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Michael Kratsios
Acting Director
Office of Science and Technology Policy
Executive Office of the President
The White House

David Sacks
Artificial Intelligence and Crypto Czar
Executive Office of the President
The White House

Re: Request for Information on the Development of an Artificial Intelligence Action Plan

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Dear Acting Director Kratsios and Mr. Sacks,

The National Association of Manufacturers ("NAM") welcomes the opportunity to provide comments to the White House in response to its Request for Information ("RFI") on the development of an artificial intelligence ("AI") Action Plan.[1]

The NAM is the largest manufacturing association in the United States, representing manufacturers of all sizes across all 50 states and in every industrial sector. Manufacturing contributes $2.93 trillion to the U.S. economy annually. It employs nearly 13 million people in the U.S., who earn on average almost $103,000, i.e., 18.5% more than in all private nonfarm industries. The NAM advocates for a policy agenda that helps manufacturers compete in the global economy and create jobs across the United States.[2]

1. How Manufacturers Are Using AI

In May 2024, the NAM published "Working Smarter: How Manufacturers Are Using Artificial Intelligence."[3] This report explains how manufacturers use AI in a myriad ways, which has made AI integral to modern manufacturing and put manufacturers at the forefront of developing and implementing AI systems. That is why manufacturers enthusiastically support the President's goal "to sustain and enhance America's global AI dominance in order to promote human flourishing, economic competitiveness, and national security."[4]

[1] Federal Register Vol. 90, No. 24, Thursday, February 6, 2025, available at https://www.govinfo.gov/content/pkg/FR-2025-02-06/pdf/2025-02305.pdf
[2] See Facts About Manufacturing, available at https://nam.org/manufacturing-in-the-united-states/facts-about-manufacturing-expanded/
[3] Available at https://nam.org/wp-content/uploads/2024/05/NAM-AI-Whitepaper-2024-1.pdf
[4] Section 2 of Executive Order 14179 of January 23, 2025 on Removing Barriers to American Leadership in Artificial Intelligence, available at https://www.whitehouse.gov/presidential-actions/2025/01/removing-barriers-to-american-leadership-in-artificial-intelligence/

The below are examples of how manufacturers use AI in their operations and in their products:

- The impact of AI on the manufacturing shop floor is and will continue to be a game-changer. The digitalization of the shop floor—the embedding of sensors into manufacturing equipment and their connection to high-speed communication networks—enables the collection and transmission of large amounts of data about every aspect of production operations. AI systems can then process this data to give manufacturers new insights, which allows these operations to be designed and carried out in an optimal fashion. This means more efficient shop floor operations, optimal equipment maintenance, enhanced quality of outputs, better cost control and more sustainable production processes.

- The use of AI in relation to shop floor operations also yields significant benefits for operational and worker safety, both by assisting in the design of inherently safer production processes and in helping prevent accidents by alerting operators in real-time to mistakes and dangers. AI systems can also be used to onboard new employees and train new and existing employees.

- AI augments manufacturers' product research, development and design, allowing them to bring better products to market faster and more cheaply.

- Manufacturers use AI systems to optimize how they manage their supply chains. This makes them more resilient and allows them to prevent production stoppages or shortages and to efficiently deliver products to customers.

- AI systems can enhance products by improving their performance and powering novel and intelligent product features that revolutionize the customer/user experience.

- AI can also enable manufacturers to provide new levels of after-sale customer support and product maintenance. Modern, connected products can generate data about their use and performance, which AI can analyze to predict rather than merely react to anomalies, alerting the user and preventing costly, inconvenient and potentially dangerous problems.

The range and importance of uses of AI—transforming every aspect of the core of manufacturers' operations, and the products they create—make it clear that AI has become integral to manufacturing. With the right federal policies, U.S. manufacturers will continue to devise new and exciting ways to leverage AI to innovate, lead and stay ahead of their global competitors.

2. The Impact of AI on the Manufacturing Workforce

Manufacturers face a shortage of skilled labor. First, the industry had 428,000 unfilled manufacturing jobs in December 2024. Simply put, manufacturers' challenge is to find workers to fill open jobs to meet customer demand.

Second, it is critical not to conflate AI and automation: automation is for straightforward and highly repeatable processes that do not depend on sophisticated data analytics to be performed; by contrast, AI is much more cognitive and depends on extracting insights from data to support decision-making in unique situations.

Manufacturers are keen to maintain the work of people, not computers, at the center of their operations. This "human-in-the-loop" approach means that manufacturers most often use AI to complement and augment the work of humans in the workplace, to make them more efficient, and to support their decision-making while still prioritizing human experience and ingenuity.

