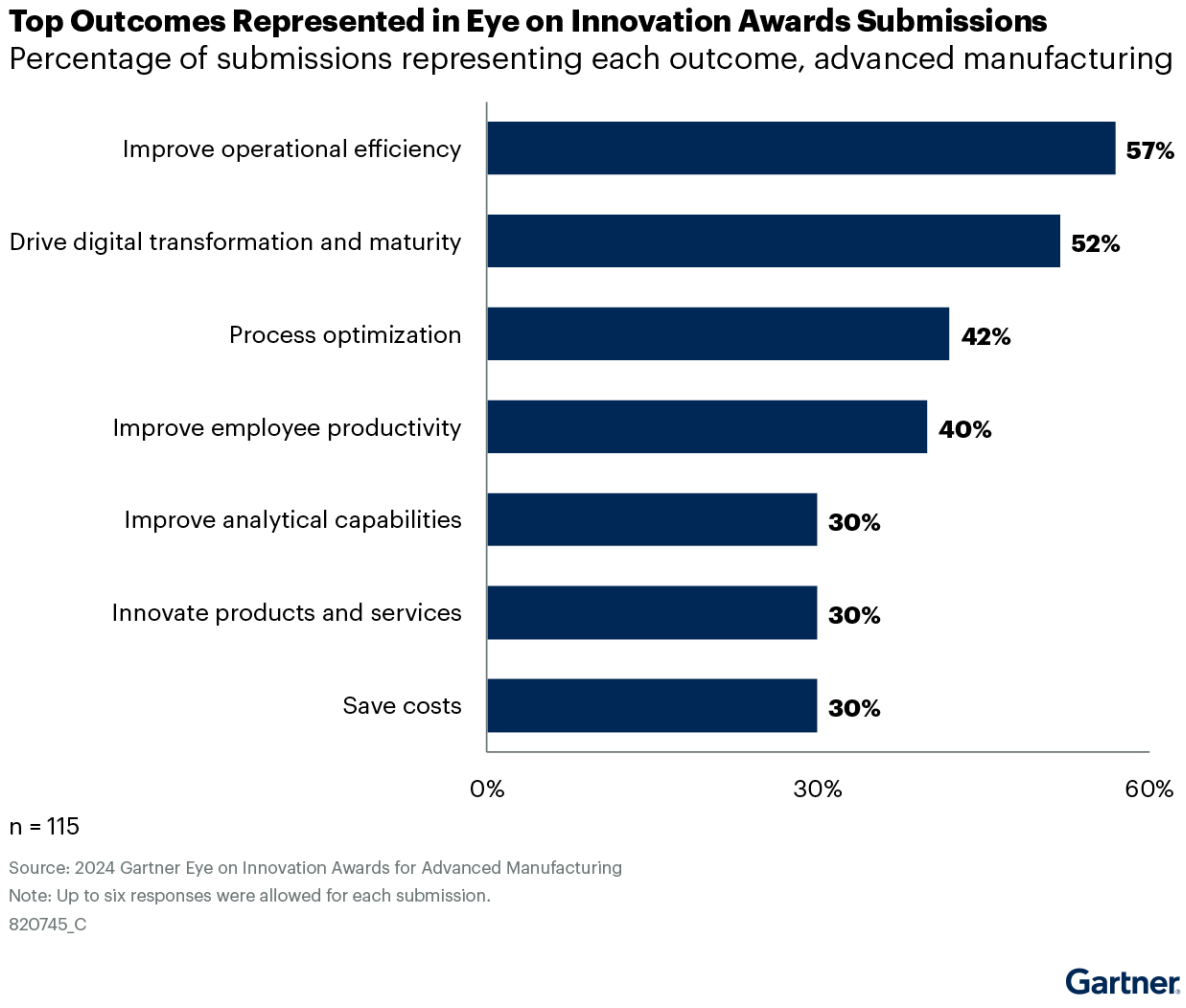
Many of the technologies listed by companies submitting innovations in 2024 are dependent on or coordinated with one another. D&A, for example, is integral to AI and ML. Much of the D&A work is enabled with cloud computing platforms. And Internet of Things (IoT) platforms, particularly in manufacturing, make sense of industrial data. Over the past several years, manufacturing CIOs have said they are increasing investment in analytics and business information platforms as well as cloud platforms more than any other area other than cybersecurity. This continued investment likely has enabled many of the firms to execute some of the ideas shown in these awards.

