Working Smarter:
How Manufacturers Are
Using Artificial Intelligence

Key Findings and
Insights from
Manufacturers

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NATIONAL ASSOCIATION OF
Manufacturers

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❯ A Letter from the Chair

Artificial intelligence has dominated the headlines in recent years, and people are truly beginning to grasp the possibilities and power of this technology. The launch of ChatGPT and other generative AI tools has made the technology even more accessible, putting it in the hands of everyday Americans.

Manufacturers have been at the forefront of developing and implementing intelligent systems and AI technologies, including machine learning, deep learning, natural language processing, machine vision, digital twins and robotics. This has positioned manufacturers uniquely as both developers and deployers of AI innovations, providing invaluable insights into the effective and responsible use of these technologies.

AI can be a force multiplier—and a force for good. At Johnson & Johnson, for example, AI has been used effectively in a number of areas, ranging from the drug development process to restocking hospitals. It helps us sort through massive amounts of data, yielding insights for the improved health and wellness of people around the world. It aids us in creating targeted treatments and getting them to the right patients at the right time. When we conduct clinical trials, AI helps us more efficiently establish safety and effectiveness guardrails, while allowing us to conduct trials at a larger scale. AI also gives us a far stronger mastery over our supply chains. Overall, it helps our people do a better job of living up to our commitment of improving health care outcomes and making our towns, country and world a better place.

AI functions best with humans as the core decision-makers within AI-enhanced processes. These operators must be knowledgeable, well-trained and able to utilize the technology safely and to its fullest potential. Early on, Johnson & Johnson developed an ethical AI framework, as well as a data science academy to enhance our teams' digital acumen and equip them with AI engagement skills. As manufacturers upskill and train more team members to work with AI, the technology will empower those workers to be more innovative and productive.

As you'll read in this paper, manufacturers of all sizes have found similar ways to use AI to amplify their operations and live up to their own commitments. With AI supporting us, manufacturers can do so much more to improve the quality of life for everyone.

Given the importance of this generational technology, policymakers must develop sensible, carefully thought-out frameworks for various AI applications—and they should lean on manufacturers' years of experience to engineer those frameworks. We need a policy environment that supports innovation and growth in manufacturing AI, because it will bolster U.S. competitiveness and leadership in this critical emerging field.

All possible futures for modern manufacturing in the U.S. involve AI. This technology is a game-changer, and it will continue proving itself to be an essential partner on the shop floor. This paper offers policymakers a window into the future of AI in modern manufacturing—and a roadmap to help us get there.

Kathryn Wengel
Executive Vice President and Chief Technical Operations & Risk Officer, Johnson & Johnson
Chair of the Board, National Association of Manufacturers

❯Key Insights

- Artificial intelligence tools are used widely across the industry and are key to advancing modern manufacturing.

- Manufacturers are consumers, developers and deployers of AI throughout their production processes.

- The potential applications for AI in manufacturing are expansive and can help industry leaders improve efficiency, product development, safety, predictive maintenance and supply chain logistics.

- AI refers to a large umbrella of technologies that include machine learning, machine vision and deep learning. These tools allow manufacturers to make their shop floors safer, improve work experience and create innovative products that solve global challenges.

- Manufacturers are implementing and testing AI programs in a way that keeps workers as the central drivers and decision-makers for AI processes or products.

- To remain a global leader in advancing AI and supporting manufacturing innovation, the U.S. should take a cautious approach to AI regulation, tailor any regulation to specific use cases and risks, right-size compliance burdens, support R&D and new workforce pathways and ensure that regulatory frameworks are aligned globally.

❯ What Is AI?

Innovation is what drives manufacturing, and as a result, manufacturers have always been at the forefront of new technologies, striving to operate more efficiently and effectively. Now manufacturers are leading in the adoption and use of artificial intelligence. AI is a broad umbrella term, defined by the National Institute of Standards and Technology as a "system that can, for a given set of objectives, generate outputs such as predictions, recommendations or decisions influencing real or virtual environments."[1] These systems use data and human-built algorithms to simulate how humans perceive, learn and respond to questions and prompts. AI systems are often connected to other machines and respond to the digital and physical world to support processes that can either be very simple or complex.[2]

> **"** **We see AI as a key strategic enabler for our effectiveness, to do things better, faster and more economically, while delivering essential products to our customers."**
> – Sreedhar Sistu,
> Vice President, AI Offers,
> Schneider Electric

