

Written Testimony of

Jason Oxman
President and Chief Executive Officer
Information Technology Industry Council (ITI)

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Subcommittee on Commerce, Manufacturing and Trade

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***AI in Manufacturing: Securing American Leadership in
Manufacturing and the Next Generation of Technologies***

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Chairman Bilirakis, Ranking Member Schakowsky, and members of the Subcommittee, thank you for the opportunity to testify before you today. My name is Jason Oxman, and I am the President and CEO of the Information Technology Industry Council (ITI). ITI represents 80 of the world's leading information and communications technology (ICT) companies. Our members span the tech industry and are making the physical components that power AI systems, developing AI models that serve as the brains of AI systems, and developing and deploying the AI software applications that bring the benefits of AI to the manufacturing sector. ITI members manufacture the building blocks that power the digital infrastructure undergirding the AI economy, including semiconductors, networking equipment, cooling systems, and electrical solutions. Our members are also investing billions of dollars in expanding domestic capacity for advanced semiconductor manufacturing and critical AI infrastructure like data centers.

The tech sector continues to empower the American manufacturing renaissance, and my testimony will outline our industry's investment and innovation and how we hope to work together with the Committee to further strengthen U.S. leadership in AI and manufacturing. Reaching those shared goals will require close collaboration with the innovators in the private sector that ITI represents. I would like to offer the committee several recommendations about how we can work together to secure a bright future for American manufacturing and technology development.

- Create an enabling environment for innovation to allow for sectors like manufacturing to realize the full benefits of AI, especially competitive tax measures that encourage U.S. investment in semiconductor manufacturing, such as the Advanced Manufacturing Investment Credit and restoring the immediate deduction of R&D expenses.
- Accelerate the adoption of AI in manufacturing operations, including by developing a skilled AI workforce that can leverage these new capabilities and create new jobs.
- Maintain a stable data policy environment to enable private sector competition and innovation, including by increasing access to federal data sets, unlocking data necessary to create new AI solutions for manufacturers and American businesses in all sectors.
- Continue public-private partnerships that spur private sector investment in AI and manufacturing, such as the SMART USA (Semiconductor Manufacturing and Advanced Research with Twins USA) Institute for Digital Twins at NIST.¹

¹ See U.S. Dept. Of Commerce Jan. 3, 2025 announcement that awards \$285 million to the Semiconductor Research Corporation Manufacturing Consortium Corporation to operate a CHIPS Manufacturing USA institute located in Durham, North Carolina.

<https://www.nist.gov/chips/research-development-programs/chips-manufacturing-usa-institute>

- Remove barriers to U.S. manufacturers’ ability to compete in global markets, including revisiting hastily drafted policies like the Bureau of Industry and Security’s Interim Final Rule on “Framework for Artificial Intelligence Diffusion.”

Congress and the Administration should work together with the private sector to encourage future innovation and investment in the United States and harness American manufacturing prowess, protect consumers and businesses, mitigate foreseeable risks, create U.S. jobs, and do not complicate or duplicate existing standards, laws, and sector-specific policies and frameworks.

I. Impact of AI on U.S. Manufacturing

Today, the United States is leading AI development, deployment, and innovation. The United States employs the best and the brightest AI researchers and technical experts working to advance American leadership in AI innovation. Other nations have recognized the United States as the center for AI excellence and are working harder than ever to develop the next major technological advancements in AI and to deploy AI in new use cases in their countries. In fact, an Accenture survey of 1,500 executives across all sectors found that 84 percent believed AI is critical to meeting their growth objectives and 73 percent said they risk going out of business if they cannot scale AI.²

Below is a sample of the AI use cases that will empower innovation in the manufacturing sector:

- **Predictive Maintenance:** AI can analyze real-time sensor data from manufacturing equipment to predict maintenance needs accurately. By identifying potential equipment failures in advance, manufacturers can schedule maintenance proactively, minimizing unplanned downtime and reducing costs.
- **Supply Chain Management:** AI can optimize supply chain operations by analyzing data from multiple sources, including demand forecasts, inventory levels, and logistical constraints. AI algorithms can optimize inventory management, improve demand forecasting accuracy, and enable efficient routing and scheduling of shipments.
- **Cobots:** Cutting-edge AI solutions are deployed to work alongside human workers by augmenting factory-focused tasks and enhancing productivity and safety while handling physically demanding tasks.
- **Digital Twin:** A digital representation of a physical asset or process that evolves over the lifecycle, from a product or machine to production, plants or even the entire supply

² <https://www.accenture.com/us-en/insights/artificial-intelligence/ai-investments>

chain. By combining the real and the digital worlds, the Digital Twin helps to define and optimize the product and production system before investing in physical assets, thus reducing the need for physical prototypes.

