PUBLIC COMMENT: FOUNDATION FOR DEFENSE OF DEMOCRACIES

Department of Commerce
Bureau of Industry and Security

Section 232 National Security Investigation of Imports of Robotics and Industrial Machinery

[Docket No. 250924-0161]
XRIN 0694-XC138

AUTHORS

Craig Singleton
Senior Director and Senior Fellow, FDD's China Program

Jack Burnham
Research Analyst, FDD's China Program

Daniel Swift
Senior Research Analyst, FDD's Center on Economic and Financial Power

Washington, DC
October 17, 2025

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Introduction

China's role within America's industrial robotics supply chains is relatively minor but poised to grow steeply over the coming years. While the United States experiences a significant trade deficit in industrial robotics, this gap is primarily the result of significant investments by U.S. allies such as Germany, Japan, and South Korea, rather than a failure of domestic industrial policy. Moreover, the United States has benefited from its role as a major consumer market, having attracted significant foreign direct investment (FDI) from leading manufacturers that often deploy automation to increase productivity and lower costs.

However, China's aggressive industrial strategy raises the prospect that Chinese firms may seize a dominant position within the American industrial robotics market. A pillar of China's overarching industrial policy, Beijing has poured resources into researching, developing, and manufacturing both industrial robots designed for maintaining production lines and humanoid robots intended to perform more complex manufacturing tasks. These measures will likely have a significant impact on American manufacturing by providing a cost-competitive alternative to traditional suppliers such as Germany and Japan.

This trend may pose profound risks for U.S. national security, both in the form of nurturing strategic dependencies and allowing Chinese products with significant security vulnerabilities to enter the American market. As America seeks to ramp up its defense-industrial base — which will become increasingly reliant on automation — the Bureau of Industry and Security (BIS) should closely scrutinize the security implications of industrial robotic imports.

Overview of American Industrial Robotics Market

The United States has a significant trade imbalance within its industrial robotics industry primarily due to decades of specialization among its closest allies and partners and substantial foreign direct investment into key domestic industries. While the United States was once a pioneer within industrial robotics, having introduced the first industrial robot to assist in automotive manufacturing, decades of underinvestment allowed other major manufacturing powers, particularly Japan, Germany, and South Korea, to become industry leaders.[1] These investments, along with broader changes within the American economy — particularly the rise of services as a larger share of gross domestic product — prompted a surge in the import of advanced industrial robots, particularly as Japanese and South Korean firms sought to establish American manufacturing bases.[2]

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[1] Rebecca Rosen, "Unimate: The Story of George Devol and the First Robotic Arm," *The Atlantic*, August 16, 2011. (https://www.theatlantic.com/technology/archive/2011/08/unimate-the-story-of-george-devol-and-the-first-robotic-arm/243716); Daniel Araya, "China's Robots Are Coming of Age," *Centre for International Governance Innovation*, July 11, 2024. (https://www.cigionline.org/articles/chinas-robots-are-coming-of-age)

[2] Japan External Trade Organization, "Japan-U.S. Investment Report: 2025," accessed October 2, 2025. (https://www.jetro.go.jp/usa/japan-us-investment-report); Office of the United States Trade Representative, "U.S.-

This long-running stream of investment, coupled with rising imports, offers significant benefits to the American economy while promising to unlock future re-industrialization. While the United States does import many key components of industrial robotics, American firms still maintain a significant hold over the industry in the form of software products, particularly robot controller integrator software, which is essential for standing up automated assembly lines.[3] Moreover, these imports generate significant positive spill-over effects for domestic firms while creating new employment opportunities — evidence suggests that firms that employ automation experience employment growth, both as a result of preparing for automation and the opportunities it creates for re-shoring production lines.[4]

Combined, these overall industry trends largely account for China's currently limited hold on the American industrial robotics market. While American imports of industrial robots reached $707 million in 2024, far higher than its exports of $169 million, most imports came from Japan, Germany, and South Korea — countries whose firms have invested billions in building out their automative and heavy industrial presence in the United States.[5] In contrast, America only imported $29.7 million in industrial robots from China in 2024, a figure that has grown relatively slowly in absolute terms over the past several years.[6] The sluggishness of this growth largely parallels overall foreign direct investment trends, with inflows of Chinese FDI into the United States dropping precipitously since 2017 — fewer Chinese factories lead to the installation of fewer Chinese industrial robots to run production lines.[7]