While the Eye on Innovation Awards' findings yield insight into the technologies manufacturing organizations are utilizing frequently and successfully, they also yield insight into what mission-critical outcomes those technologies are meant to achieve.

Primary Targeted Outcomes Included Improved Operational Efficiency and Enhanced Process Optimization

Improving operational efficiency and driving digital transformation are the two most frequent outcomes featured in this year's Eye on Innovation submissions, with 57% and 52% of organizations, respectively, reporting them as their top outcomes (see Figure 3). In addition to improved operational efficiency and process optimization, D&A, AI and automation technologies were also frequently used to improve employee productivity.

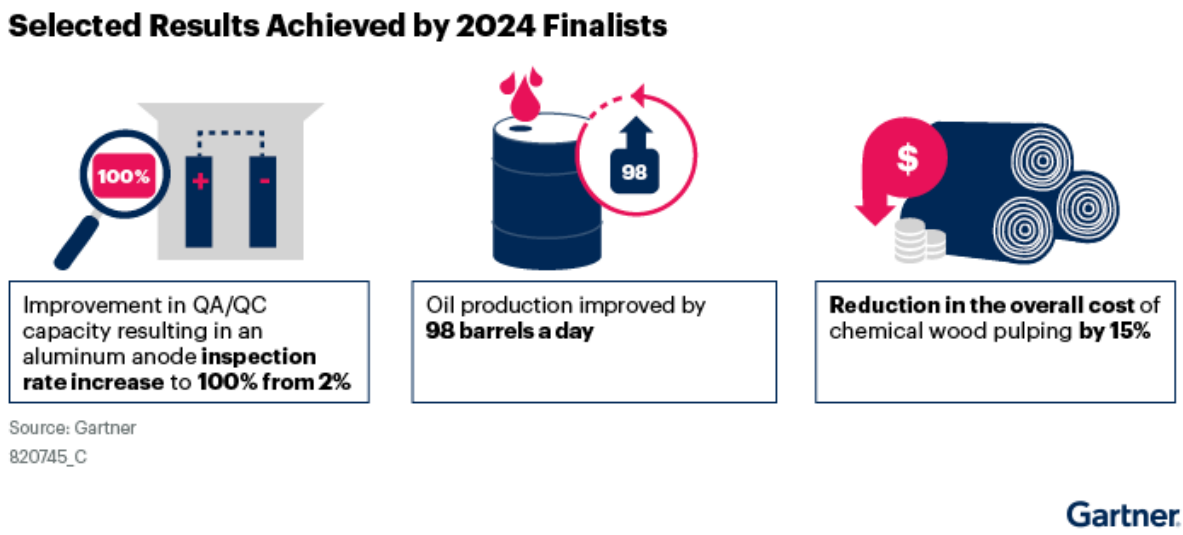
Figure 3: Top Outcomes Represented in Eye on Innovation Awards Submissions



For manufacturing companies, operating efficiency is always going to be a top priority. These capital- and operation-intensive businesses tend to have high revenue but low profit margins. Slight gains in operating efficiency can translate into big bumps in profitability.

Process optimization is also a popular targeted outcome for this year's innovations. Finalists achieved a variety of results in this area, such as those who used computer vision technology to accelerate the quality assurance process. Some also leveraged digital twins to optimize product and quality control processes as well as to automate production. See Figure 4 for an overview of these achievements.

