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# Smart Machines and Smarter Policy: Foreign Investment Regulation, National Security, and Technology Transfer in the Age of Artificial Intelligence, 51 J. Marshall L. Rev. 279 (2018)

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# SMART MACHINES AND SMARTER POLICY: FOREIGN INVESTMENT REGULATION, NATIONAL SECURITY, AND TECHNOLOGY TRANSFER IN THE AGE OF ARTIFICIAL INTELLIGENCE

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# I. INTRODUCTION

"We are summoning the demon," Tesla founder and tech entrepreneur Elon Musk said while speaking at M.I.T. in 2014.[1] Musk was warning that artificial intelligence technology (AI) would eventually accelerate to the point that it could not be controlled by humans and would pose an existential threat to humanity.[2] While these statements may exaggerate the threat posed by AI, genuine questions do exist relating to the potential for AI to play a transformative role in our daily lives, the economy, and the geo-political balance of power. While the U.S. currently is at the forefront of research and development of AI, China is seeking to utilize this technology to aid its rise as an economic and military power. In pursuit of these strategic goals, Chinese companies have begun to invest heavily in U.S. AI companies. This has sparked concerns in Washington that Chinese investment in the U.S. AI industry is being used as a vehicle for the technology transfer to Chinese government entities.[3]

In light of these national security concerns, Senator John Cornyn (R-TX) introduced a bill to Congress that increases restrictions on foreign investment, which may target Chinese companies investing in U.S. AI companies.[4] While the bill may address legitimate security concerns, it also has the potential to negatively impact the U.S. AI industry and the U.S. economy as a whole. This analysis will weigh the national security concerns with the economic drawbacks to determine whether Senator Cornyn's legislation will be an effective regulatory reform. Part I will discuss AI systems, their national security implications, and China's strategic focus on this technology. Part II will discuss how Chinese investment in U.S. AI industry has the potential to become a pipeline for technology transfer to China. Part III will examine how the U.S. government manages national security risk in foreign investment transactions, discuss past U.S. foreign investment regulatory actions, in addition to introducing the current proposal for reform. Finally, Part IV will analyze the potential economic impact to the U.S. AI industry from increased investment restrictions and recommend policy alternatives to mitigate these impacts.

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1. Maureen Dowd, *Elon Musk's Billion-Dollar Crusade to Stop the A.I. Apocalypse,* VANITY FAIR, (Mar. 26, 2017), www.vanityfair.com/news/2017/03/elon-musk-billion-dollar-crusade-to-stop-ai-space-x.

2. *Id.*

3. Michael Brown & Pavneet Singh, *China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable a Strategic Competitor to Access the Crown Jewels of U.S. Innovation*, U.S. DEF. INNOVATION UNIT EXPERIMENTAL 2 (Feb. 2017), new.reorg-research.com/data/documents/20170928/59ccf7de70c2f.pdf.

4. Foreign Investment Risk Review Modernization Act, S. 2098, 115th Cong. (2017), www.congress.gov/bill/115th-congress/senate-bill/2098.

# II. ARTIFICIAL INTELLIGENCE, ITS APPLICATIONS AND STRATEGIC IMPLICATIONS

## *A. AI Systems and their Applications*

AI has a wide variety of industrial and defense applications that have led to strategic imperatives to acquire this technology. However, it is difficult to understand what is exactly meant by the term "artificial intelligence" because there is currently no widely accepted definition for it.[5] Most definitions of AI focus on replicating human characteristics like consciousness, self-awareness, language use, and the abilities to learn, adapt and reason within a computer system or an algorithm.[6] An AI system can consist of both hardware components, like a drone or robot, and software components, like a program running on networked computers.[7] The most widely-used approaches to defining AI focus on the achievement of goals through computational processes.[8] An ideal AI system is able to synthesize large amounts of data, recognize complex patterns within those data sets, draw conclusions based on those patterns, and then make predictions or take action based on those conclusions.

Categorizing AI technologies can be as difficult as defining them, as many companies often mix and match different technologies according to their needs. However, AI systems are generally categorized by functionality or by business application.[9] Accordingly, AI systems for industrial applications commonly break down into five categories: robotics & autonomous vehicles, computer vision, language, virtual agents, and machine learning.[10] Virtual agents, which are computer programs that can converse with humans like Amazon's "Alexa" or Apple's "Siri," can play a song for you, order your dinner, or give you an answer to a hotly contested trivia question with a simple voice command. Self-driving cars are another high profile industrial application of AI, with driverless fleets from Tesla, Uber, Google's Waymo, and Intel's Mobileye already in the testing phase.

Despite the excitement surrounding these consumer applications of AI, the bulk of investment in the technology is going

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5. Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies*, 29 HARV. J. LAW & TEC. 353, 359 (2016).

6. *Id.* at 360.