- **AI Packaging Manufacturing System:** Semiconductor companies have built fab-deployed automation that incorporates equipment automation, carrier and container standardization, automated material handling system, real-time dispatching systems, and product resume and yield analysis. Moreover, these advanced manufacturing systems employ the use of intelligent mobile devices, Internet of Things, and mobile robots with intelligent automated material handling systems to aid with complex manufacturing architectures.

As evidenced by the above examples, AI has the potential to significantly improve applications in the manufacturing context and play a transformative role for society more broadly. At the same time, ITI recognizes there are key questions that are emerging in the AI policy conversation, including questions related to workforce development and skills training, resource constraints that may disrupt global supply chains and manufacturing operations, energy demands, and permitting reforms that directly impact manufacturing facilities. We know there is increasing interest on the part of lawmakers and policymakers to identify solutions that address the foregoing questions.

II. ITI’s Response to the Administration’s Executive Order (EO) 14179, Removing Barriers to American Leadership in Artificial Intelligence

The Trump Administration’s recent executive order will enable the administration to develop an AI Action Plan that is driven by market trends and aligns with a pro-innovation agenda.³ As Congress and the administration consider policies that help incentivize increased investment and innovation in AI, it is worth reminding policymakers that the first Trump Administration was active in AI policymaking and progressed important work that propelled U.S. AI leadership onto the global stage. Key actions include signing two AI Executive Orders, one in 2019 on Maintaining America’s Leadership in AI (EO 13859)⁴ and one in 2020 on Promoting the Use of

³ See Executive Order 14179, *Removing Barriers to American Leadership in Artificial Intelligence* (Jan. 23, 2025). Found here: <https://www.whitehouse.gov/presidential-actions/2025/01/removing-barriers-to-american-leadership-in-artificial-intelligence/>

⁴ Executive Order 13859, *Maintaining America’s Leadership in AI* (Feb. 11, 2019). Found here: <https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence/>

Trustworthy AI in the Federal Government (EO 13960).⁵ EO 13859 significantly focused on driving research and development, as well as the critical role of leading the development of technical standards to maintain U.S. competitiveness.

The first Trump Administration also prioritized international engagement on AI policy. For example, the first Trump Administration was a leading voice in efforts taking place in the Organization for Economic Co-operation and Development (OECD) to establish a set of AI principles (formally adopted in 2019 and adhered to by 47 countries).⁶ The 2019 NIST Plan for Federal Engagement in Developing Technical Standards and Related Tools specifically highlighted the importance of ongoing engagement in international standards dialogues in order to shape the development of international technical standards, which are critical to advancing U.S. AI technology.⁷

ITI is encouraged by the Office of Science and Technology Policy's (OSTP) recent request for information (RFI) pursuant to EO 14179, which will define priority AI policy actions related to hardware and chips, data centers, energy consumption and efficiency, workforce, innovation and competition, and export controls, among other areas. ITI looks forward to contributing its perspective to the OSTP RFI, and we call on the Trump Administration to revisit the beneficial policies enacted during the first administration and build on those achievements to elevate the United States into the next stage of AI leadership.

III. Supporting Innovation and Investment for a Strong U.S. Manufacturing Sector

The United States must advance a robust strategy that supports multiple components of innovation and investment, which will ensure that manufacturers and companies from all sectors are able to reap the benefits of AI.