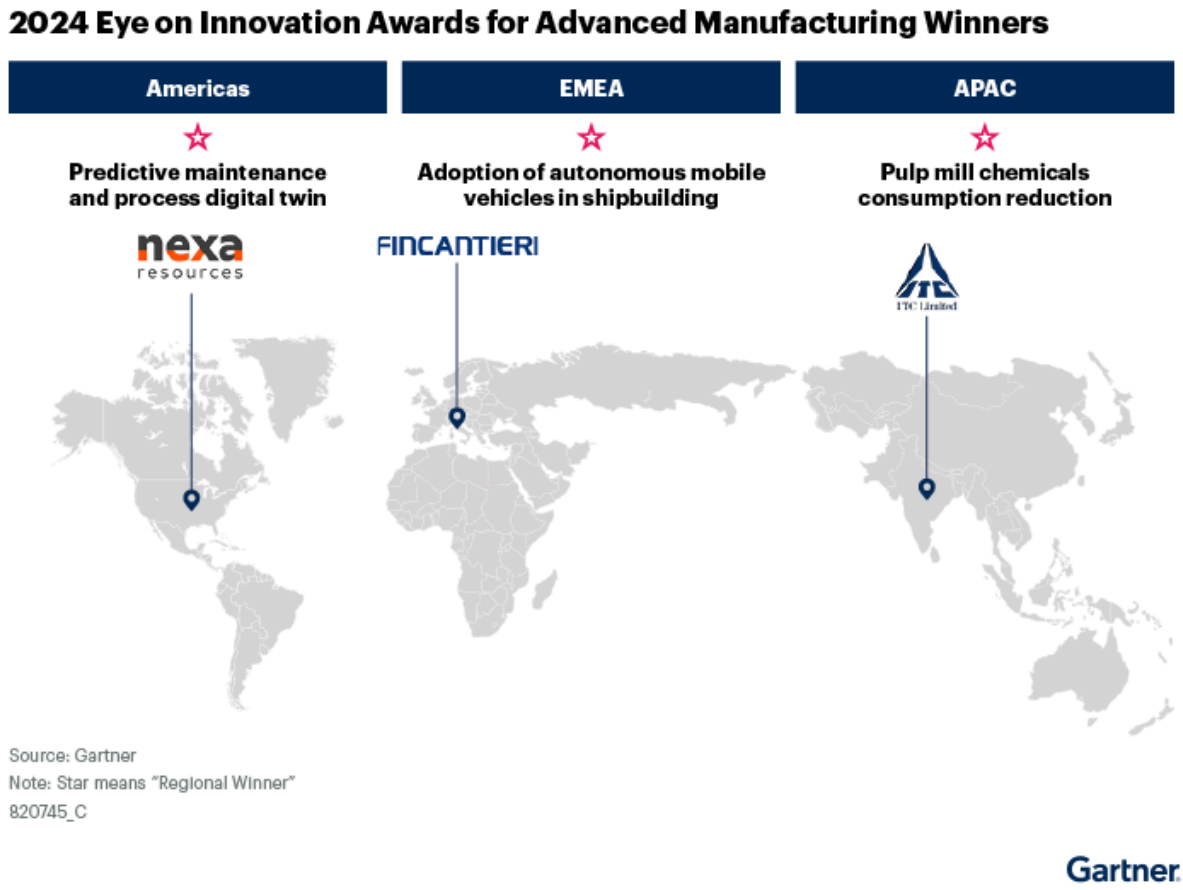
Figure 4: Selected Results Achieved by 2024 Finalists



The Winners: 2024 Eye on Innovation Awards for Advanced Manufacturing

The winners and finalists for this global awards series were selected by a panel of peer senior industry executives for three regions: the Americas, EMEA and APAC (see Figure 5).

Figure 5: 2024 Eye on Innovation Awards for Advanced Manufacturing Winners



The Americas

Emerging patterns from finalists for the Americas include the use of generative AI (GenAI) on the factory floor, IoT as a building block for larger scale technologies and the use of data management technology to build self-service tools.