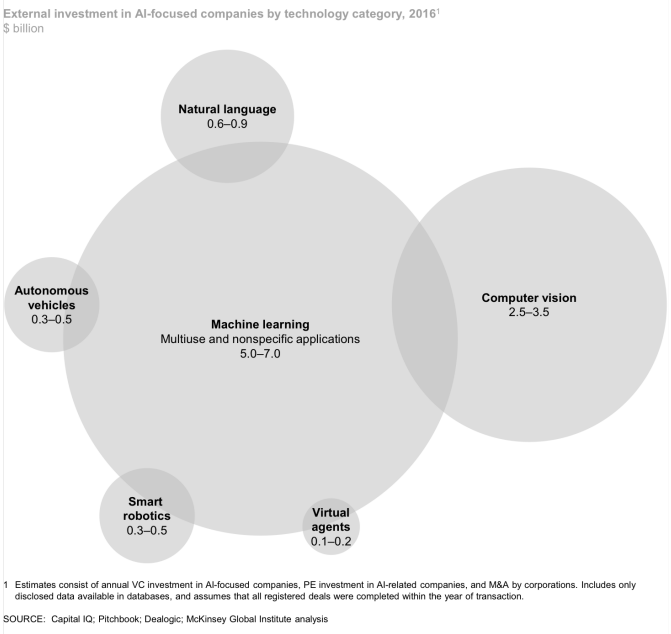
7. *Id.* at 362.

8. *Id.* at 361.

9. *Id.*

10. Jacques Bughin et al., *Artificial Intelligence: The Next Digital Frontier?* 4 (McKinsey & Co. Discussion Paper, June 2017), www.mckinsey.com/~/media/McKinsey/Industries/Advanced%20Electronics/Our%20Insights/How%20artificial%20intelligence%20can%20deliver%20real%20value%20to%20companies/MGI-Artificial-Intelligence-Discussion-paper.ashx.

into machine learning applications. Machine learning applications received almost 60% of the investment from outside the industry in 2016, in large part because they enable other AI technologies.[11] Machine learning is based on "algorithms that learn from data without relying on rules-based programming in order to draw conclusions or direct an action."[12] Machine learning has the potential to provide exponential advances in robotic automation and decision-making applications that continually optimize outcomes.[13] Combining machine-learning systems with manufacturing processes could supercharge productivity gains for the manufacturing industry in particular. At this stage, however, adoption of AI is largely limited to the technology sector, as other industries are uncertain of the return on investment or how the technology can be adapted to their business needs.[14]




Investment in AI is primarily driven by private firms in the technology sector. Digital giants Google and China's Baidu currently dominate private investment in AI, spending an estimated $20-30 billion in 2016.[15] The bulk of this investment has been poured into research and development, with a small amount

11. *Id.* at 12.
12. *Id.* at 8.
13. Daniel Alderman & Jonathan Ray, *Best Frenemies Forever: Artificial Intelligence, Emerging Technologies, and China-US Strategic Competition*, INST. ON GLOB. CONFLICT AND COOPERATION 2 (Feb. 28, 2017), escholarship.org/uc/item/2pq268gz.
14. Bughin, *supra* note 10, at 10.
15. *Id.* at 4.

directed to acquisitions of other AI companies. The market for AI start-up companies is growing significantly, with venture capitalists spending $4-5 billion on greenfield investments in 2016.[16] Although the U.S. and China are leading investment in AI, many other countries are beginning to dedicate significant portions of their budget to AI. The South Korean government recently announced it will spend $1 billion over the next five years on AI research and development, which would equal the AI budget of the U.S. within a few years.[17] Given the many commercial applications of AI and the potential for it to revolutionize manufacturing, it is no surprise that corporations as well as national governments are making investment in AI a priority.

## *B. The National Security Implications of AI*

While the transformative industrial applications of AI are being recognized, U.S. national security experts also envision that AI applications will have a similar impact on the defense sector. AI may significantly improve military and intelligence capabilities, and analysts see its potential impact on military superiority as being on par with the development of airplanes and nuclear weaponry.[18] The proliferation of military drones is one example of AI's potential military usage, but this phenomenon may be a mere prelude to the next generation of AI-enhanced automated weaponry. AI will likely allow more robotic support for combat personnel and accelerate the shift from manned to unmanned combat missions.[19] This is evidenced by the dramatic increase in the market for military robots, which grew from $2.4 billion to $7.5 billion during the period of 2000 to 2015, and is expected to reach $16.5 billion by 2025.[20] Combining these drones with AI systems that allow them to operate autonomously in theatre has the potential to transform military power and warfare.

Another impact of AI technology on defense systems is that military and intelligence activities that currently require many people will be achievable with fewer people or without people at all.[21] This is important for surveillance operations, whose efficiency can be greatly improved with the application of AI systems. Surveillance monitoring operations that would have in the past

16. Greenfield investments are a type of foreign direct investment where a foreign company invests in a new venture. *Id.* at 6.

17. Greg Allen & Taniel Chan, *Artificial Intelligence and National Security*, THE BELFER CENTER FOR SCIENCE AND INTERNATIONAL AFFAIRS, HARVARD KENNEDY SCHOOL OF GOVERNMENT 23 (July 23, 2017), www.belfercenter.org/sites/default/files/files/publication/AI%20NatSec%20-%20final.pdf.

18. *Id.* at 12.

19. *Id.* at 16.

20. *Id.* at 13-14.