AI's transformational impact is being felt across all sectors, including manufacturing. AI has increased U.S. economic growth, facilitated economic opportunities for businesses of all sizes, and enabled the U.S. to deepen cooperation with allies and remain competitive with other nations. In seeking to advance a pro-innovation AI policy agenda, which will in turn benefit the adoption of AI technology in the manufacturing sector, it is important that Congress work with

⁵ See EO 13960, *Promoting the Use of Trustworthy AI in the Federal Government* (Dec. 3, 2020). Found here: <https://www.federalregister.gov/documents/2020/12/08/2020-27065/promoting-the-use-of-trustworthy-artificial-intelligence-in-the-federal-government>

⁶ <https://www.oecd.org/en/topics/sub-issues/ai-principles.html>

⁷ <https://www.nist.gov/artificial-intelligence/plan-federal-engagement-developing-ai-technical-standards-and-related-tools>

stakeholders to develop policies that support innovation and workforce development, advance helpful applications of AI, and progress the research and development needed to maintain American leadership in AI.

Technology companies, including ITI members Microsoft, NVIDIA, OpenAI, Oracle, and SoftBank Group, recently pledged to invest \$500 billion over the next four years to build new AI infrastructures needed to power future-generation AI technologies here in the United States.⁸ Stargate is not just a tech project—it's a massive manufacturing and construction effort in the United States. It will entail building large-scale data center campuses, power generation facilities, and deploying high-end hardware across the country. OpenAI collaborated with outside experts to analyze the potential job creation and GDP growth associated with building a single 5-gigawatt data center in various U.S. states. The analysis found that each data center would create or support approximately 40,000 jobs and contribute between \$17 billion and \$20 billion to a state's GDP.⁹ The Stargate Project's investments will directly benefit the manufacturing sector, produce thousands of American jobs, and generate the economic output needed for the U.S. to maintain its competitive edge.

Congress and the administration should provide the necessary resources and support to complement the private sector's contributions.

a. Enact policies that support increased access to data, AI infrastructure, and compute.

Data is foundational to AI innovation as one major component of AI systems. By leveraging large and diverse datasets and increased computing power and ingenuity, AI developers and other stakeholders will be able to innovate and find solutions to meet the needs of individuals and society in unprecedented ways. More available data means more inputs with which to train algorithms, resulting in higher quality AI offerings. U.S. businesses of all kinds, including manufacturers, currently lack the certainty of a single U.S. national data privacy standard, which would help encourage pro-innovation uses of data like AI applications in manufacturing and help the U.S. reassert a global leadership position. It is also important for the government to promote the adoption of existing international standards regarding data governance and data quality, as well as focus on the development of new standards for data quality. In addition to making government data available in machine-readable formats, governments may also be able to curate widely available data as labeled, diverse, representative, quality data for the purposes of training corresponding AI.

⁸ <https://openai.com/index/announcing-the-stargate-project/>

⁹ <https://cdn.openai.com/global-affairs/openai-infra-economics-10.09.24.pdf>

A U.S. approach that prioritizes innovation should therefore **seek to support existing international data standards and promote the development of new standards for data quality, as well as make government data available in machine-readable formats and curate widely available data.**

We also support efforts to establish opportunities and resources for companies of all sizes to partner with federal research centers focused on AI R&D, including the National AI Research Resource (NAIRR).¹⁰ Specifically, ITI supports the CREATE AI Act,¹¹ bipartisan, bicameral legislation that is supported by members of this Subcommittee, as well as the U.S. House Task Force on Artificial Intelligence.¹² The NAIRR is a shared national research infrastructure that provides AI researchers, small business owners, and students with greater access to the compute resources, data, and tools needed to develop safe and trustworthy AI. If authorized, the NAIRR could provide AI testbeds, open-source models, and high-powered computational tools to small-and-medium-sized enterprises, including manufacturing businesses, that hope to leverage AI to improve cross-business functions. The continued success of American manufacturers and U.S. AI leadership also depends on meeting the increased demand for electricity to operate the manufacturing facilities being reshored in the United States and rapidly expanding AI infrastructure such as data centers, while enabling all Americans to benefit from a more resilient power grid. U.S. policymakers at all levels of government need to act quickly to strengthen the electrical grid, remove regulatory barriers to siting and permitting, and promote an all-of-the-above energy strategy that encourages and enables innovations in the generation and distribution of power.

b. Foster public trust in AI technology.