While recent advancements in large language models and chatbots, such as ChatGPT and Google Gemini, have placed a spotlight on generative AI technology, these applications represent but a fraction of the types of AI currently in use. In fact, manufacturers have been developing and deploying intelligent systems and AI technology for many years, in the form of machine learning and deep learning, natural language processing, machine vision, digital twins and robotics, all further explained in the following pages. These innovations are often categorized under the banner of "advanced manufacturing" or "Manufacturing 4.0." AI integration into manufacturing processes has contributed already to significantly improved operations and to the development of new products.[3]

AI represents a tremendous opportunity for the manufacturing industry. AI technologies can help manufacturers improve their operations by upgrading how they analyze large datasets, identifying knowledge gaps, providing solutions and enabling teams to develop new efficiences at scale. Widespread implementation of AI across the industry could lead to more efficient processes, increased sustainability, more innovative products and safer workplaces. These innovations will both grow the economy and bolster U.S. global leadership in manufacturing. Given the vast potential of AI, policy approaches to AI should further the development of these technologies and support their responsible use by manufacturers across a wide range of applications—strengthening innovation and, in turn, supporting U.S. competitiveness on the world stage.

This report reviews how AI has evolved within manufacturing and how manufacturers are developing and deploying AI technologies to innovate within their business operations and across the industry. Manufacturers are a leading voice on the opportunities presented by AI and have much to share about their experiences. This report concludes with policy recommendations that would best equip the manufacturing industry to take advantage of the immense opportunities AI technology has to offer. The NAM supports a policy environment for AI that encourages safe, responsible development while promoting the innovative growth of the technology.
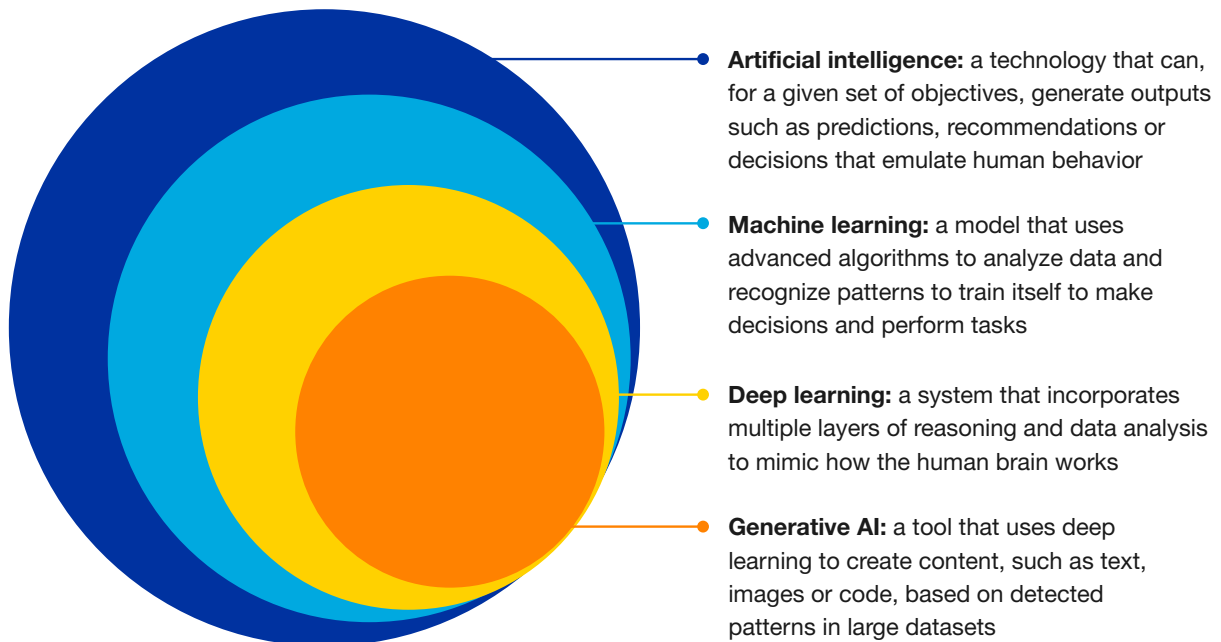
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[1] National Institute of Standards and Technology, *Artificial Intelligence Risk Management Framework (AI RMF 1.0)* (Washington, D.C.: Department of Commerce, 2023), 1, https://nvlpubs.nist.gov/nistpubs/ai/NIST.AI.100-1.pdf.