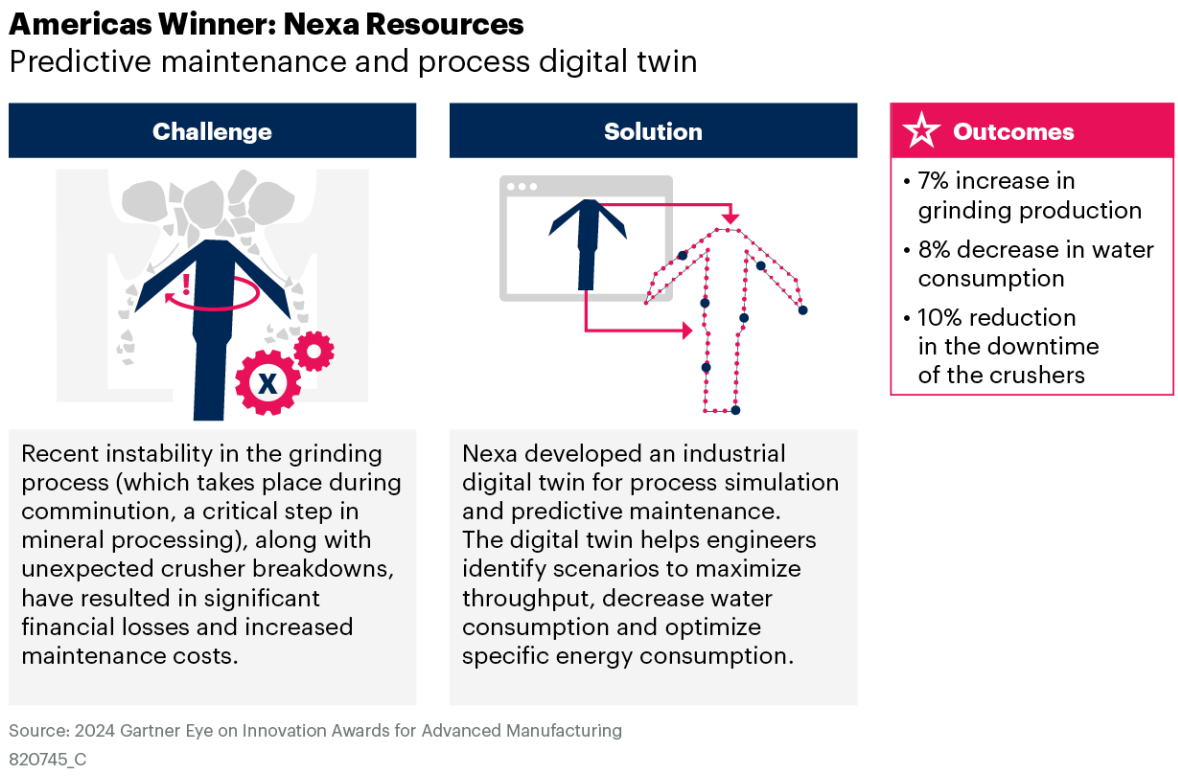
The finalists for the Americas included: Eastman Chemical, Lenovo, Nexa Resources and Otis each had two entries that made it in the finalist grouping.

- Finalists in the Americas commonly used GenAI and AI for the optimization of factory floor operations as well as development of predictive software capabilities. These predictive capabilities enhanced a variety of practices from equipment failure monitoring to environmental, social and governance (ESG)-linked goals for energy efficiency.

- Among finalists in the Americas, IoT was primarily used as a building block for the use of related technologies like digital twins and edge tier. They used IoT to enhance the interconnectivity between related technologies and the product they manufacture. For example, IoT was used as a building block for edge tier technology, which bridges the gap between the point of data collection and the cloud.
- Finalists in the region primarily utilized data management technology to build self-service tools targeted toward enhancing the customer experience. The typical first step in this domain was to integrate data from preexisting sources in order to provide customers with a centralized place to access important data.

The winner in the Americas was Nexa Resources (see Figure 6).