As a result, AI in manufacturing requires a workforce with improved education and training:

- Manufacturers need more workers with higher education degrees in data science and computer science to develop and deploy AI systems.

- Manufacturers need employees with improved, AI-ready knowledge and skills everywhere, from product designers and developers, to supply chain managers, to the workers operating on the shop floor. In particular, manufacturers hire most production workers from career and technical education institutions, like community colleges. Manufacturers often partner with these institutions to ensure that the curriculum is regularly updated to fit their workforce needs. When it comes to AI, that means critical thinking, problem solving and understanding concepts of data input and output. Manufacturers work closely with career and technical education institutions to ensure that they graduate workers who have the skills our industry needs.

As manufacturers continue to struggle to fill jobs, they need more workers to fill them—and they need more of them to be AI-ready.

3. The Policy Implications of the Use of AI by Manufacturers

Taking a Pro-AI Regulatory Approach

The growing number and variety of use-cases of AI in manufacturing, on the shop floor and throughout manufacturers' operations, require a regulatory environment that is optimized for the development and deployment of these groundbreaking technologies. This is why manufacturers welcomed and strongly support the Administration's decision to develop, as Vice President Vance put it, "an AI action plan that avoids an overly precautionary regulatory regime while ensuring that all Americans benefit from the technology and its transformative potential."[5] The Vice President was entirely correct to set the development and use of innovative technology as the paramount objective. In this spirit, we make the following four recommendations.

First, manufacturers recommend that the AI Action Plan direct federal regulators to review the statutory and regulatory frameworks they maintain and enforce. These reviews would yield two types of insights. They would allow regulators to identify regulations, in particular product regulations, that were enacted before the advent of AI and that might prevent manufacturers from developing and offering AI-enabled products. Regulators should then examine whether the policy goals of the regulations in question are appropriate in the AI age, and if so if they can be attained without inhibiting the use of AI. Conversely, these reviews would also identify the existing, "pre-AI" regulations that are in fact compatible with AI: most uses of AI correspond to tasks and objectives (e.g. operational safety, or after-sale customer support) that industry has faced for a long time and that are thus highly likely to have already been addressed by existing laws and regulations. This means that companies likely can apply existing rules to their uses of AI, obviating the need for new, duplicative requirements.

[5] Address by Vice President J.D. Vance to the Paris Artificial Intelligence Action Summit, February 11, 2025.

Second, AI is context-specific, so "AI regulation" should be too: the diversity of use-cases of AI makes manufacturers particularly sensitive to any policy or regulatory approach to AI that is one-size-fits-all. Indeed, an underlying AI model could be used in a host of applications with different purposes and risk profiles. Manufacturers recommend that the AI Action Plan direct federal regulators, if and when they have determined that a new regulation is indeed necessary (see previous paragraph), to focus not on the AI technology itself—be it how it is developed or how it operates—but on how that technology is used: a regulation should apply to a specific use of AI and be appropriately calibrated (with clear and narrow definitional language) for context and risk,[6] rather than impose inflexible and ill-fitting requirements that would hamper innovation.

Third, focusing risk-based norms (whether regulation or standards) on specific uses of AI tends to shift more of the direct compliance burden towards the company that deploys and uses an AI system. To discharge that burden, the deployer needs to scrutinize how it uses the system and what the system's outputs are. But the system's performance does not depend solely on how it is used: it also depends on how it was developed and trained by its vendor, and the deployer therefore has a critical need for visibility into the system's development and training.[7] That visibility depends on seamless collaboration with the developer. Given that many AI technologies and their uses are evolving continuously and rapidly, AI development practices and AI system functionalities (and transparency and documentation around development and functionalities) and developer-deployer (also known as vendor-customer) relations are also still evolving. Manufacturers believe that this is an area that would significantly benefit from industry best practices and recommend that the AI Action Plan direct NIST to work with federal regulators, as appropriate, and industry to develop such best practices and direct NIST to promote them within international standards organizations (e.g., ISO/IEC). Importantly, this would also help the U.S. reach the goal set by the President in E.O. 14179 of AI-fueled economic competitiveness, because it would incentivize companies to increase their adoption of AI systems by increasing their trust in these systems and in their own ability to withstand regulatory scrutiny.