21. *Id.* at 12.

required a massive government budget and personnel can now be conducted with only a few thousand people.[22] This application is important for the Chinese government because it is looking to increase the effectiveness of the surveillance that it conducts on its large population. AI and machine-learning are also foundational to the future of cybersecurity, which has a growing role in the defense industry. AI-enhanced cyber tools can reduce the need for human-intensive tasks, which can dramatically increase the ability and productivity of cyber-warfare.[23]

The military applications of AI has led the U.S. Department of Defense (DOD) to announce their "Third Offset Strategy" to ensure U.S. military superiority through the pursuit of next-generation technology.[24] The initial stage of the strategy involves exploiting AI and autonomy technologies by using them in battle networks that coordinate command, control, and communications operations in theatre.[25] The DOD has acknowledged, however, that this strategy is implemented in part to pace competitors like Russia and China who are also developing these capabilities.[26] It has indicated that Russia and China have dedicated substantial resources to counter-network operations including cyber capabilities.[27] In regards to AI technology, Russia has announced a plan to have 30% of combat power in remote-controlled and autonomous robotic platforms by 2030.[28] While information on the Chinese military is opaque, it has already announced an intention to develop cruise missiles with an AI system in response to the U.S. Navy's semi-autonomous guided Long Range Anti-Ship Missile.[29]

The DOD has enacted use restrictions on automated systems using lethal force, but there are significant concerns that other states may not exercise such restraint.[30] U.S. companies are also exercising restraint when it comes to the application of AI to military technology. Google's DeepMind, largely seen as the world leader in AI research has a strong stance against the military or

22. *Id.* at 18.

23. *Id.*

24. Richard Purcell, *Hagel's 'Third Offset Strategy' Key to Maintaining U.S. Military Supremacy*, WORLD POL. REV. (Dec. 29, 2014), https://www.worldpoliticsreview.com/articles/14744/hagel-s-third-offset-strategy-key-to-maintaining-u-s-military-supremacy.

25. Cheryl Pellerin, *Deputy Secretary: Third Offset Strategy Bolsters America's Military Deterrence*, DEP'T OF DEF. NEWS NETWORK (Oct. 31, 2016), www.defense.gov/News/Article/Article/991434/deputy-secretary-third-offset-strategy-bolsters-americas-military-deterrence/.

26. *Id.*

27. *Id.*

28. Allen & Chan, *supra* note 17, at 21.

29. John Markoff & Matthew Rosenberg, *China's Intelligent Weaponry Gets Smarter*, N.Y. TIMES (Feb. 3, 2017), www.nytimes.com/2017/02/03/technology/artificial-intelligence-china-united-states.html.

30. Allen & Chan, *supra* note 17, at 21.

surveillance use of the AI technology.[31] When Google acquired the company, the two organizations agreed that Google would prohibit the use of its AI technology for such purposes.[32] When Google acquired Boston Dynamics and Schaft, two leading developers of robotics research and development, they also agreed that these firms would not pursue military or intelligence contracts.[33] Despite this pushback, the potential disruptive impact that AI may have on warfare and military superiority has caused the U.S. government to place strategic focus on the development of AI systems.

### *C. China's Strategic Focus on AI Technology Investment*

In addition to the large investment that Chinese companies have made in AI, the Chinese government has also placed a strategic focus on this technology. "Made in China 2025" is the Chinese government's new strategic initiative to transform its manufacturing industry through the application of next-generation technology.[34] Over the past two decades, China has become the world's largest manufacturer, but it is still plagued by issues like the lack of core technologies and a lack of independent innovation.[35] The Chinese government believes that the development of AI, in addition to other technologies, can help the country achieve this manufacturing transformation.[36] In response to the government's initiative, Chinese firms like Baidu and Tencent are spending heavily to build up large, skilled research teams in machine-learning and AI.[37] Baidu collaborated with the Chinese government to set up a new national laboratory in Beijing dedicated to keeping China at the forefront of this technology.[38] Given the lack of independent innovation in China and the plan's aggressive targets, emphasis on home grown technological development may not be

31. *Id.* at 52.

32. *Id.*

33. *Id.*

34. U.S. CHAMBER OF COMMERCE, *Made in China 2025: Global Ambitions Built on Local Protections* 6 (July 2017), www.belfercenter.org/sites/default/files/files/publication/AI%20NatSec%20-%20final.pdf.

35. XINHUA FIN. AGENCY, *AI Becomes Key Facet for Made in China 2025* (Mar. 9, 2017, 4:35 PM), en.xfafinance.com/html/Dont_Miss/2017/310664.shtml.

36. *Id.*

37. Tom Simonite, *It's Too Late to Stop China from Becoming an AI Superpower*, WIRED (June 29, 2017, 7:00 AM), www.wired.com/story/america-china-ai-ascension/.

38. Phil Stewart, *The U.S. Weighs Restricting Chinese Investment in Artificial Intelligence*, THOMSON REUTERS (Jun. 13, 2017, 2:53 PM), www.reuters.com/article/us-usa-china-artificialintelligence/u-s-weighs-restricting-chinese-investment-in-artificial-intelligence-idUSKBN1942OX.

enough. Chinese companies need to pursue foreign direct investment to gain access to advanced AI technology.[39]

Given that the U.S. is currently the global leader in technological innovation, it makes sense that Chinese companies have now become significant investors in the U.S. AI industry. During the 2010-2016 period, Chinese companies participated in fifty-one AI financings, with twenty-nine deals and $470 million in financing alone in the 2015-16 period.[40] The Chinese tech giant Tencent created an AI lab in Seattle, near the campus of Amazon, and promptly began investing in Silicon Valley AI companies.[41] Baidu acquired the U.S. firm xPerception, which makes vision perception software with robotic and virtual reality applications.[42] While China's past investments in the technology sector were limited to acquisitions or joint ventures, greenfield, or start-up investments, are becoming an increasing preferred method of investment. These include deals with Chinese venture capital firms like Sinovation, which has invested in 25 artificial intelligence start-up companies in the U.S.[43] Greenfield investment is becoming a popular mode of investment because it is less politically risky than high-profile mergers and acquisitions.[44]

In sum, the rapid growth and development of AI technology has major implications for both industrial and defense applications. AI enhancements to the manufacturing industry have the potential to provide major productivity boosts, while AI-enhanced weaponry has the potential to reshape the battlefield of the future. The U.S. is currently the global leader in AI technology, but the Chinese government has placed strategic emphasis on enhancing its technological capabilities. Limitations on the Chinese innovative capabilities have caused Chinese companies to invest in the U.S. AI industry in order to better access technological enhancements.

