

AI Export Controls: Balancing National Security and Global Innovation

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Artificial intelligence has rapidly developed from a specialized field of computer science into a technology with growing importance to scientific research, economic competition, and national security. Advanced AI systems depend not only on software but also on powerful semiconductors, computing infrastructure such as data centers, technical expertise, and international supply chains. These technologies can have both civilian and military applications, making it increasingly difficult to separate commercial and scientific development from national security concerns. This overlap has become particularly significant in the competition between the United States and China, where advanced AI is connected to broader economic, technological, and geopolitical interests. Zeng (2025), in the article “ChatGPT as a Security Threat: US–China Security Dilemma in the Generative AI Race,” examines the dual-use nature of artificial intelligence and the difficulty of separating its civilian and military applications (para. 1). This dual-use nature creates a policy challenge because restrictions intended to prevent potentially harmful applications may also affect technologies with legitimate civilian and scientific uses. In response to these concerns, the United States has increasingly relied on export controls to restrict access to certain advanced technologies. However, these restrictions can affect more than just national security, as AI research and development occur within an interconnected international scientific community. Balancing national security concerns with continued scientific collaboration and technological development is therefore an important consideration for the future of advanced AI. Examining this balance raises a broader question about how security policies interact with legitimate research and technological progress: How do U.S. export controls affect scientific research, international collaboration, and technological innovation in advanced artificial intelligence?

Export controls have historically been used as a national security tool to prevent strategic technologies from falling into the hands of foreign adversaries. However, advances in artificial intelligence have expanded these concerns beyond traditional military equipment. Modern AI systems have applications across civilian, commercial, and military environments, meaning that access to advanced technology can influence a country's economic and political power as well as its defense capabilities. Joshua Angelo (2025), in the *Duke Law & Technology Review* article “Playing to Win: The Use of Export Controls to Address Non-Military Strategic Competition,” examines this broader purpose by analyzing U.S. export control statutes and judicial precedent. Angelo argues that technologies such as artificial intelligence, quantum computing, and 5G communications have become part of strategic competition with China even when their applications are not directly military (p. 234). This demonstrates why the definition of national security in the context of technology has expanded as technological capabilities have become increasingly connected to economic and geopolitical influence. In this context, controlling access to advanced technology serves to protect a country's technological position, even when the technology is not exclusively designed for military use. More recent U.S. policy has applied this reasoning directly to the semiconductor industry. In the Congressional Research Service report *U.S. Export Controls and China: Advanced Semiconductors*, Sutter (2025) explains that U.S. export controls have limited China's access to certain advanced technologies, while policymakers continue to debate how those restrictions affect U.S. competitiveness in semiconductors and AI. Some stakeholders favor loosening controls on advanced chips to strengthen U.S. companies. In contrast, others argue that doing so could surrender technological advantages to China (para. 9). This debate demonstrates one of the challenges of using export controls as a competitive strategy; restricting another country's access to technology may protect a strategic advantage, but

overly restrictive policies could also affect the companies responsible for maintaining that advantage. These competing concerns show that modern export controls serve not only to prevent direct military threats but also to protect broader strategic advantages. At the same time, determining where national security protection ends and unnecessary technological restriction begins creates a difficult policy problem as AI continues to advance.

Scientific research in artificial intelligence increasingly depends on cooperation between researchers, institutions, and industries across national borders. This creates a potential conflict for export control policies because restrictions intended to limit access to sensitive technology may also affect the international networks involved in developing new technologies. Ding et al. (2025), in the study “Rise of Generative Artificial Intelligence in Science,” examined the growth of generative AI research across scientific disciplines using publication data from the OpenAlex database. Their analysis found that GenAI application publications involved slightly more international collaboration than publications applying other forms of AI. Although the difference was modest, the researchers found a positive relationship between GenAI applications and the number of countries represented in the research, suggesting a somewhat more globally connected research network (para. 33). The relatively small difference does not suggest that GenAI research is universally international, but it does demonstrate that researchers developing and applying these technologies are participating in scientific communities that extend across national borders. This complicates export control policy because restricting access in one part of that network could have effects beyond the specific country, company, or institution being targeted. Researchers can depend on shared knowledge, technical expertise, hardware, and partnerships when developing new technologies. Hrynkiv (2026), in the article “Export Controls and the Energy Transition: Aligning Security and Sustainability,” examines a similar conflict between