Fourth, regulators must right-size any eventual compliance burden associated with AI regulation. The ubiquitous use of AI throughout modern manufacturing, as well as manufacturing's dependence on innovation, underscore the need for rules that enable rather than hinder manufacturers' development and adoption of AI systems. Notably, the overwhelming majority of manufacturers are small and medium-sized companies,[8] which are particularly affected by regulatory burdens—indeed, smaller companies already bear a disproportionate share of the industry's regulatory burden, with federal compliance costs surpassing $50,000 per employee per year for small manufacturers.[9] Limiting compliance burdens associated with AI-specific policies will ensure that small and medium-sized manufacturers are not left behind as AI continues to transform manufacturing. Manufacturers recommend that the AI Action Plan include two directives to federal regulators to minimize compliance burdens: allow companies to self-assess their compliance, rather than requiring that they provide attestations or undergo third-party audits, other than in exceptional cases; and ensure that regulatory compliance burdens

[6] As an example, the use of AI in research and development ("R&D") will, in most cases, create little to no risk and thus warrant little to no regulatory restraints.
[7] AI development and deployment is of course often not binary, with one company acting as developer and another as deployer: a single company can be both developer and deployer, or a deployer can be also partly a developer (e.g., if it uses an open source or open weights AI system). Finally, in the case of an open source AI system there may not be a single entity that is the vendor, as the system may have been developed and made publicly available by a community of open source developers. That said, the issue remains that the company that deploys the AI system needs visibility into the system's development.
[8] See point 3 of Facts About Manufacturing, available at https://nam.org/manufacturing-in-the-united-states/facts-about-manufacturing-expanded/
[9] The Cost of Federal Regulation to the U.S. Economy, Manufacturing and Small Business, by Nicole V. and W. Mark Crain, October 2023, available at https://nam.org/wp-content/uploads/2023/11/NAM-3731-Crains-Study-R3-V2-FIN.pdf

can be discharged by implementing consensus-based industry standards and best practices, because they are flexible, adaptive, risk-based, use case-specific and technology-neutral.

Enhancing U.S. Global AI Policy Leadership

Enhancing America's global AI dominance will also depend on sustaining the effort started by the Vice President in Paris to make innovation the cornerstone of the global policy environment for AI. This in turn will help manufacturers reap the economies of scale of a globally aligned regulatory environment.

Manufacturers thus recommend that the AI Action Plan direct the appropriate departments and agencies to develop and execute a strategy of international engagement that keeps foreign markets open to the use of American AI and supports the development of national policies and international industry standards and best practices that accelerate AI innovation and adoption.

Developing the Manufacturing Workforce of the AI Age

As explained above, the impact of AI on the manufacturing workforce is twofold. Manufacturers therefore recommend that the AI Action Plan endorse a dual workforce strategy.

First, to develop and deploy AI systems, manufacturers need more workers with higher education degrees in data science and computer science. The AI Action plan should make enhanced access to, and support for the development of, science, technology, engineering and mathematics (STEM) education programs throughout the country, at both the K-12 and higher education levels, a national priority. But the AI Action Plan should also recognize that to *become* the global leader in AI our country did not solely rely on its U.S.-born STEM graduates—it also needed to leverage an influx of foreign-born STEM graduates. Therefore, to *remain* that global AI leader the U.S. needs to continue to attract and retain these foreign-born STEM graduates by expanding high skilled immigration, e.g. by increasing the allowable number of advanced degree STEM graduates for employment-based visa categories, in particular among lawful permanent residents.

Second, to understand and use AI systems, manufacturers need employees with improved, AI-ready knowledge and skills throughout their companies. The AI Action Plan should commit the Administration to support the development of this AI-ready workforce by working with Congress to support the career and technical education institutions that train this workforce. In particular, the NAM supports the bipartisan and bicameral Stronger Workforce for America Act, which would reauthorize the Workforce Innovation and Opportunity Act and was passed by the House of Representatives on a bipartisan basis in the 118th Congress. This bill would increase funding available to the manufacturing industry to upskill, recruit and retain its workforce, and supports industry working together and with training institutions to create collaborative solutions.

Addressing Energy and Permitting Reform

One of the key drivers of the U.S.'s continued progress in the development and adoption of AI is the availability of electricity, and the reliability and resilience of the power grid. There are concerns about the strain put on the grid from retirements in traditional power-generating units and the expansion of data centers, which are highly energy intensive. To address this issue, industry develops, builds and deploys solutions to regularly improve the energy efficiency of

data centers, not only for their computing but also for their cooling.[10] Nevertheless, a resilient, modern grid is required to enable the historic growth in data centers—which in turn would contribute to growth in the development and adoption of AI. That is why manufacturers recommend that the AI Action Plan commit the Administration to working with Congress to address energy and permitting reform.