Fostering public trust remains critical to supporting innovation. In particular, efforts to develop metrics, benchmarks, and evaluation techniques for AI systems, which are intended to help foster public trust, rely upon innovation. Innovation in measurement tools for AI will make risk management more concrete and objective and improve accountability and transparency. The

¹⁰ As authorized under P.L. 116-283 (FY21 NDAA), specifically sections related to *the National AI Initiative Act of 2020*, the National Artificial Intelligence Research Resource Task Force published a report on Jan. 2023 entitled, *Strengthening and Democratizing the U.S. Artificial Intelligence Innovation Ecosystem: An Implementation Plan for a National Artificial Intelligence Research Resource*, which details the mission and resource needs for a codified NAIRR. Report can be found here:

<https://www.ai.gov/wp-content/uploads/2023/01/NAIRR-TF-Final-Report-2023.pdf>

¹¹ From the 118th Congress, H.R. 5077, *The CREATE AI Act*:

<https://www.congress.gov/bill/118th-congress/house-bill/5077>

¹² <https://www.speaker.gov/wp-content/uploads/2024/12/AI-Task-Force-Report-FINAL.pdf>

National Institute of Standards and Technology (NIST) will play an increasingly important role in convening stakeholders to develop these metrics, guidelines, and best practices, and we encourage the government to continue supporting NIST's work on AI.

Promoting trust in AI systems requires AI model developers, deployers, and policymakers to collaborate. Transparency is a key means by which to achieve that trust. Manufacturers play an essential role in promoting trust and accountability of AI systems as well. To support those efforts, ITI developed Policy Principles for Enabling Transparency of AI systems, which offer recommendations to policymakers on how best to approach transparency as a policy tool, including considering the objective of and intended audience for transparency requirements, targeting transparency requirements to level of risk, and considering the role that disclosure plays. Additionally, ITI members are actively taking steps to build and deploy safe and transparent AI systems.

While transparency can take different forms, our member companies are working to ensure that users understand when they are interacting with an AI system and, broadly, how that system works. For example, several of our member companies provide information about an AI system via model or system cards. In the manufacturing context, this type of transparency measure allows manufacturers looking to integrate an AI model or an AI system to better understand the intended uses and potential limitations of the model, what type of data it was trained on, and evaluation metrics.¹³ This can help a production manager determine a specific AI model's potential application and whether that specific AI model or system is applicable to a manufacturer's envisioned use case.

c. Support a skilled workforce.

ITI supports legislative efforts to advance education and workforce development programs and to strengthen the nation's workforce in ways that ensure all people can participate in an AI-enabled future. These policies could include modernizing candidate recruitment, hiring, and training, and should establish and advance industry-informed skilling and re-skilling programs to prepare individuals for the future of work, including an AI-enabled future. To support these initiatives, we encourage government and businesses to continue to focus on policies designed to advance and incentivize professional and technical apprenticeships, education and training programs in STEM fields, and access to external and online reskilling programs.

¹³ Importantly, there is not one standard model card, but there are common elements across model and system cards introduced by different member companies.

ITI member companies already invest countless resources to help develop and advance the workforce needed to fuel American innovation. For the workforce pipeline to improve, the U.S. government must play an influential part in growing and supporting a skilled American workforce that is prepared for the future of work. Last Congress, ITI endorsed the bipartisan LIFT AI Act, which would instruct the National Science Foundation to award grant funds to higher education institutions or nonprofit organizations that support research activities to improve educational curricula and evaluation methods for K-12 AI literacy.¹⁴ ITI is encouraged by efforts that would address several aspects of the workforce pipeline by providing opportunities for AI skilling and expanding AI education to boost America’s competitiveness and innovation.

That said, AI is not just a function of STEM or advanced technical training; one way to ensure access to an AI workforce is to invest broadly across all relevant disciplines and teach flexible skills and problem solving from early childhood education. At the university level, AI and/or data science programs should incorporate the social sciences, humanities, and history to integrate humanistic approaches into the curriculum beyond a single, separate “AI ethics” unit.

d. Adopt pro-innovation tax policies and foster partnerships to promote R&D activities.