## III. FOREIGN INVESTMENT AND THE TECHNOLOGY TRANSFER PIPELINE

### *A. Foreign Investment and Technology Transfer*

One way to describe the influx of Chinese investment in the US AI industry is strategic asset seeking behavior. Strategic asset

39. Ann R. Thryft, *Made in China 2025: AI in U.S. Factories? Not There Yet,* ASPENCORE GLOB. REP. (Aug. 3, 2017), www.eetimes.com/document.asp?doc_id=1332106.

40. Brown & Singh, *supra* note 3, at 7.

41. Markoff & Rosenberg, *supra* note 29.

42. Stewart, *supra* note 38.

43. Brown & Singh, *supra* note 3, at 8.

44. Curtis J. Milhaupt, *Is the U.S. Ready for FDI from China? Lessons from Japan's Experience in the 1980s*, DELOITTE U.S. CHINA SERV. GROUP 15 (Nov. 2008), ccsi.columbia.edu/files/2014/01/MilhauptFinalEnglish.pdf.

seeking behavior constitutes the funding of foreign investment to gain access to technologies that would otherwise not be available in the home country.[45] The transfer of technological know-how and knowledge from the developed country facilitates an increase in productivity in the developing country with the added benefit of knowledge spillovers to other domestic firms and industries.[46] Investments in centers of innovation, like Silicon Valley, are an important source of technology diffusion for developing nations like China.[47] This strategy for acquiring advanced technology is not new, however, as China has used this method ever since the Law of Joint Ventures was promulgated in 1979.[48]

Although patented technology can be legally protected from transfer to the foreign investing country by the use of licensing agreements, it is more difficult to control "know-how" or knowledge relating to a company's technology.[49] Once knowledge is released into the industry, it is impossible to retrieve and may be used by anyone. For this reason, companies often seek to protect their knowledge and technology from transfer by foreign investors through nondisclosure and confidentiality agreements.[50] However, several aspects of the advanced technology industry in the US, which will be explored below, make it easier for this technology to be transferred across borders. Among the factors critical to this technology transfer are the diffuse and open nature of the AI industry, the off-the-shelf nature of US military technology, the close connections between the Chinese and U.S. AI industries, and the corresponding close connections between Chinese tech companies and the Chinese Communist Party. The confluence of these factors create a virtual pipeline for the transfer of AI technology from U.S. companies to Chinese government entities.

## *B. The Diffuse and Open Nature of AI Technology*

To begin with, the inherent nature of AI technology makes it conducive to technology transfer. Major technological advancements in the past, like nuclear technology, have required substantial infrastructure investments making those operations difficult to conceal.[51] The ability of AI systems to be developed with minimal resources and in multiple locations make it difficult to

45. Edmund Amann & Swati Virmani, *Foreign Direct Investment and Reverse Technology Spillovers: The Effect on Total Factor Productivity*, OECD J. ECON. STUD. 129, 135 (2014), dx.doi.org/10.1787/eco_studies-2014-5jxx56vcxn0n (last visited Nov. 15, 2017).

46. *Id.* at 136.

47. *Id.* at 132.

48. *Id.*

49. RALPH H. FOLSOM, FOREIGN INVESTMENT LAW IN A NUTSHELL, 28 (2016).

50. *Id.*

51. Scherer, *supra* note 5, at 369.

determine where the technology is actually located.[52] AI systems can be developed with limited visible infrastructure and their individual components can be located far away from one another.[53] The interaction between the variety of components developed in disparate geographic locations can complicate the ability of any singular corporate entity, let alone a government regulator, to monitor their transfer.[54] Participants in an AI project need not be related in any fashion and some systems are even being developed in open-source libraries available to be accessed by anyone. This diffusion of activity also makes it possible for individual components of these systems to be developed outside of the system developer's control.[55] The open and diffuse nature of AI systems sets them apart from previous disruptive technologies and makes it more likely that they can be transferred across borders.

### *C. Changing Nature of U.S. Military Procurement*

Another factor aiding the transfer of U.S. technology to China is the changing nature of military procurement. Over the past two decades, the DOD has moved toward a system of procuring advanced military technologies from commercial sources.[56] This "off-the-shelf" procurement strategy allows the DOD to outsource the cost of research and development as well as externalize the costs of introducing these new technologies to the market.[57] In addition to cost efficiencies for the government, this method also helps the military avoid being locked into certain technology configurations that would otherwise be outdated by the time of production.[58] Emerging defense technologies now increasingly come from the private sector, making the U.S. tactical advantage on the battlefield increasingly dependent on the private corporations.[59] Given the liberal U.S. foreign investment laws, it is possible that foreign entities may now be able to invest in the early stages of defense technology companies and even have the potential to purchase these companies on the open market. Not only would this allow the Chinese government to access the latest U.S. defense technology through one of its tech companies, but it would also make these U.S. companies off limits for the DOD.[60] When advanced technology has the potential to determine military superiority, potential Chinese

52. *Id.*
53. *Id.*
54. *Id.* at 371.
55. *Id.* at 370.
56. David R. Fitzgerald, *Leaving the Back Door Open: How Export Control Reform's Deregulation May Harm America's Security*, 15 N.C.J.L. & TECH. ON. 65, 69 (2014).
57. *Id.*
58. *Id.* at 69-70.
59. *Id.* at 69.
60. Stewart, *supra* note 38.

access to U.S. military procurement streams creates significant national security concerns.