The NAM strongly supports an all-of-the-above approach to the nation's energy portfolio—one that utilizes our abundant, clean and affordable natural gas resources; taps into the nation's significant mineral wealth to drive a responsible energy transition; supports existing baseload resources like nuclear power; and provides pathways to commercialization for nascent technologies like hydrogen, advanced nuclear reactors, and geothermal. All these energy sources will be critical to ensuring the successful build-out of data centers in America while powering the other energy-intensive sectors of the economy.

Permitting Reform

There are challenges with permitting the energy generation projects that will harness these energy sources, along with building out the transmission and distribution infrastructure to get the power to customers. As such, manufacturers recommend that the AI Action Plan endorse the following permitting reform principles:

- Expediting judicial review;
- Accelerating the permit process for needed energy infrastructure, including more transmission lines, pipelines and permanent carbon sequestration sites;
- Providing regulatory certainty;
- Creating enforceable deadlines;
- Increasing the use of categorical exclusions to the National Environmental Policy Act process;
- Unlocking access to domestic critical materials, including on federal lands;
- Streamlining the Clean Water Act.

Existing Energy Generation

Ensuring the continued affordability and reliability of the nation's current energy generation mix and the existing technologies that make it up is important and closely related to the need for comprehensive permitting reform discussed above.

Data centers and many manufacturing operations require uninterrupted energy sources to ensure economic viability and safety. Traditional nuclear-generating stations (in the form of large-scale light water reactors) are one source of this baseload energy. Though the economics and permitting of such new nuclear generation have been difficult, manufacturers recommend that the AI Action Plan commit the Administration to working with stakeholders to identify ways that the projected increase in demand growth can be leveraged to lower the cost curve of traditional light-water reactors.

In addition, the United States continues to add significant amounts of new renewable energy generation to the grid, which the NAM welcomes. However, these energy sources do not yet

[10] According to McKinsey & Company, cooling accounts for some 40% of a data center's energy consumption: see Investing in the Rising Data Center Economy, available at https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/investing-in-the-rising-data-center-economy

provide adequate baseload capacity. As such, manufacturers recommend that the AI Action Plan commit the Administration to working with all stakeholders to examine the key role natural gas has and must play in meeting growing energy demand in a cost-effective way. Specifically, we must examine natural gas's role as a source of baseload power to the data center industry as well as a complement and backup to intermittent renewable generation sources.

New Generation Technology

Additionally, newer energy sources to meet growing demand—these are primarily clean hydrogen and small, modular and advanced nuclear reactors—remain prohibitively costly. To utilize hydrogen as an affordable energy source, significant work remains on the production side of the equation; equally important is the need to have workable guidance for hydrogen production incentives and to address the nation's pipeline and storage systems.

Manufacturers recommend that the AI Action Plan direct the Nuclear Regulatory Commission to expeditiously and safely license small, modular and advanced nuclear reactors, to allow the best of these new energy generation sources and technologies to come to market and be commercialized to bring down their cost curve. In this respect, the NAM supported the enactment of the ADVANCE Act which accelerates the development and commercialization of advanced nuclear reactor technologies.

Transmission Policy

Given the issues raised by cost allocation and transmission siting policies, manufacturers recommend that the AI Action Plan commit the Administration to working with all relevant stakeholders, including state and local governments, utilities, consumers, generators and others within the manufacturing industry, to develop a robust understanding of the needs of data centers for additional transmission capacity, while ensuring appropriate fairness in allocating the associated project and operational costs.

Protecting Personal Data

Data continues to be a critical input into, and biproduct of, modern manufacturing, and while many uses of AI in manufacturing do not implicate personally identifiable information, some do. Maintaining the privacy and security of personal data is thus important to manufacturers.

That is why manufacturers recommend that the AI Action Plan commit the Administration to working with Congress to pass a national privacy law that fully preempts the growing patchwork of state laws, protects individuals' privacy, and provides 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. Most importantly, in the context of AI, such a national privacy law can and must enable innovation and commerce by enshrining the right of innovators and entrepreneurs to use personal data to improve existing products and services and develop new ones.[11]

[11] For more details on such a federal law, see the letter sent by the NAM and other trade associations to the House Energy and Commerce and Senate Commerce Committees, available at https://documents.nam.org/tech/20250128%20Coalition_PrivacyDay_SenateCommerceHouseEC.pdf

Supporting U.S. Manufacturing of AI Chips

President Trump has rightly recognized the geostrategic importance of increasing the U.S. share of the global design and manufacturing of semiconductors, which is also one of the key drivers of its continued progress in the development and adoption of AI, and of its continued global dominance in AI. Leading-edge logic chips, as well as high bandwidth memory chips, are the essential microelectronic foundation for AI. Onshore manufacturing capacity in both is therefore needed to secure U.S. AI leadership and continued innovation: as Vice President Vance put it, "The U.S. possesses all components across the full AI stack, including advanced semiconductor design, frontier algorithms, and, of course, transformational applications. Now the computing power this stack requires is integral to advancing AI technology, and to safeguard America's advantage, the Trump administration will ensure the most powerful AI systems are built in the U.S. with American-designed and manufactured chips."[12]