Korea Free Trade Agreement," accessed October 9, 2025. (https://ustr.gov/trade-agreements/free-trade-agreements/korus-fta)

[3] "Robot Controller Integrator Software Market Size, Share and Trends 2025 to 2034," *Precedence Research*, accessed October 9, 2025. (https://www.precedenceresearch.com/robot-controller-integrator-software-market)

[4] Ben Armstrong, "How Foreign Investment Is Boosting U.S. Manufacturing," *Harvard Business Review*, September 23, 2024. (https://hbr.org/2024/09/how-foreign-investment-is-boosting-u-s-manufacturing); Peter Njekwa Ryberg, "Manufacturing automation and its implications for local employment outcomes: Evidence from Sweden," *Papers in Regional Science*, October 2025. (https://www.sciencedirect.com/science/article/pii/S105681902500034X#sec0075)

[5] Robert D. Atkinson, Meghan Ostertag, and Trelysa Long, "A Time to Act: Policies to Strengthen the US Robotics Industry," *Information Technology and Innovation Foundation*, July 18, 2025. (https://itif.org/publications/2025/07/18/time-to-act-policies-to-strengthen-us-robotics-industry); Japan External Trade Organization, "Japan-U.S. Investment Report: 2025," accessed October 3, 2025. (https://www.jetro.go.jp/usa/japan-us-investment-report); Office of the United States Trade Representative, "U.S.-Korea Free Trade Agreement," accessed October 9, 2025. (https://ustr.gov/trade-agreements/free-trade-agreements/korus-fta); Melissa Eddy, "German Companies Grow Wary of Investing in the U.S.," *The New York Times*, May 13, 2025. (https://www.nytimes.com/2025/05/13/business/germany-us-trade-trump.html)

[6] Robert D. Atkinson, Meghan Ostertag, and Trelysa Long, "A Time to Act: Policies to Strengthen the US Robotics Industry," *Information Technology and Innovation Foundation*, July 18, 2025. (https://itif.org/publications/2025/07/18/time-to-act-policies-to-strengthen-us-robotics-industry)

[7] Derek Scissors, "$2.5 Trillion: 20 Years of China's Global Investment and Construction," *American Enterprise Institute*, January 21, 2025. (https://www.aei.org/research-products/report/2-5-trillion-20-years-of-chinas-global-investment-and-construction)

China's Growing Role in American Industrial Robotics Supply Chains

However, China's global position within the industrial robotics sector, and the robotics sector writ large, will likely grow over the next several years due to both Beijing's industrial policy coming to fruition and the rising importance of humanoid robots to a range of sectors.

China's industrial robotics sector has benefited from a confluence of industrial policies and internal market dynamics, including access to significant financial capital, complementary investments in automotive manufacturing and artificial intelligence (AI), and demographic pressure on the country's workforce. Under the auspices of its "Made in China 2025" industrial policy, Beijing committed significant investments to the country's industrial robotics sector, aiming to produce 100,000 robots a year and employ 150 robots for every 10,000 employees throughout the economy by 2020 — goals that China has now accomplished.[8]

While these investments primarily came from the central government, additional investments in automotives and AI complemented them. Seeking to establish a leading market position, Beijing used state-backed "guidance funds" to support manufacturing, research, and development, while local governments offered low-cost land and other targeted subsidies to small - and medium-sized firms providing key inputs into the supply chain.[9] Moreover, China increased the effectiveness of this strategy by simultaneously investing in a globally competitive automotive manufacturing sector, which in turn has raised demand for industrial robots capable of running complex assembly lines.[10]

Chinese investments in AI have also spurred a growing market for industrial robots, particularly those that can take on a wider range of roles and model human behavior, such as ensuring quality control on production lines or engaging in dangerous and sophisticated tasks.[11] Taken together,

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[8] State Council of the People's Republic of China, "国务院关于印发《中国制造2025》的通知 [Notice of the State Council on the Publication of 'Made in China 2025'"], May 8, 2015. (https://cset.georgetown.edu/wp-content/uploads/t0432_made_in_china_2025_EN.pdf); "Robots at center of China's big strategy to leapfrog its rivals," *China Daily* (China), October 31, 2016. (https://www.chinadaily.com.cn/business/tech/2016-10/31/content_27224252.htm)

[9] Emily de La Bruyère, "Made in China 2025—Who is Winning?" *Foundation for Defense of Democracies*, February 6, 2025. (https://www.fdd.org/analysis/2025/02/06/made-in-china-2025-who-is-winning)