## *D. Integration of U.S. and Chinese AI Industries*

In addition, the integration of U.S. and Chinese AI industries increase the likelihood of technology transfer. The connection between these industries is evident within the commercial sphere and in academia. [61] One area within the commercial sphere where co-mingling occurs is in research and development centers. Chinese companies have set up research centers in U.S. technology hubs in order to increase access to industry knowledge and share ideas with U.S. entrepreneurs in the field. In 2013, Baidu set up the Institute for Deep Learning in Silicon Valley, where it created software matching skills in human speech two years before it was accomplished by the Microsoft AI lab.[62] In addition, the Zhong Guan Cun Innovation Center, a research center and start-up incubator was opened in Santa Clara, California in 2016 with significant funding from the Chinese government.[63] U.S. companies have also funded research and development centers in China that work on AI systems.[64] This interconnectedness has notable benefits for the U.S. AI industry as these exchanges facilitate access to Chinese AI experts and ideas, but it also increases the potential that AI technology incubated in these centers will be transferred back to China for use by the Chinese government.

The academic setting is another place where technology transfer is increasingly taking place.

A large amount of cutting-edge AI technology is being developed in U.S. universities, and policies of openness, exchange, and academic freedom in these institutions make new developments easier to access by foreign nationals. At present, it is estimated that 25% of the graduate students at U.S. universities in STEM (Science, Technology, Engineering & Mathematics) fields are Chinese foreign nationals.[65] As a result, Chinese graduate students master the technologies that will later become critical to next generation industrial and military systems. In addition to the number of Chinese nationals enrolled in AI programs at U.S. universities as students, Chinese government employees have been known to audit AI courses to gain access to technological know-how.[66] Professors at Stanford University, a major hub of AI research near Silicon Valley, have noticed this phenomenon.[67] It is particularly pronounced as

61. Alderman & Ray, *supra* note 13, at 2.
62. Markoff & Rosenberg, *supra* note 29.
63. Brown & Singh, *supra* note 3, at 18.
64. Alderman & Ray, *supra* note 13, at 3.
65. Brown & Singh, *supra* note 3, at 17.
66. Markoff & Rosenberg, *supra* note 29.
67. *Id.*

many of their students prefer to watch lectures from home on video, while Chinese nationals auditing the course will instead be present at the front of the class.[68] All in all, the industry is marked by extreme fluidity with and between both countries' commercial industry and academia, which are both connected to the defense industrial base.[69]

## *E. China's Tech Companies in Close Cooperation with State*

While the above factors have shown how U.S. AI technology can be more easily transferred to Chinese companies, the close cooperation of Chinese tech giants with the Chinese Communist Party makes it possible for these technologies to be accessed by the Chinese government entities. In the age of Xi Jinping, the dividing line between private industry and state-subsidized or controlled companies has become increasingly cloudy. Chinese technology companies, who once shunned association with the Chinese Communist Party are now actively promoting their connection to it.[70]

More than thirty-five tech companies have instituted party committees in recent years that assess a company's objectives to ensure that they do not stray too far from party objectives.[71] In order to curry favor with the government, three of the biggest tech groups, Baidu, Alibaba, and Tencent – have been careful to demonstrate loyalty to the party. Robin Li, the chairman of Chinese tech giant Baidu, is also a Chinese Communist Party National Committee member.[72] Ties to the party that would previously have been obscured to please foreign investors, are now seen as being good for their brands. There is also a perception that no company can get ahead in China without aligning itself with the party's goals.

A close connection to the Chinese government with a national strategic focus, means that it will not be long before that technology is accessed by the Chinese military. One example of this is the Chinese company Iflytek, which created an award-winning speech recognition technology, and has a close relationship with the government for the development of surveillance technology.[73] While the Chinese Communist Party has the right to be concerned with the growing power of tech giants amassing cash and user data, the government under Xi Jinping will keep them close to make sure that

68. *Id.*

69. Alderman & Ray, *supra* note 13, at 2.

70. Emily Z. Feng, *Chinese Tech Groups Display Closer Ties w Communist Party*, THE FIN. TIMES (Oct. 10, 2017), www.ft.com/content/6bc839c0-ace6-11e7-aab9-abaa44b1e130?mhq5j=e5.

71. *Id.*

72. *Id.*

73. Markoff & Rosenberg, *supra* note 29.

any advanced technology that is transferred from U.S. industries is made available for government purposes.

In sum, strategic asset seeking behavior by Chinese companies in the U.S. has enabled technology transfer through investment and acquisitions. The open and diffuse nature of AI systems, the off-the-shelf nature of defense procurement, the integrated Chinese and U.S. AI industries, and the connection of Chinese tech companies to the Chinese Communist Party all make for an environment conducive to technology transfer. When you combine this open environment with a Chinese national strategy focused on the acquisition and development of AI technologies, it demonstrates the potential for a direct pipeline from U.S. technological development to Chinese military advancement. The potential for this technological pipeline has sparked national security concerns and calls for increased regulation of Chinese investment in the AI industry.