In his first term, the President led the way by convincing key U.S. and foreign chip manufacturers to increase their U.S. production capacity, and his Administration worked closely with Congress to craft the CHIPS for America Act. The President's leadership and the federal programs he initiated have spurred hundreds of billions of dollars of private sector investment in U.S. semiconductor manufacturing and innovation, which strengthens our national security by onshoring and securing the supply of semiconductors that are a key input for U.S. AI leadership. This will deliver broad and long-term benefits to the economy and people of the U.S. That is why manufacturers recommend that the AI Action Plan urge the Commerce Department to implement in a timely manner the agreements it has reached with various chip manufacturers and commit the Administration to working with Congress to renew Section 48D of the Internal Revenue Code, which establishes the Advanced Manufacturing Investment Credit and is set to expire at the end of 2026.

Providing Federal Support for Domestic AI Innovation

Manufacturing is the most innovation-dependent sector of the economy, accounting for 53% of private-sector R&D.[13] That makes manufacturers particularly sensitive to effective federal laws and policies that support America's innovation ecosystem.

First among these is the tax treatment of industry's R&D investments. For 70 years and until 2022, the federal tax code allowed companies to immediately expense their R&D spending. The expiration of this provision has forced companies to amortize it, i.e. claim fractions of their R&D tax deduction each year over several years. This negatively impacts companies' cash flow, making R&D spending more expensive: after growing at 6.6% per year on average over the five years before the amortization requirement took effect, R&D spending in the U.S. increased only 3.5% over the course of 2022 and decreased 0.1% in 2023, while in 2022 the European Union's R&D growth surpassed America's R&D growth for the first time in nearly a decade and, even more worrisome, China's R&D growth tripled that of the United States.[14] Manufacturers recommend that the AI Action Plan call on Congress to reinstate the longstanding, pro-innovation policy of immediate R&D expensing.

[12] Address by Vice President J.D. Vance to the Paris Artificial Intelligence Action Summit, February 11, 2025.
[13] See Facts About Manufacturing, available at https://nam.org/manufacturing-in-the-united-states/facts-about-manufacturing-expanded/
[14] See EU Industrial R&D Investment Scoreboard (2023), available at https://op.europa.eu/en/publication-detail/-/publication/1e5c204f-9da6-11ee-b164-01aa75ed71a1/language-en

Manufacturers also recommend that the AI Action Plan ensure that the U.S. does not again find itself in a position of overwhelming dependence on offshore design and manufacturing of critical inputs of the AI ecosystem, as it has with semiconductors.[15] This could be done by directing the appropriate federal agencies to regularly review the evolution of the supply of these inputs and anticipate when the U.S. might reach problematic levels of dependence on foreign suppliers.

Maintaining a Level-Playing Field Between Open and Proprietary AI Solutions

Manufacturers have long called for policy approaches that promote their continued access to the widest possible choice of technologies, including AI technologies.

In this context, access to AI models that are open source and/or have open weights (hereafter referred to together as "open AI models") enables manufacturers' development of new AI capabilities and use of a wide range of AI innovations. The cost of developing and training an AI model can be considerable, if not prohibitive. The availability of open AI models allows any interested party to develop new AI capabilities without having to incur these costs. This lowers barriers to entry in AI development by providing new opportunities for AI innovation. This means greater competition among, and choice between, developers of AI systems. Critically, enhanced access to open AI models will benefit not just tech entrepreneurs, but also companies throughout the manufacturing sector. This advances the goal set by the President for his Administration's AI Action Plan. As such, manufacturers recommend that the Action Plan support access to both open and proprietary AI solutions.

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As AI has become integral to modern manufacturing, manufacturers were heartened that the President made the sustainment and enhancement of America's global AI dominance a priority of his Administration in his first week in office. The NAM looks forward to continuing to support the Administration's championing of American AI and manufacturing in America.

Sincerely,

Charles Crain
Managing Vice President, Policy

[15] While AI systems can operate on a variety of computing environments, they are most often found in data centers that are designed to handle the unique demands of AI workloads and whose key components include: servers that feature AI chips; AI-optimized storage; high-bandwidth and low-latency networking and cabling, in particular fiber optics; high performance, energy-efficient cooling systems; and AI software (models and applications) and AI-specific software frameworks.