[2] Tom Culver, Lee Green and Jim Redden, "Peering into the Future of Intelligent Systems," *Research-Technology Management* 62, no. 3 (May 2019): 21-30, https://www.tandfonline.com/doi/abs/10.1080/08956308.2019.1587322.

[3] Haili Zhang, Xiaotang Zhang and Michael Song, "Deploying AI for New Product Development Success," *Research-Technology Management* 64, no. 5 (August 2021): 50-57, https://www.tandfonline.com/doi/full/10.1080/08956308.2021.1942646.

How Did We Get Here?

AI in manufacturing is made possible by the connected nature of machines and tools in manufacturing operations. Widespread digital integration, using connected sensors and instruments to collect data across shop floors, enables machine learning, a type of AI that was developed as early as the 1980s.[4] A machine learning system analyzes data and recognizes patterns to train itself to make decisions and perform tasks efficiently. Deep learning, an extension of machine learning that evolved through the 2010s, incorporates multiple layers of reasoning and data analysis to mimic how the human brain works.[5] Machine learning and deep learning are the basis for most of the AI tools manufacturers use. As of October 2023, 74% of surveyed manufacturers had invested or were planning to invest in machine learning.[6]

Artificial intelligence: a technology that can, for a given set of objectives, generate outputs such as predictions, recommendations or decisions that emulate human behavior

Machine learning: a model that uses advanced algorithms to analyze data and recognize patterns to train itself to make decisions and perform tasks

Deep learning: a system that incorporates multiple layers of reasoning and data analysis to mimic how the human brain works

Generative AI: a tool that uses deep learning to create content, such as text, images or code, based on detected patterns in large datasets

[4]Jim Davis, "Putting Intelligence Back into AI," Manufacturing Leadership Council (Dec. 8, 2020), https://manufacturingleadershipcouncil.com/putting-intelligence-back-into-ai-17349/?stream=all-news-insights; Michael Platz and Shanton Wilcox, "Achieving Impact from End-to-End Digitalization," *Manufacturing Leadership Journal* (January 2023), https://manufacturingleadershipcouncil.com/achieving-impact-from-end-to-end-digitization-31586/?stream=ml-journal.

[5]"What is deep learning?," IBM, accessed Jan. 30, 2023, https://www.ibm.com/topics/deep-learning.

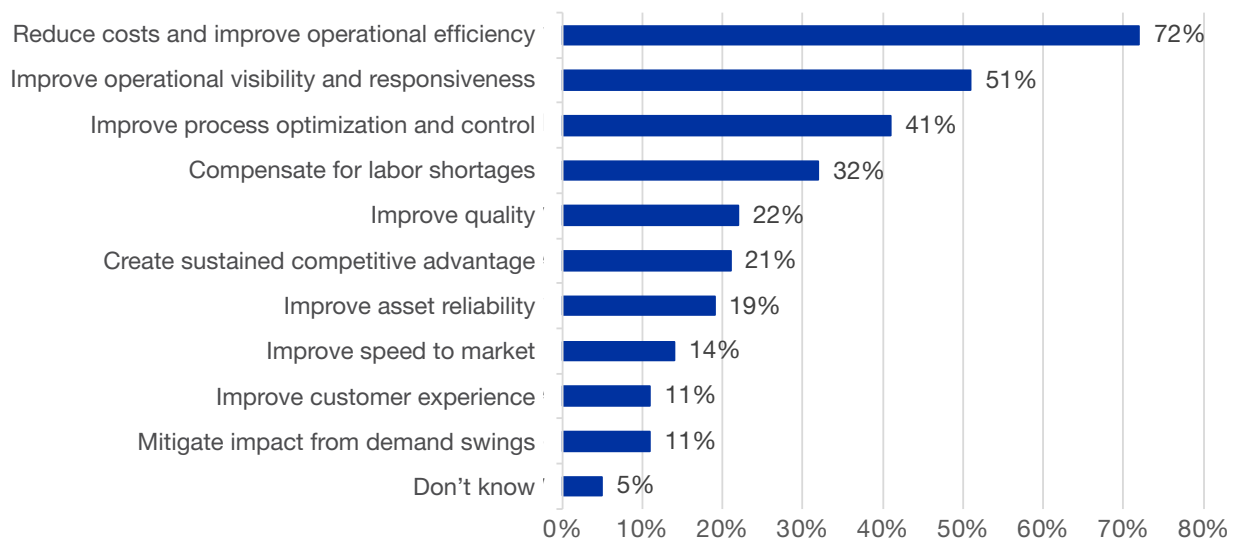[6]Penelope Brown, "SURVEY: Manufacturers Go All-In on AI, Manufacturing Leadership Council (Oct. 1, 2023), https://manufacturingleadershipcouncil.com/survey-manufacturers-go-all-in-on-ai-35350/?stream=ml-journal.