# IV. THE U.S. FOREIGN INVESTMENT REGULATORY REGIME

## *A. Foreign Investment and National Security*

The U.S. has historically taken a liberal policy toward foreign direct investment over the last several decades, emphasizing a maximum degree of openness to foreign investment.[74] The domestic benefits of foreign investment have included the rescue of iconic U.S. companies, the injection of innovative new business practices, and increases in the pool of venture capital. [75] Despite these economic benefits, foreign direct investment also brings with it certain national security risks. In particular, foreign investment may threaten national security by rendering U.S. companies excessively reliant on a foreign-owned entity. It may allow a foreign entity to use newly acquired technology to harm U.S. national interests, or cause infiltration or sabotage by foreign government.[76] An open foreign investment climate increases the potential for acquisitions by foreign companies that transfer assets to an individual or company that answers to a foreign government.[77] With these security concerns in mind, the fundamental challenge becomes balancing the national security risks with the economic benefits of foreign investment.[78]

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74. Joana Rubin Travalini, *Foreign Direct Investment in the United States: Achieving a Balance between National Economy Benefits and National Security Interests*, 29 NW. J. INT'L L. & BUS. 779, 781 (2009).

75. *Id.*

76. Timothy Webster, *Why Does the United States Oppose Asian Foreign Direct Investment?* 37 NW. J. INT'L L. & BUS. 213, 244 (2017).

77. Travalini, *supra* note 74, at 781.

78. *Id.* at 779.

## *B. Foreign Investment Regulation in the U.S.*

In order to mitigate the national security risk inherent in foreign investment, Congress created the Committee on Foreign Investment in the United States (CFIUS). President Gerald Ford agreed to create CFIUS in response to congressional studies that indicated the U.S. did not maintain an adequate mechanism for monitoring foreign investments.[79] The committee is charged with monitoring foreign investment and "coordinating implementation of United States policy on such investment"[80] The current CFIUS process begins when a voluntary notice is filed by the foreign investor with the Treasury Department. That filing is then circulated to committee members, including twelve U.S. government agencies, with Treasury, Homeland Security, Commerce and the Justice Department taking the most active roles.[81] The Office of International Investment of the Department of Treasury generally administers the review, but the DOD is particularly influential when evaluating national security implications.[82]

CFIUS often focuses on transactions where the target U.S. company has export-controlled technologies or when the transaction may result in the absence of U.S. companies supplying technology that is critical to national defense.[83] After a thirty-day review, the committee must approve the transaction or determine that an additional forty-five-day investigation is warranted.[84] In assessing the national security risk, CFIUS evaluates the threat level of the particular buyer in addition to assessing the vulnerability of the particular assets being acquired.[85] After an investigation is conducted, CFIUS may elect to enter into an agreement with the parties that mitigates the national security risks of the transaction by imposing conditions on the foreign company.[86] Mitigation agreements may include selling off certain assets, restricting access to certain locations, restricting certain technologies to specific personnel, or submitting to additional inspections or reporting requirements.[87]

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79. *Id.* at 783.

80. *Id*.

81. *Id.*

82. Travalini, *supra* note 74, at 784.

83. *Id.* at 786.

84. AMERICAN BAR ASSOCIATION, HANDBOOK OF EXPORT CONTROLS AND ECONOMIC SANCTIONS, 216 (Kay C. Georgi & Paul M. Lalonde eds. 2013).

85. Stewart A. Baker et al., *Navigating Joint CFIUS and DSS Jurisdiction*, Steptoe & Johnson, LLP (Mar. 3, 2015), www.steptoe.com/publications-10272.html.

86. AMERICAN BAR ASSOCIATION, *supra* note 84, at 217.

87. Thilo Hanemann & Daniel H. Rosen, *Chinese Investment in the United States: Recent Trends and the Policy Agenda*, RHODIUM GROUP 90 (Dec. 9, 2016),

Alternatively, CFIUS may decide to submit a report to the President, who then has fifteen days to decide whether to permit or block the transaction.[88] The ability of the President to block foreign investment transactions with national security risks was established by the 1988 Exon-Florio Act, which is the statutory authority supporting CFIUS.[89] Congress passed Exon-Florio to give the President authority to block such transactions when it is determined by CFIUS that the "foreign interest exercising control might take action that impairs the national security."[90] The legal standard for the President to block or suspend transactions under the CFIUS statue is the existence of "credible evidence" that the transaction does not just impact national security, but that it "threatens to impair," or poses a risk to national security.[91] In addition, the President must find that other provisions in the law provide him with inadequate authority to address these national security risks.[92]

Congress broadened the authority of CFIUS even further by passing the Foreign Investment and National Security Act of 2007 (FINSA), which amended the Exon-Florio statute.[93] FINSA expanded the CFIUS mandate to cover critical infrastructure and technologies as well as strengthened congressional oversight by extending time periods for investigation and review of transactions.[94] Another important aspect of FINSA was that it made a CFIUS investigation mandatory if the investment transaction involved a foreign government entity or a state-owned enterprise (SOE).[95] This was important to China because a large portion of Chinese foreign investment flows through SOEs.