[10] Keith Bradsher, "China Has an Army of Robots on Its Side in the Tariff War," *The New York Times*, April 23, 2025. (https://www.nytimes.com/2025/04/23/business/china-tariffs-robots-automation.html); Craig Singleton, "Beijing's Power Play," *Foundation for Defense of Democracies*, October 23, 2023. (https://www.fdd.org/analysis/2023/10/23/beijings-power-play)

[11] Martin Casado and Anne Neuberger, "China is winning the race for AI robots," *The Wall Street Journal*, October 1, 2025. (https://www.wsj.com/opinion/china-is-winning-the-race-for-intelligent-robots-7b2416fe); Wendy Chang, "China's 'AI+' drive aims for integration across sectors: a wake-up call for Europe," *Mercator Institute for China Studies* (Germany), October 2, 2025. (https://merics.org/en/comment/chinas-ai-drive-aims-integration-across-sectors-wake-call-europe)

these trends allowed Chinese factories to install 300,000 robots in 2024 alone, more than the rest of the world combined and nearly 10 times more than the United States.[12]

China's surge in industrial robotics is also partially a policy response to a stark demographic reality, one that will shape Beijing's industrial policy for decades to come. As the country's prime-age labor force continues to shrink while overall wages rise, Chinese firms have turned to industrial robotics to lower costs and spur greater productivity.[13] This trend, which is likely to continue given the country's overall demographic structure, will have significant implications for China's robotics sector by producing and maintaining a vast, captive internal market.

Along with industrial robots, Chinese firms have also sought to develop and deploy humanoid robots capable of carrying out a broader, less repetitive range of tasks. Led by firms such as Unitree — a major manufacturer with deep ties to the People's Liberation Army — and reliant on a range of smaller start-ups, Chinese humanoid robots have improved in performance while remaining low in cost.[14] These startups have collectively raised billions of dollars over the past several years, with Chinese humanoid robotics firms receiving $2.4 billion in private investment in the first nine months of 2025 alone.[15]

Government support has also partially spurred these developments, with city governments expanding laboratory space for training humanoid robots and encouraging greater public demonstrations, such as running marathons.[16] While Chinese firms have faced significant hurdles in fully indigenizing the production process, particularly due to a lack of niche components such as sensors and advanced semiconductors, humanoid robots will likely only grow in importance as manufacturing supply chains adjust to meet demand.[17]

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[12] Meaghan Tobin and Keith Bradsher, "There Are More Robots Working in China Than the Rest of the World Combined," *The New York Times*, September 25, 2025. (https://www.nytimes.com/2025/09/25/business/china-factory-robots.html)
[13] Keith Bradsher, "China Has an Army of Robots on Its Side in the Tariff War," *The New York Times*, April 23, 2025. (https://www.nytimes.com/2025/04/23/business/china-tariffs-robots-automation.html)
[14] The House Select Committee on the Chinese Communist Party, Press Release, "Trojan Horse Tech: Select Committee Sounds Alarm on CCP Robots Inside U.S. Institutions," May 7, 2025. (https://selectcommitteeontheccp.house.gov/media/press-releases/trojan-horse-tech-select-committee-sounds-alarm-ccp-robots-inside-us)
[15] Rachel Cheung, "The Robot Reckoning," *The Wire China*, October 5, 2025. (https://www.thewirechina.com/2025/10/05/the-robot-reckoning-china-humanoid-robots)
[16] Du Qiongfang, "China's first heterogenous humanoid robot training facility set to put into use," *Global Times* (China), April 7, 2025. (https://www.globaltimes.cn/page/202504/1331603.shtml); Yan Zhuang, "The Athletes at China's Robot Games Fell Down a Lot," *The New York Times*, August 18, 2025. (https://www.nytimes.com/2025/08/18/world/asia/china-humanoid-robot-games.html)
[17] Meaghan Tobin and Keith Bradsher, "There Are More Robots Working in China Than the Rest of the World Combined," *The New York Times*, September 25, 2025. (https://www.nytimes.com/2025/09/25/business/china-factory-robots.html)

Chinese Dominance of Industrial Robotics Sector Poses Risks to U.S. National Security

China's industrial robotics sector poses a national security risk to the United States through a combination of potential weaponization of strategic supply chains and possible backdoors embedded by Chinese firms within their products.

