

ONE HUNDRED NINETEENTH CONGRESS
Congress of the United States
House of Representatives
COMMITTEE ON ENERGY AND COMMERCE
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February 10, 2025

MEMORANDUM

TO: Members, Subcommittee on Commerce, Manufacturing, and Trade
FROM: Committee Majority Staff
RE: Subcommittee on Commerce, Manufacturing, and Trade Hearing

I. INTRODUCTION

The Subcommittee on Commerce, Manufacturing, and Trade has scheduled a hearing on Wednesday, February 12, at 10:00 a.m. (ET) in 2123 Rayburn House Office Building. The title of the hearing is “AI in Manufacturing: Securing American Leadership in Manufacturing and the Next Generation of Technologies.”

II. WITNESSES

- Ms. Barbara Humpton, President and CEO, Siemens Corporation
- Mr. Jason Oxman, President and CEO, Information Technology Industry Council (ITI)
- Mr. Jeff Kinder, Executive Vice President, Product Development and Manufacturing Solutions, Autodesk
- Dr. Elisabeth B. Reynolds, Professor of Practice, Massachusetts Institute of Technology (*Minority*)

III. BACKGROUND

A. The U.S. Manufacturing Economy

Manufacturing has long been a cornerstone of the American economy, driving innovation, job creation, and economic growth. In recent decades, however, the industry has faced challenges ranging from globalization and offshoring to technological disruption and workforce shortages.¹

¹ C3.ai, *AI-Driven Supply Chain*, 2023, https://c3.ai/wp-content/uploads/2023/09/23_0831_C3_AI_Supply-Chain_eBook.pdf.

The COVID-19 pandemic further highlighted vulnerabilities in global supply chains, underscoring the need for resilient domestic manufacturing capabilities. Major supply chain disruptions are becoming increasingly frequent; specifically, manufacturing companies with complex global operations can expect a major disruption at least once every 3.7 years.²

B. U.S. Competitiveness

The Department of Commerce plays a vital role in working with the private sector to map and monitor supply chains while strengthening their resilience and security. A key focus of supply chains should be advancing the production and deployment of emerging technologies like artificial intelligence (AI) and blockchains. Examining how these technologies can enhance supply chain efficiency and security will be essential to maintaining America's competitive edge. The Department of Commerce also works to drive U.S. economic competitiveness and spur growth in communities across the country by creating industry friendly conditions and fostering innovation.

As indicated in the 2020 China Task Force report, "AI, semiconductors, quantum, 5G, and robotics are only a few of the industries the Chinese Communist Party (CCP) aims to monopolize. Plans such as Made in China 2025 are being implemented using what former Assistant Attorney General for National Security John Demers calls the CCP's 'rob, replicate, and replace' policy."³ Failing to bolster American supply chains will result in the U.S. ceding leadership to the CCP in key emerging technology manufacturing areas including AI, and its many applications like self-driving vehicles, blockchain technologies, quantum computing, advanced semiconductor fabrication, nanorobotics, and more. The U.S. must maintain its competitive advantage in innovation and ingenuity to secure American leadership in next generation technologies, and bolster supply chains to secure manufacturing leadership.

The challenges posed to American supply chains, and subsequently manufacturing, have provided other countries with the chance to surge ahead in global competitiveness for manufacturing.⁴

Between 1997 and 2022, U.S. compound real annual growth averaged just 1.7 percent—well below the global rate of 3.8 percent—placing the U.S. below the 50th percentile. In 2022, the U.S. accounted for 15.1 percent of manufacturing value added to global GDP, while China accounted for 31 percent. China's manufacturing sector produced \$5.1 trillion in value added, making up 28.6 percent of its national GDP, well above the global average of 17.5 percent. The U.S. produced \$2.6 trillion in manufacturing value added, or just 10.7 percent of national GDP.⁵ Additionally, China produces more goods than the U.S. in 9 of the top 11 manufacturing

² *Id.*

³ U.S. House of Representatives, *China Task Force Report*, Sept. 30, 2020, <https://foreignaffairs.house.gov/wp-content/uploads/2020/09/CHINA-TASK-FORCE-REPORT-FINAL-9.30.20.pdf>.

⁴ Douglas Thomas, *Annual Report on the U.S. Manufacturing Economy: 2024*, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, October 2024, <https://doi.org/10.6028/NIST.AMS.600-16>.

⁵ *Id.*

industries.⁶ While the U.S. maintains the highest GDP per capita among leading manufacturing nations,⁷ China's rapid manufacturing growth presents a serious challenge to American industrial leadership in the 21st century.

IV. ARTIFICIAL INTELLIGENCE IN MANUFACTURING

AI presents a significant opportunity for the U.S. to not only maintain but also bolster its competitiveness in manufacturing. The National Association of Manufacturers (NAM) reported that the top four use cases for AI in manufacturing operations were manufacturing and production, inventory management, quality operations, and R&D.⁸ A NAM poll of manufacturers found that they experienced the following changes to their manufacturing capacities after deploying AI in their operations: 72 percent reported reduced costs and improved operational efficiency; 51 percent reported improved operational visibility and responsiveness; and 41 percent reported improved process optimization and control.⁹

AI capabilities can also mitigate volatility in American supply chains. AI-enabled supply chains could allow for a more dynamic and prompt management system that responds in real time to threats and risks, and provides greater agility in the face of shifting demand, supply chain shocks, and major disruptions.¹⁰ To protect national and economic security, the U.S. must foster an innovative environment that allows for greater adoption and adaptation of emerging technologies, like AI and its applications.

⁶ See Thomas, Figure 2.7 (the 9 industries in which China produces more goods than the U.S. are: food, beverages, tobacco; computer, electronic and optical products/equipment; chemicals and pharmaceuticals; basic/fabricated metal and products, except machinery/equipment; other non-metallic mineral products, coke, and refined petroleum; machinery and equipment N.E.C.; textiles, wearing apparel, leather and related; wood, paper, printing, media products and cork, except furniture; and rubber and plastics products. The U.S. produces more goods than China in the remaining 2 industries: motor vehicles, trailers, other transport equipment; and furniture, jewelry, toys, etc., equipment repair/installation).

⁷ See generally Thomas, (Calculating proportions of the U.S. economy based on GDP and comparing it to other countries can be slightly deceiving; U.S. GDP per capita is higher compared to other top manufacturing countries, which makes the denominator disproportionately larger when making percentage calculations. The U.S. has the second largest manufacturing value added per capita among the ten largest manufacturing countries, falling only to South Korea. Further, it is easier for economies that are still developing, such as China and India, to grow at a faster rate than already developed economies, such as the U.S. and some Western European countries).

⁸ National Association of Manufacturers, *Working Smarter: How Manufacturers Are Using Artificial Intelligence*, May 2024, <https://nam.org/wp-content/uploads/2024/05/NAM-AI-Whitepaper-2024-1.pdf>.

⁹ *Id.*

¹⁰ *Id.*

V. KEY QUESTIONS

- How can AI and other emerging technologies be used to better address challenges in the American manufacturing ecosystem?
- Why is it important to bolster American manufacturing and what are the economical and national security ramifications if China surpasses America?
- Why must the U.S. secure leadership in manufacturing, specifically for manufacturing emerging technologies like AI and its applications including autonomous vehicles?

VI. STAFF CONTACTS

If you have any questions regarding this hearing, please contact Giulia Leganski, Brannon Rains, Natalie Hellmann, or Alex Khlopin of the Committee Staff at (202) 225-3641.