In sum, CFIUS seeks to monitor foreign investments to protect national security, while maintaining an open U.S. investment environment. Because the term "national security" is never defined, however, the committee must make a determination on a case-by-case basis. The rules are intentionally ambiguous to give regulators the discretion that helps protect CFIUS classified intelligence assessment, but this ambiguity is one of the leading criticisms of foreign investors.[96] Investors can never fully exclude the possibility that a foreign investment transaction will threaten national

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rhg.com/reports/chinese-investment-in-the-united-states-recent-trends-and-the-policy-agenda.

88. AMERICAN BAR ASSOCIATION, *supra* note 84, at 217.

89. 50 U.S.C.A. § 4565 (2015).

90. Travalini, *supra* note 74, at 784.

91. James K. Jackson, *The Committee on Foreign Investment in the United States (CFIUS),* CONG. RES. SERV. 41-42 (Oct. 11, 2017), fas.org/sgp/crs/natsec/RL33388.pdf.

92. FOLSOM, *supra* note 49, at 274.

93. 50 U.S.C.A. § 4565(2)(E) (2015).

94. Travalini, *supra* note 74, at 793.

95. *Id*. at 795.

96. Webster, *supra* note 76, at 269.

security, making it difficult for them to know when a CFIUS filing will be necessary.[97] In addition, once CFIUS renders its opinion there is no way to challenge it because the Exon-Florio amendment prohibits judicial review of the President's decision.[98] Exon-Florio and FINSA give CFIUS broad powers that it has exercised in the past to restrict foreign investment in the U.S. due to national security concerns.

## *C. Past High-Profile CFIUS Action Against Chinese Investors*

Despite this broad authority, CFIUS review has only very rarely prompted the President to block a transaction or order a forced divestiture.[99] One major forced divestiture occurred in 1990, when the U.S. directed China National Aero-Technology Import and Export Corporation (CATIC) to divest its acquisition of MAMCO Manufacturing, Inc., a Seattle-based aircraft manufacturing firm.[100] This divestiture was ordered because of concerns over CATIC's potential acquisition through MAMCO of restricted technology that would have otherwise required a dual-use export license.[101] Dual-use export licenses are required for companies that export products with both civilian and military applications.[102] If a CFIUS filing describes any business activities that require such a license, it can trigger additional scrutiny from the Directorate of Defense Trade Controls.[103] As a result of these concerns, President George H.W. Bush gave CATIC three months to sell off its new acquisition under government watch.[104]

However, the President does not always have to take action for a deal to collapse under CFIUS scrutiny. Oftentimes, the publicity surrounding a CFIUS investigation alone is enough to negatively impact the transaction. From 1990-2017, firms in nearly half of the transactions investigated by CFIUS have chosen to withdraw rather than face scrutiny.[105] One of the most high profile voluntary withdrawals occurred in 2005 when China's National Offshore Oil Company (CNOOC) decided to drop its bid to acquire U.S. oil company Unocal in part due to CFIUS concerns.[106] During

97. *Id.* at 246.
98. *Id.* at 270.
99. FOLSOM, *supra* note 49, at 278.
100. Jackson, *supra* note 91, at 6.
101. *Id.*
102. AMERICAN BAR ASSOCIATION, *supra* note 84, at 217.
103. *Id.*
104. Stuart Auerbach, *President Tells China to Sell Seattle Firm*, THE WASHINGTON POST (Feb. 3, 1990), www.washingtonpost.com/archive/politics/1990/02/03/president-tells-china-to-sell-seattle-firm/4e2521e2-3ba1-4d9b-a864-ec512a607a28/?utm_term=.086256c38873.
105. Jackson, *supra* note 91, at 25.
106. Travalini, *supra* note 74, at 788.

CNOOC's failed acquisition of Unocal, CFIUS review perceived a threat to the energy security of the U.S. because the state-owned and state-subsidized nature of CNOOC made the transaction seem like a strategic takeover rather than a purely commercial transaction.[107] Concerns were also raised that the transaction would allow for the transfer of certain advanced drilling technologies to China.[108] Because of the scrutiny from CFIUS, CNOOC eventually withdrew its bid and Unocal accepted a bid that was considerably less from the American company Chevron.[109]

In another high profile voluntary withdrawal, Huawei Technologies withdrew its offer in 2008 to purchase 3Com, a company that specialized in networking equipment and software.[110] 3Com produced the Tipping Point cybersecurity software that was, at that time, used by various U.S. defense firms to prevent outside groups from accessing their confidential databases.[111] The offer was reportedly withdrawn after failure to agree with CFIUS on a mitigation agreement.[112] Commentators were split over whether there was a real national security threat, but concerns over the potential for facilitation of cyber-espionage surfaced, given the company's close ties to the Chinese military.[113] However, a report by the House Intelligence Committee disclosed no concrete evidence of a national security threat and this information was corroborated by the fact that Huawei had operated all over the world without any reports of security breaches.[114] Even 3Com's offer to divest itself of the anti-hacking software failed to move President George W. Bush's administration to approve the transaction.[115]

In 2017, President Trump exercised his authority under Exon-Florio by blocking a Chinese investor from taking over the Lattice Semiconductor Corporation.[116] This was only the fourth time in the history of CFIUS that a president had blocked a foreign takeover of a U.S. company based on national security risks.[117] The explanations given by the White House for blocking the transaction were the "importance of semiconductor supply chain integrity to the United States government, and the use of Lattice products by the

107. *Id.*

108. *Id.*

109. *Id.* at 789.