How Do Manufacturers Use AI?

Manufacturers are collectors of knowledge. They bring together the skills and ideas of people, sometimes from all around the world, to create new products. These goods can be as small and simple as a bolt or as large and complex as an automobile. The modern shop floor is interconnected and technologically advanced. This enables manufacturers to collect data about their operations and enhance their production processes. In short, the technological innovations of modern manufacturing enable machines to amplify the productive power of manufacturing workers—and AI is the next step in this innovative journey.

In 2023, the NAM's Manufacturing Leadership Council, a global network of executives in the manufacturing industry, conducted surveys on how manufacturers use AI in their operations to explore some of the ways AI is already making an impact. When asked about why they were investing in M4.0 technologies or digitally integrated innovations such as AI, respondents pointed to cost reduction, operational awareness and process optimization, as shown in Figure 1.[7] This includes visibility into operations by collecting and analyzing data to develop insight into the performance of a manufacturing process, and using digital technology and data to determine a process's efficiency, speed, equipment utilization, materials usage, waste, etc., and making decisions on how any of those facets could be improved.

Figure 1: What Are the Most Important Reasons Your Company Invests in Transformative M4.0 Technologies? (Check Top Three Reasons)

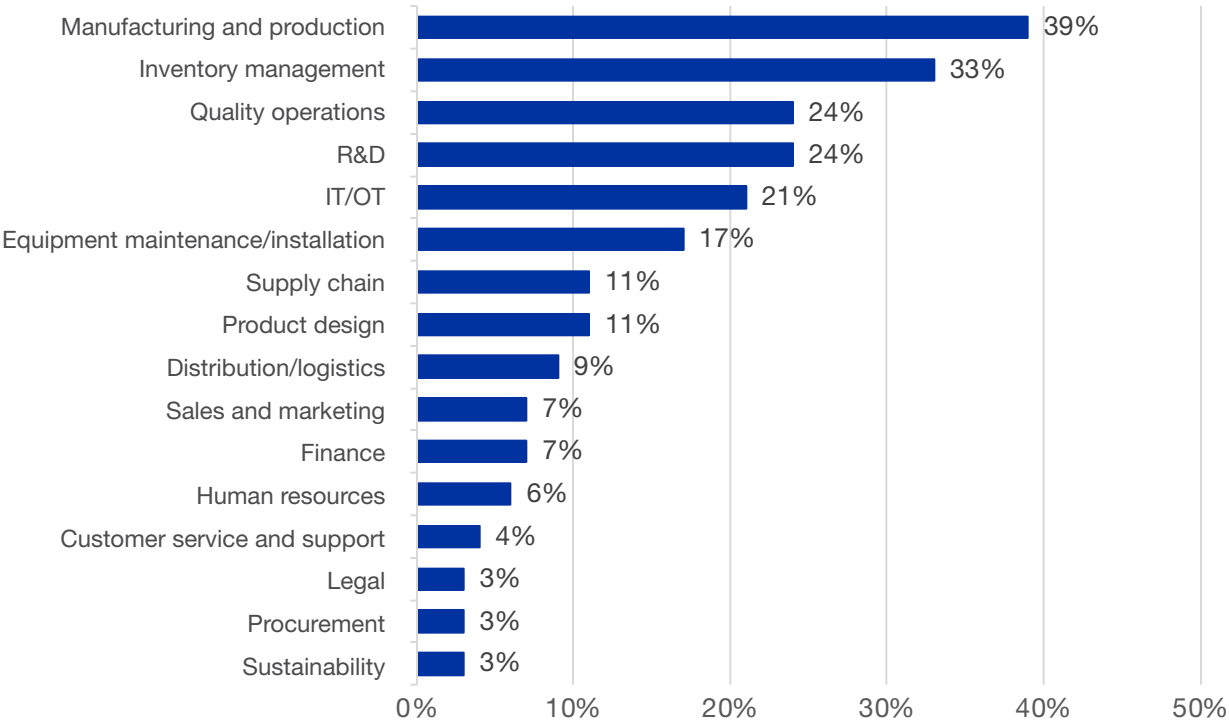| Reason	Percentage
Reduce costs and improve operational efficiency	72%
Improve operational visibility and responsiveness	51%
Improve process optimization and control	41%
Compensate for labor shortages	32%
Improve quality	22%
Create sustained competitive advantage	21%
Improve asset reliability	19%
Improve speed to market	14%
Improve customer experience	11%
Mitigate impact from demand swings	11%
Don't know	5%