Figure 6: Winner for the Americas — Nexa Resources



EMEA

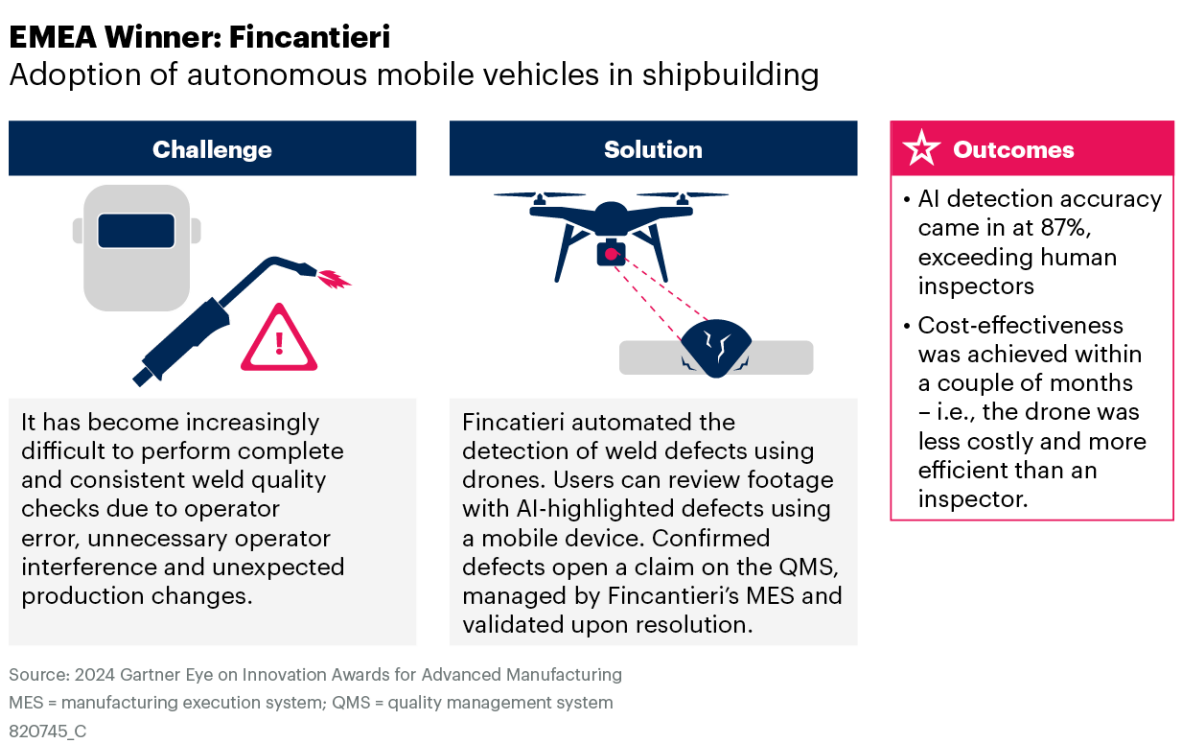
EMEA finalists used AI technology for process optimization, IoT as an edge solution and cloud as the nexus for a set of other technologies.

The finalists for EMEA included: bp, BSH, Eczacıbaşı Holding, Emirates Global Aluminum, Fincantieri, Ford Otosan and Novo Nordisk.

- EMEA finalists typically used AI technology in conjunction with a variety of other technologies like edge computing and digital twins. Finalists' AI-driven innovations typically sought to cut costs with the technology, targeting material costs and other critical inputs.
- Finalists in the region tended to use IoT as an edge solution that transmits data from the point of collection to a cloud platform for analysis. Additionally, EMEA finalists tended to use IoT technology to develop digital twins.
- Similar to how finalists in the Americas utilized other technologies, finalists in EMEA used cloud platforms as a nexus for complementary technologies. An example of this is data collected by a drone and shared to a cloud platform, which is then automatically analyzed by an algorithm.

The winner in EMEA was Fincantieri (see Figure 7).

Figure 7: Winner for EMEA — Fincantieri



Source: 2024 Gartner Eye on Innovation Awards for Advanced Manufacturing
MES = manufacturing execution system; QMS = quality management system
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APAC