The tech sector spends over \$200 billion annually on domestic research and development (R&D), and for every \$1 billion of that investment, 17,000 jobs are supported in the United States. U.S. tax policy should encourage companies to make investments in domestic cutting-edge R&D by allowing companies to deduct their research and development costs in the year they occur. Reforms in the Tax Cuts and Jobs Act (TCJA) bolstered U.S. innovation and competition with other countries and encouraged companies to locate their R&D investments, facilities, and jobs in communities across the United States.

To make the U.S. the top destination for R&D investments, ITI reiterates the importance of restoring the ability to deduct R&D expenses during the current year. ITI has also been a leading advocate for the Advanced Manufacturing Investment Credit (section 48D), which provides an investment tax credit of 25 percent for qualified investments in the operation of a facility to manufacture semiconductors or semiconductor manufacturing equipment.¹⁵ Section 48D will bring the U.S. an estimated \$24 billion in investments for semiconductor manufacturing and equipment. Extending the placed in construction date for eligibility will promote section 48D’s effectiveness by providing the certainty necessary to undertake large multi-year investment

¹⁴ From the 118th Congress, H.R. 9211, The LIFT AI Act:
<https://www.congress.gov/bill/118th-congress/house-bill/9211>

¹⁵ <https://www.irs.gov/pub/irs-drop/a-24-40.pdf>

decisions to keep the U.S. at the forefront of semiconductor manufacturing. ITI provides more detail on these recommendations in its October 2024 letter to members of the Ways & Means Republican Tax Teams.¹⁶

U.S. Manufacturing Centers of Excellence (MCoE) offer a collaborative partnership for industry, government, and academia to optimize R&D activities and standards development geared towards enhancing manufacturing processes. In an effort to evolve traditional manufacturing operations into the next era of advanced manufacturing, MCoE are increasingly looking to partner with innovative technology providers that develop fit-for-purpose solutions. Similarly, the National Institute for Standards and Technology (NIST) has built a national network of manufacturing partnerships, known as the Manufacturing Extension Partnership, to support public-private partnerships that deliver comprehensive, proven solutions by helping small and medium-sized manufacturers grow, make operational improvements, and reduce risk.¹⁷ ITI encourages the government to continue to support these types of helpful partnership activities.

Technology companies and U.S. manufacturers must seize the opportunity to work with Congress and advocate for pro-growth policies that incentivize both sectors to build manufacturing facilities across the country, promote public private partnerships, spur cutting-edge innovations that benefit manufacturers, and create more jobs for American workers.

All of the above recommendations will help to create a holistic, innovative framework that can help to enable the development of AI tools and adoption of AI in the manufacturing sector.

At the same time, supporting such a framework requires assessing the evolving geopolitical landscape, including evaluating and targeting policy activities intended to protect U.S. economic and national security interests.

IV. AI and U.S. Global and Economic Security Interests

In the next decade, U.S. policymakers will wrestle with geopolitical challenges with implications for American technological innovation and, as a result, economic security. The technology sector represents around 10 percent of the U.S. Gross Domestic Product (GDP), directly employing nine million Americans, and accounts for roughly 32 percent of the market capitalization of the S&P 500. As the numbers demonstrate, the strength of the innovation

¹⁶ https://www.itic.org/documents/tax/ITITAXTEAMSFINALLETTER_signature.pdf

¹⁷ <https://www.nist.gov/mep>

economy bolsters the broader U.S. economy, but it also drives the U.S.’s leading edge responsible for developing the technology tools and capabilities that underpin U.S. national security, such as semiconductors, AI, and advanced manufacturing. Both the technology sector and U.S. economic security depend on smart and stable government policy that supports American innovation, ingenuity, and global competitiveness.

a. Global technology competition.

While the United States has an enviable starting point in the global competition for AI development and deployment, continued success in U.S. innovation and leading in the race for emerging technologies is not guaranteed. As recent news around DeepSeek demonstrates, foreign competitors are working hard to achieve AI breakthroughs and deploy AI in new use cases. There are still many scientific, technical, and business questions surrounding DeepSeek’s R1 model and its development. However, it is a clear reminder that companies around the world, including in China, are innovative and racing to catch up with American AI companies, many of whom are ITI member companies.