Where possible, manufacturers develop their own AI tools to accomplish these tasks. Others purchase AI products from technology companies. Regardless of whether manufacturers develop AI technology or deploy AI technology—or both—they find that AI helps ease the burden of repetitive tasks, allowing manufacturing workers to devote their energy and time to more complicated and forward-thinking activities and projects.

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[7] Ibid.

As displayed in Figure 2, respondents noted a wide range of uses for AI in their operations, the top three of which were manufacturing and production, inventory management and quality operations/R&D.[8]

To implement AI, manufacturers work to identify which AI system is best suited to help them tackle their challenges; how to responsibly and transparently collect the data necessary to train and run the AI model; and where to implement AI to transform current processes. In this context, modern manufacturers view data as a critical input that can be leveraged and utilized to discover new efficiencies. AI is helping to transform that data and deploy solutions at a scale not possible for humans alone.

Figure 2: Which of the Following Corporate Functions Have Begun the Adoption of AI? (Select All That Apply)

Function	Percentage
Manufacturing and production	39%
Inventory management	33%
Quality operations	24%
R&D	24%
IT/OT	21%
Equipment maintenance/installation	17%
Supply chain	11%
Product design	11%
Distribution/logistics	9%
Sales and marketing	7%
Finance	7%
Human resources	6%
Customer service and support	4%
Legal	3%
Procurement	3%
Sustainability	3%

With the large amounts of data collected on the shop floor and throughout their operations, manufacturers use AI to design production processes, predictive maintenance programs and logistics decision-making models, among many other examples. These companies are pushing the boundaries of what AI systems can do. This puts manufacturers in a unique position to guide the development of the AI policy landscape.

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[8]David Brousell, Jeff Puma and Paul Tate, *The Future of Industrial AI in Manufacturing* (Washington, D.C.: Manufacturing Leadership Council, 2023), https://www.manufacturingleadershipcouncil.com/wp-content/uploads/2023/06/The-Future-Of-AI-In-Manufacturing-MLC-2023.pdf.

Efficiency

The continued, expanded implementation of early AI technologies, such as machine learning, has improved manufacturers' efficiency. Greater efficiency allows manufacturers to allocate resources in a more cost-effective manner, improve shop floor processes, implement more sustainable practices and discover new opportunities for growth. In interviews conducted by the NAM, one chemical production company stated that the application of machine learning to data collected from chemical reactors enables operators to make better decisions about how to operate them. The AI model alerts operators when it is optimal to make changes in the process, rather than manually keeping track of all sensors or depending on a specific operational timetable. Human operators are still at the center of decision-making and operations, but AI has helped improve the reliability of their processes and the quality, delivery and safety of their products.

> **" Hitachi is focused on applying AI, machine learning and related technologies toward addressing real-world challenges in industrial and societal domains. Functional areas include maintenance and repair, operations optimization, quality assurance, safety management, supply chain management and automation and control, among others. The goal is the end-to-end optimization of key industrial processes."**
> – Chetan Gupta, GM of the Advanced AI Innovation Center, Hitachi, Ltd. and Head of the Industrial AI Lab at Hitachi America

Machine vision is a more recent advancement in AI, enabling industrial equipment to "see" by gathering and analyzing visual data in its environment to form conclusions. Almost 80% of MLC survey respondents had invested or planned to invest in vision systems.[9] One logistics company uses machine vision to sort packages, depending on AI-enabled robots to respond to and make decisions based on ever-changing situations and conditions rather than simply repeating the same patterns. Many companies are also using machine vision to perform quality control, quickly reviewing parts and materials for defects that are more difficult for humans to detect. For some manufacturers, this has been a paradigm shift and has allowed their machines and processes to work more efficiently and respond to new situations and problems more quickly.