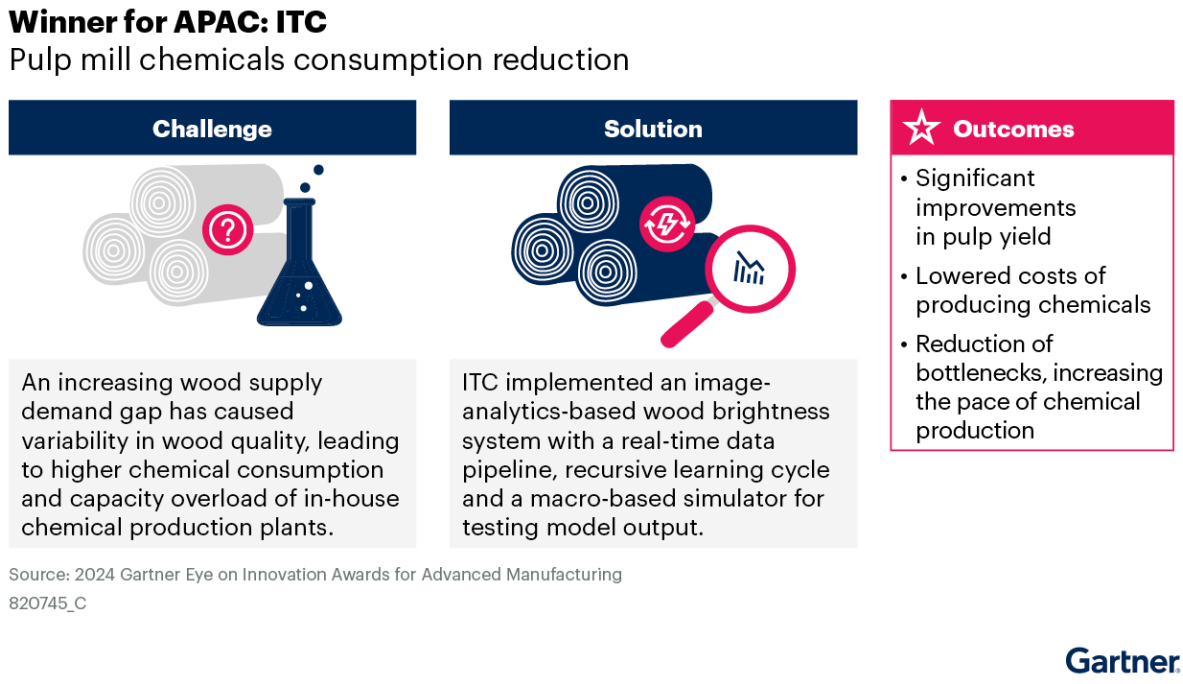
The innovations from APAC finalists demonstrated varied use of AI technology, a use of IoT technology similar to finalists from other regions and a heavy focus on data integration when using digital twins.

The finalists for APAC included: CHANGAN Automobile, Haier Group, IEIT SYSTEMS, ITC, Lenovo and Wistron.

- When using AI technology, APAC finalists focused on similar target outcomes but a varying set of use cases. Plenty of finalists' submissions targeted improvements in efficiencies when using AI technology. However, the direct use of the technology varied. For example, in some instances, finalists used AI to train and develop the underlying model for digital twins, and in other instances they used it to automate quality assurance (QA)/quality control (QC) processes.
- Finalists in APAC tended to use IoT technology to collect data through sensors on-site serving as input for related systems. Some examples of related systems include an algorithm that automates data file settings or a smart manufacturing platform.
- Digital twins were a popular technology among APAC finalists. For this region, one of the primary use cases for digital twins was the integration of data from different business units or stages of the manufacturing process. An example of this includes the combination of data from R&D with the data from production. The use of digital twins as just one element of a wider digital systems overhaul strategy also represents a pattern in the innovations from APAC finalists.

The winner in APAC was ITC (see Figure 8).

Figure 8: Winner for APAC — ITC



For manufacturing leaders interested in learning more about the 2024 award winners and finalists or to participate in the 2025 awards, see the awards main page: Gartner Eye on Innovation Awards for Advanced Manufacturing.

Evidence

2025 Gartner CIO and Technology Executive Survey. This survey tracked how senior IT leaders worldwide prioritize strategic business, technical and management objectives. It was conducted online from 1 May through 28 June 2024. The survey includes respondents who lead an IT function, with a total of 3,186 CIOs and technology executives participating, including 689 from manufacturing. The survey participants are representative of various geographies, revenue bands and industry sectors, including both public and private organizations. Disclaimer: The results of the survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.

2024 Gartner Eye on Innovation Awards for Advanced Manufacturing. The main objective was to understand innovative uses of technology to drive best-in-class initiatives at advanced manufacturing organizations. Submissions were accepted online from 1 February through 31 May 2024. In total, we received 115 submissions from respondents who worked in advanced manufacturing organizations. Respondents were sorted by region: APAC (n = 55), EMEA (n = 42) and Americas (n = 18).

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