American companies leverage global markets for developing and selling their products. For U.S. high-tech innovation to truly thrive in the years to come, policymakers must create and sustain an environment, both at home and in the global marketplace, in which innovative companies can compete and expand. As such, it is important to ensure that export controls, and other review authorities, are tailored to realize economic security objectives by ensuring robust stakeholder engagement during their development and implementation, providing sufficient transition periods, and are scoped to address clearly identified national security objectives. Overly broad controls on technology products will undermine and limit the ability of companies to participate in the global marketplace, which will then disrupt the virtuous cycle of private-sector R&D investments made possible by revenues from sales of U.S. products to a diverse customer base in overseas markets.

b. The Biden Administration's “AI Diffusion Rule” is one example of an overly broad control on critical technologies without sufficient consideration of the unintended consequences on American innovation and global competitiveness.

In the final days of President Biden’s administration, ITI raised concerns¹⁸ over the late-term issuance of the Interim Final Rule titled “Framework for Artificial Intelligence Diffusion,” which would establish a unilateral global licensing regime for advanced computing chips for training AI

¹⁸ <https://www.itic.org/documents/trade/AIDiffusionExportControlLettertoCongress-FINAL.pdf>;
<https://www.itic.org/documents/AIDiffusionLettertoRaimondo010725.pdf>

models and was promulgated without sufficient stakeholder consultation.¹⁹ A rule of this nature – if not crafted correctly – may cede areas of AI and AI-enabling infrastructure to U.S. competitors. Other countries – including China – are eager to fill gaps in market demand created when there are barriers prohibiting U.S. companies' ability to compete on a level-playing field abroad. Should the U.S. lose its advantage in the global AI ecosystem, it will be difficult, if not impossible, to regain in the future.

ITI urged the Biden administration to follow the appropriate regulatory review process for the AI Diffusion IFR to protect against destabilizing global export controls and endangering U.S. leadership in the AI ecosystem. If implemented hastily, a rule of this nature could fragment global supply chains potentially encouraging multinational companies and customers to limit their reliance on U.S. technology, fundamentally undermining the objective of keeping the U.S. the global leader in AI. Therefore, ITI calls on the Trump Administration to delay the IFR's compliance dates and open a deliberative process to review and revise the IFR, to ensure reforms promote U.S. economic and national security.

c. The U.S. government should work closely with industry to strengthen the information, communications and technology (ICT) supply chain.

America's most innovative technologies, including AI systems and components, develop from a stable, robust, diverse, and interconnected global landscape of markets, innovators, and suppliers. Successful policies will revitalize and strengthen supply chains and allow businesses operating in the United States to leverage the global landscape to enhance the competitiveness of their products, services, and the American workforce. ITI supports supply chain policies that promote diversity, stability, and resilience, where the private and public sectors partner to understand and mitigate strategic supply chain vulnerabilities and identify areas that will have concrete national security benefits and limited adverse economic consequences. We believe it is imperative for Congress to advance the bipartisan *Promoting Resilient Supply Chains Act*, legislation under this Committee's jurisdiction which would help anticipate and address future supply chain disruptions before they happen, identify opportunities to grow manufacturing capacity and jobs here at home and reduce costs for American consumers.²⁰

¹⁹ *Federal Register*, (Jan. 15, 2025). 15 CFR Parts 732, 734, 740, 742, 744, 748, 750, 762, 772, and 774, [Docket No. 250107–0007], RIN 0694–AJ90:

<https://www.govinfo.gov/content/pkg/FR-2025-01-15/pdf/2025-00636.pdf>

²⁰ <https://www.commerce.senate.gov/2024/5/cantwell-blackburn-introduce-bill-to-prevent-supply-chain-disruptions-before-they-happen-protect-american-producers-pocketbooks>

Conclusion

Congress has an important role to play in maintaining U.S. leadership in the development and deployment of the technology making sure that the benefits of AI are realized not just by the manufacturing sector and but also society more broadly. We share the Committee's goal of equipping Members of Congress with the tools and expertise needed to advance meaningful legislation that encourages future AI innovation and investment in the United States while mitigating real risks to consumers and businesses alike. We look forward to partnering with you in that important work and appreciate the opportunity to testify before you today.