AI models can also perform predictive analytics using data collected from digitally enabled devices. A result of this analysis can be predictive maintenance, or identifying parts that are not performing efficiently so that they can be replaced before they break. More than half of MLC survey respondents stated that predictive maintenance is a key AI application in their operations.[10] Such efficiencies can prevent unplanned downtime for production as well as enhance sustainability by enabling more energy-efficient processes, lowering waste and decreasing emissions.

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[9]Brown, "SURVEY: Manufacturers Go All-In on AI."
[10]Ibid.

Safety

Manufacturers are interested in using AI to improve safety for employees and operations. One automotive manufacturer is using AI and machine vision to monitor intersections of production lanes, letting workers know if a forklift or other machinery is coming around the corner, outside of the periphery of their vision. This use of AI helps to prevent human mistakes and greatly improves safety on the shop floor. For individual workers, ergonomic assistance, like a robotic exoskeleton that collects and learns from data on the wearer's movements and the environment, can enhance human strength and prevent injuries. Over time, these tools have the potential to improve worker safety, make jobs less physically demanding and reduce health care costs, which are key concerns for employers.

> **" AI gives us the ability to combine digital and physical teams and to help our people by reducing repetitive tasks and physical stress while promoting safety."**
> – Joel Stenson, Senior Vice President of Operations Technology, UPS

Other companies use connected devices and AI modeling to improve the customer experience. In fact, 47% of surveyed manufacturers plan to deploy more customer-facing AI tools in the next two years.[11] One automotive company has already begun collecting data from their newest vehicle models and alerting customers when the AI identifies changes in the performance of the vehicle, allowing users to prevent costly, inconvenient and potentially dangerous problems later.

Product Development and Design

Researchers have found that product development can benefit from using AI models to learn from accumulated data and that higher AI usage in the development process increases success.[12] Manufacturers in many different industry subsectors are utilizing AI to develop new products. A supplier of automotive parts has created an AI tool that processes wheel geometry data, allowing the company to more quickly develop wheel designs that perform better and are produced more efficiently. AI allows this company to bring products to market faster, respond to design changes more quickly and better apply the knowledge of their engineering team, unlocking continuous innovation and learning.

One pharmaceutical company shared that it is using AI models to identify new ways to develop molecules and advance individualized treatments for disease. This company is developing their own AI models to find more precise endpoints for treatments, which make clinical trials safer, more effective and with a greater margin for success.

Training

Manufacturers want to keep the work of people, not computers, at the center of their operations. The ingenuity of workers is a key component in any AI processes or products. When it comes to AI in manufacturing—workers are the drivers and decision-makers, and AI works to make their jobs easier and more efficient. Many companies have found that their best AI outcomes result from enriching employees' experience at work, thus improving their output. AI technology is often used to complement and augment the work of humans, like a co-pilot. This approach enhances worker efficiency while still prioritizing human experience and ingenuity—ultimately

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[11]Ibid.

[12]Zhang, Zhang and Song, "Deploying AI for New Product Development Success."

increasing trust and confidence in AI systems.[13] The most effective AI models are human-centered, allowing them to learn and unlearn, continuously improving to meet the needs of their human operators.[14]

Manufacturers are upskilling their workforce actively to meet the opportunities of AI. Many companies, from logistics to pharmaceuticals, are setting up training programs to help employees develop their confidence and competency in the use of AI systems. These training programs include a focus on safety and control, to limit risks to workers and to protect companies' intellectual property in the face of the increased cybersecurity risks that come from an interconnected shop floor.

Recruitment of new employees has also changed. One automotive supplier noted that they have increased their hiring of the data scientists necessary to build and implement AI systems.

The most effective AI models are human-centered, allowing them to learn and unlearn, continuously improving to meet the needs of their human operators.

At the end of workers' careers, companies can use AI systems to manage knowledge as key personnel enter retirement. As of 2019, nearly one-quarter of the manufacturing workforce was over 55,[15] and one electrification and emerging technology company is using AI-utilizing systems for knowledge management and to train new employees on the skills of legacy workers. They are also using AI models to identify future challenges and predict which skills will be needed, identifying how many employees will need to be trained in these new skills.