While China currently holds a relatively minor share of the U.S. industrial robotics market, this will likely shift over the coming years due to overall changes within the American manufacturing sector. From purchasing foreign competitors to continuing to subsidize domestic firms, China may increasingly corner the industrial robotics industry — turning its technical edge into a long-term, strategic American dependency.[18] This risk will likely only increase as the American manufacturing sector continues to attract productivity-enhancing investments — spending on factory construction has tripled over the past four years, with factories installing industrial robots at an increased pace to drive productivity gains and compensate for a shrinking workforce.[19]

This trend poses the most risks for the U.S. defense industrial base. As noted in the National Defense Industrial Strategy, the United States must integrate AI and automation into its production processes to streamline overall defense procurement and enhance innovation.[20] While industrial robots likely cannot fully build certain items, other necessary armaments, such as artillery shells, are well-suited for them — a key factor behind the U.S. Army's $653 million investment in the Iowa Army Ammunition Plant in August.[21] As such, China's growing market share within the global industrial robotics industry may coincide with American efforts to revamp an already-overburdened defense industrial base — becoming a decisive factor in any large-scale war in the Indo-Pacific.

Along with undermining the industrial robotics industries of the United States and its closest allies and partners, the Chinese industrial robotics industry also poses another risk — encouraging American firms to import products that contain significant security vulnerabilities that Beijing could use for espionage or sabotage. Over the past several months, independent researchers have discovered two separate software backdoors into a range of Unitree products,

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[18] Daniela Wei and Sheenagh Matthews, "China's Midea to Become Largest Investor in Germany's Kuka," *Bloomberg News*, July 3, 2016. (https://www.bloomberg.com/news/articles/2016-07-03/voith-sells-kuka-stake-to-china-s-midea-for-about-1-3-billion)

[19] Laurent Belsie, "A new US manufacturing boom may bring more AI than jobs," *Christian Science Monitor*, March 28, 2025. (https://www.csmonitor.com/Business/2025/0328/tariffs-manufacturing-ai-jobs)

[20] U.S. Department of Defense, "National Defense Industrial Strategy," November 16, 2023. (https://www.businessdefense.gov/docs/ndis/2023-NDIS.pdf)

[21] Mark Bowden, "The Crumbling Foundation of America's Military," *The Atlantic*, December 17, 2024. (https://www.theatlantic.com/politics/archive/2024/12/weapons-production-munitions-shortfall-ukraine-democracy/680867); Michael Chambers, "Army invests $635M in cutting-edge artillery ammunition production facility", *U.S. Army*, August 20, 2025. (https://www.army.mil/article/287950/army_invests_635m_in_cutting_edge_artillery_ammunition_production_facility)

including a backdoor that would allow hackers to control and infect multiple Unitree units and another that would allow the robot to conduct surveillance on its users.[22]

Though Unitree has argued that these vulnerabilities are common across a range of robotic platforms, the discoveries fall within a well-defined pattern of Chinese firms embedding exfiltration points in critical industrial products and align with Beijing's desire to leverage its commercial firms' access to conduct espionage.[23] As more Chinese robots enter the United States, the risks posed by their intentional security vulnerabilities may provide a platform for Beijing to spy on Americans or conduct sabotage operations in the event of a crisis.

Conclusion

While the growing import of industrial robots is an overall positive for the United States, China's emerging role in American robotic supply chains presents a clear danger to U.S. national security. Over the course of more than a decade, China has sought to use a range of non-market practices to dominate strategic global sectors, with potentially profound implications for the security of the American economy and defense industrial base. BIS's investigation into the national security implications of industrial robotics imports is timely and will provide a strong foundation for future trade and non-trade-based remedies.

Thank you for considering our comments. We look forward to seeing how our input is incorporated into this investigation.

[22] Evan Ackerman, "Exploit Allows for Takeover of Fleets of Unitree Robots," *IEEE Spectrum*, September 25, 2025. (https://spectrum.ieee.org/unitree-robot-exploit); Sam Sabin, "Chinese robotics manufacturer left backdoor in product," *Axios*, April 1, 2025. (https://www.axios.com/2025/04/01/threat-spotlight-backdoor-in-chinese-robots-future-of-cybersecurity)

[23] Jiwon Ma and Jack Burnham, "Promoting the Integrity and Security of Telecommunications Certifications Bodies, Measurement Facilities, and the Equipment Authorization Program," *Foundation for Defense of Democracies*, August 15, 2025. (https://www.fdd.org/analysis/2025/08/15/promoting-the-integrity-and-security-of-telecommunications-certifications-bodies-measurement-facilities-and-the-equipment-authorization-program)