national security and international technological development. Although the article primarily focuses on green technologies, Hrynkiv explains that these technologies are rarely developed entirely within one country and instead rely on international collaboration and knowledge exchange through research partnerships, skilled professionals, licensing, and global supply chains (para. 3). Hrynkiv further warns that barriers to international knowledge and technology exchange may hinder innovation and the diffusion of new technologies (para. 3). Although green technologies and artificial intelligence involve different industries and security concerns, the comparison illustrates a broader challenge for technologies that depend on internationally distributed knowledge and resources. A restriction aimed at protecting one technological advantage may also change how researchers access expertise, equipment, or partnerships needed for future innovation. The same concern applies to AI, as its scientific development also occurs within international research networks. Together, these findings demonstrate why international collaboration must be considered when evaluating the broader effects of AI export controls. Protecting sensitive technologies may serve legitimate national security interests, but restrictions that interfere too broadly with scientific networks could also limit collaboration and knowledge exchange that contribute to technological progress.

The long-term effects of AI export controls will depend heavily on whether policymakers can protect national security without unnecessarily restricting technological innovation. As artificial intelligence continues to develop, a policy that is effective today may become less effective as computing technology, global supply chains, and international competition change. RAND researcher Lennart Heim (2025), in *Understanding the Artificial Intelligence Diffusion Framework: Can Export Controls Create a U.S.-Led Global Artificial Intelligence Ecosystem?*, analyzes the U.S. Artificial Intelligence Diffusion Framework introduced in January 2025. Heim

explains that the framework seeks to address competing policy goals by maintaining U.S. leadership in AI, managing security risks, and allowing beneficial AI technologies to continue to spread internationally (para. 1). The framework demonstrates that export controls need not operate as a complete barrier to technological exchange. Instead, policymakers can attempt to control access to sensitive technologies while maintaining opportunities for international cooperation and technological development. However, this strategy creates an ongoing challenge because technological leadership also depends on access to international markets, researchers, infrastructure, and partnerships. Heim recognizes this tension later in his analysis, warning that overly stringent restrictions could encourage countries to seek alternative AI ecosystems. At the same time, controls that are too relaxed could create additional security risks (para. 10). These competing risks suggest that the effectiveness of export controls cannot be measured only by how much technology they restrict; policymakers must also consider whether the restrictions preserve the international relationships and economic advantages that contribute to U.S. technological leadership. This illustrates why future export control policies will likely require continued adjustment rather than a single permanent solution. As AI technology evolves, policymakers will have to continue balancing national security against innovation, economic competitiveness, and international cooperation.

U.S. export controls on advanced artificial intelligence demonstrate the difficulty of balancing national security with continued scientific and technological development. These policies can help prevent sensitive technologies from strengthening geopolitical competitors and allow the United States to protect its advantages in areas such as advanced semiconductors and AI computing. However, the effects of these restrictions extend beyond national security. AI research increasingly depends on international collaboration, shared knowledge, technical

expertise, and global supply chains, so restrictions can also affect how researchers and institutions cooperate across borders. Overall, the evidence suggests that the effects of export controls are not simply positive or negative. Their impact depends on how restrictions are designed, which technologies and countries they target, and how policies adapt as artificial intelligence continues to evolve. Future export control policies should account for both the national security risks associated with advanced AI and the scientific and economic benefits of international technological cooperation. Rather than completely resolving the tension between security and innovation, the continued development of AI will likely require policymakers to reevaluate where to draw that balance.

References

- Angelo, J. (2025). Playing to win: The use of export controls to address non-military strategic competition. *Duke Law & Technology Review*, 25(1), 233–261.
<https://scholarship.law.duke.edu/dltr/vol25/iss1/6/>
- Ding, L., Lawson, C., & Shapira, P. (2025). Rise of generative artificial intelligence in science. *Scientometrics*, 130, 5093–5114. <https://doi.org/10.1007/s11192-025-05413-z>
- Heim, L. (2025, February). *Understanding the artificial intelligence diffusion framework: Can export controls create a U.S.-led global artificial intelligence ecosystem?* RAND Corporation. <https://www.rand.org/pubs/perspectives/PEA3776-1.html>
- Hrynkyv, O. (2026). Export controls and the energy transition: Aligning security and sustainability. *Review of European, Comparative & International Environmental Law*, 35(1), 156–171. <https://doi.org/10.1111/reel.70043>
- Sutter, K. M. (2025, September 19). *U.S. export controls and China: Advanced semiconductors* (CRS Report No. R48642). Congressional Research Service.
<https://crsreports.congress.gov/product/pdf/R/R48642>
- Zeng, J. (2025). ChatGPT as a security threat: US–China security dilemma in the generative AI race. *The British Journal of Politics and International Relations*, 1–16.
<https://doi.org/10.1177/13691481251389415>