Supply Chain

Manufacturers are using AI models to predict, prevent or mitigate disruptions in their supply chains and make more informed decisions about their logistics plans. These tools allow the industry to be more resilient to risk, prevent production stoppages or shortages and effectively deliver products to customers. This is a growing area of AI implementation, with 21% of surveyed manufacturers already using AI in their supply chain management and 60% planning to deploy it in the next 12–24 months.[16]

[13]Jim Euchner, "Little ai, Big AI—Good AI, Bad AI," *Research-Technology Management* 62, no. 3 (May 2019): 10-12, https://www.tandfonline.com/doi/full/10.1080/08956308.2019.1587280.

[14]Davis, "Putting Intelligence Back into AI."

[15]The Manufacturing Institute and Alfred P. Sloan Foundation, *The Aging of the Manufacturing Workforce* (Washington, D.C., July 2019), https://themanufacturinginstitute.org/research/the-aging-of-the-manufacturing-workforce/.

[16]Brown, "SURVEY: Manufacturers Go All-In on AI."

In application, AI tools in the supply chain can help companies make the most of their inventories. One technology and computing company built and integrated an AI program that used machine learning to assess the common parts across different areas of their operations, identifying when and where parts could be shifted from one area to another as needed. Because spare parts had been scrapped previously if unused, using machine learning to assess hundreds of parts and greatly reduced potential waste—an unfeasible task for a human team—has saved this company millions of dollars in replacement and sourcing costs. The company hopes to expand this project to include further advancements in AI technology, including deep learning and graph neural networks.

In the aerospace sector, AI, specifically machine learning, has evolved to deliver solutions in the areas of autonomy, such as obstacle avoidance and automatic vehicle taxiing, as well as optimization of cargo in airplanes that are connected digitally, and many other areas. These advancements, leveraging deep learning, continue providing solutions to technology gaps that would otherwise be hard to achieve with traditional approaches.

More widely, using models that take global and national trends and disruptions into account, manufacturers can make swift changes to their supply chain decisions. This allows them to be more resilient to unexpected changes, with models able to identify new shipping patterns, altered supplier choices or inventory shocks.

❯How Are Manufacturers Testing AI Systems?

As manufacturers expand the use of AI technology, they are finding more robust ways to guarantee that these technologies are safe and reliable for their employees and customers to use. Many companies are approaching AI through the same kind of proven risk-management frameworks that they use for their IT and cybersecurity programs. Companies are also developing their own internal governance programs.

Manufacturers are using testing groups, bringing together AI, IT and operations professionals, to identify where algorithms might be inaccurate and to validate that their systems meet high thresholds of success. When testing new AI systems, one shipping and logistics company found that internal facility safety teams and their third-party testing organizations both needed to develop a new knowledge base and upskill together.

In this way and others, manufacturers are building their own governance programs for data and AI systems, maintaining data privacy and conducting internal testing before new programs are deployed. This is true especially for heavily regulated industries, such as automotive, pharmaceuticals and aerospace, that already must meet many of the safety benchmarks applicable to the development and testing of safe AI systems. Many are working directly with the government already to develop certifications for critical technologies that do not disrupt their deployment of AI.

❯What Should We Do Now?

Manufacturers are committed to the responsible development and deployment of AI. AI has become critical to modern manufacturing, and AI technologies and capabilities are still evolving quickly; policymakers should therefore foster a policy environment that supports manufacturing growth through AI innovation and adoption. Further, policymakers should leverage the industry's expertise throughout the policymaking process. A policy ecosystem that supports innovation and growth in manufacturing AI will bolster U.S. competitiveness and leadership in this critical emerging field.

✅ Review Existing Laws Before Enacting New Ones

Policymakers should not assume that existing laws and regulations are insufficient to address AI-related policy concerns. Instead, they should take stock of these laws and regulations—whether they are focused on privacy, IP, fraud, safety or other critical topics—to determine to what extent regulations need to be clarified or supplemented in the AI age. This would avoid creating duplicative and burdensome requirements.

✅ AI Is Context-Specific; AI Regulation Should Be Too

To the extent that regulations will be developed, they should differentiate among the variety of use cases of AI. One key factor will be risk, which depends on the specific context in which an AI system is deployed (e.g., what data it is trained with, what data it computes to operate, what its function is, whether it operates autonomously or under human supervision or how it interacts with or is used by workers or consumers).

Manufacturers are taking this approach already, developing their own internal governance structures to manage varying risk levels across AI use cases. Focusing policymaking on specific uses of AI also means not taking a rigid approach to regulating the underlying technology, which could be used in a host of applications with different purposes and risk profiles. The private sector has embraced the AI Risk Management Framework of the National Institute of Standards and Technology, which can be used voluntarily by companies that develop or deploy AI systems to assess and manage the associated risks, precisely because it is an excellent example of this risk-based approach.

✅ Right-Size the Compliance Burden

Policymakers keen on spurring AI innovation and use should be mindful of the potential compliance burdens that both developers and deployers of AI could face. One key test will be whether companies will be required to undergo third-party audits to demonstrate compliance, which are costly and cumbersome. Additionally, policymakers should remain mindful that the deployers of an AI system would depend on representations (about the system's design, capabilities, training data, etc.) made by the system's developer, so regulatory frameworks should allow developers and deployers to collaborate with each other to ensure compliance is seamless.

✅ Maintain U.S. Global Leadership

Manufacturers operate globally, which is why they need a globally aligned regulatory environment, rather than a patchwork of redundant or incompatible laws. Policymakers should leverage industry standards and best practices where possible—as NIST did when it developed its risk management framework—to enhance regulatory certainty and ensure ease of compliance. Countries are competing to set the standard for AI guidelines. The U.S. can and should be a leader in adopting policy approaches to AI that support innovation. The NAM is committed to working with policymakers to ensure the growth of industrial AI innovation while maintaining regulatory certainty for manufacturers. The U.S. must take the lead in passing and enforcing AI policy that is transparent, democratic and inclusive of the industry to defend against approaches that are top-down, opaque or overly restrictive.

✅ Invest in R&D and Workforce Pathways

Manufacturers are investing already in upskilling their current workforce to meet the opportunities AI provides. Manufacturers also are recruiting workers who are trained in AI, data science and related fields. Manufacturers are committed to employing people in the U.S. and ensuring that they remain competitive

enough to do so. Policymakers should support the industry's moves toward digitization and Manufacturing 4.0 by supporting the career and technical education institutions that train the industry's shop floor workforce.

In fact, a December 2023 report on smart manufacturing by the National Academies emphasized that "continuous education and workforce development are paramount to the success of smart manufacturing and ultimately the U.S. manufacturing ecosystem."[17] Manufacturers must be supported and have the resources to maintain the progress they have been making with AI.

✅ Protect Personal Data

Data continues to be a critical input and byproduct of modern manufacturing. Maintaining the privacy of personal data is important to manufacturers, who resoundingly support efforts to craft a federal privacy law that would advance individuals' privacy, prevent a patchwork of state privacy laws and provide much needed legal clarity to support continued innovation and competitiveness. Any such standard should take a risk-based approach to data privacy while also protecting manufacturers from frivolous litigation.

Without clarity from federal law, uncertainty will continue for our industry, causing manufacturers to sort through conflicting state privacy laws across the country and around the world. To provide greater legal clarity, and not obstruct interstate commerce, federal privacy legislation should preempt state privacy regulations to resolve conflicting requirements in different states. The White House's AI Bill of Rights supports these goals and sets a standard for future federal guidance. Additionally, manufacturers require harmonization of standards internationally to remain competitive. The more disparate the approach to AI across our neighbors and allies, the more time, energy and investment companies will need to spend on dealing with misalignments. This is a direct impediment to U.S. manufacturers' growth and leadership in AI.

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[17]Committee on the National Plan for Smart Manufacturing, Options for a National Plan for Smart Manufacturing: Consensus Study Report Highlights (Washington, D.C.: The National Academies Press, December 2023), https://nap.nationalacademies.org/resource/27260/RH-smart-manufacturing.pdf.

❯ What's Next?

AI is unlocking incredible opportunities across manufacturing: for consumers, for our workers and for companies of all sizes. As leading developers and deployers of AI technologies, the experiences of manufacturers are critical for policymakers as they consider actions that could affect AI. The industry stands for the responsible development and deployment of AI, especially as the technology continues to rapidly evolve and innovators develop new applications that will improve efficiency, safety, product design and supply chain resiliency. Manufacturers are also committed to keeping people—not machines—at the center of operations, using AI to enhance human capabilities. To ensure that the U.S. leads the world in the innovation and job creation associated with new applications of AI, the NAM is committed to working with policymakers to craft context-specific AI laws and right-sized compliance burdens, while also supporting investments in R&D and new workforce pathways.

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