110. Steven R. Weisman, *Sale of 3Com to Huawei is Derailed by U.S. Security Concerns***,** N.Y. TIMES (Feb. 21, 2008), www.nytimes.com/2008/02/21/business/worldbusiness/21iht-3com.1.10258216.html.

111. *Id.*

112. *Id.*

113. Webster, *supra* note 76, at 246.

114. *Id.*

115. Weisman, *supra* note 110.

116. David McLaughlin, Jennifer Jacobs, & Miao Han, *Trump Blocks China-Backed Bid for Chipmaker Over Security Risk*, BLOOMBERG (Sep. 13, 2017, 3:00 PM), www.bloomberg.com/news/articles/2017-09-13/trump-blocks-china-backed-bid-for-chipmaker-over-security-risk.

117. *Id.*

United States government."[118] However, since President Trump was elected, some have seen a reduced willingness to resolve national security risks in favor of negotiated mitigation and increased consensus in prohibiting transactions.[119] Given that there also seems to be an emerging bipartisan Congressional consensus that CFIUS needs to be strengthened, there is a strong potential for new foreign investment restrictions.[120]

## *D. New Potential Legislation Updating CFIUS*

Current congressional efforts to revise the CFIUS procedures are driven broadly by concerns that CFIUS can negotiate mitigation agreements without extensive oversight.[121] Defense Secretary Jim Mattis has called CFIUS "outdated," and leading Republican Senator Cornyn is spearheading CFIUS reform based on concerns that China is using investment as part of a strategy to leapfrog U.S. technology advantages.[122] These statements reflect a widespread belief among policymakers that current CFIUS procedures are inadequate to combat the growing threat of technology transfer to China.[123]

Senator Cornyn's proposed legislation, the Foreign Risk Review Modernization Act (FRRMR) has the potential to enshrine new foreign investment restrictions into CFIUS and impact Chinese investment in AI technology.[124] The bill would expand the jurisdiction of CFIUS to include the review of joint ventures that involve technology transfer, even if those joint ventures do not result in control of a U.S. business.[125] Currently, CFIUS does not have the authority to review transactions that result in technology transfer if they do not involve control. In addition, minority investment as low as 10% would trigger CFIUS review as long as the stake involved control.[126] While Senator Cornyn made it clear that he would not call out any country by name, he has indicated that the bill would add a new country-specific framework that would

118. *Id.*

119. Covington & Burling, LLP, *Update on CFIUS Developments: Proposed Legislation and Reflections on CFIUS Under the Trump Administrations* 1 (June 23, 2017), www.cov.com//media/files/corporate/publications/2017/06/update_on_cfius_developments_proposed_legislation_and_reflections_on_cfius_under_the_trump_administration.pdf.

120. *Id.* at 3.

121. Travalini, *supra* note 74, at 792.

122. Stewart, *supra* note 38.

123. Covington & Burling, LLP, *supra* note 119, at 2.

124. Diane Bartz, *Leading U.S. Senator Urges Changes in Foreign Investment Rules*, THOMSON REUTERS (Jun. 26, 2017, 3:45 PM), www.reuters.com/article/us-china-usa-investment-cornyn/leading-u-s-senator-urges-changes-in-foreign-investment-rules-idUSKBN19H2I5.

125. Covington & Burling, LLP, *supra* note 119, at 2.

126. *Id.*

require the committee to apply heightened scrutiny to certain countries of concern, like China.[127] Finally, although the legislation does not single out specific technologies, an aide to the Senator stated that AI technologies are an area of particular concern given that the export control system has not yet figured out how to cover them.[128]

At this time, there is still no clear departure from long-standing U.S. policy of openness to foreign investment. However, it does appear that the stars have aligned for a new wave of targeted investment restrictions. Although the increased restrictions may not target Chinese investors by name, it seems apparent that the motivations behind the restrictions are to stop Chinese companies from acquiring U.S. companies for the purposes of technology transfer. Senator Cornyn's bill may assuage national security concerns, but, by restricting investment, the bill could bring about far reaching negative economic consequences for the U.S. economy.

# V. ECONOMIC IMPACT OF INVESTMENT REGULATION

## *A. Reductions in Competitive Economic Advantage*

If Congress enacts the FRRMR and places new restrictions on Chinese investment, it may have a negative economic impact on the U.S. AI industry and, in turn, have a negative impact on the U.S. economy as a whole. [129] The impact of AI on productivity has the potential to be transformative across industries, causing businesses that fail to adapt or adopt the new technology to be undercut on costs and lose significant market share[130] As AI, and in particular machine-learning applications, have the potential to drive productivity gains in the manufacturing industry, the U.S. could end up missing out on the innovations that create future competitive economic advantages.[131] Although this reduction in competitive advantage may not be felt immediately due to current U.S. technological superiority, erosion may begin with the reduction

127. *Id.* at 3.

128. Stewart, *supra* note 38.

129. *See* U.S. NAT'L SCI. & TECH. COUNCIL, *The National Artificial Intelligence Research and Development Strategic Plan* 15 (Oct. 2016), www.nitrd.gov/PUBS/national_ai_rd_strategic_plan.pdf (reporting that AI advancements are providing many positive benefits to society and are increasing U.S. national economic competitiveness.).

130. Dr. Anand S. Rao & Gerard Verweij, *Sizing the Prize: What's the Real Value of AI for Your Business and How Can You Capitalize?* PRICEWATERHOUSECOOPERS INT'L LTD. 5 (2017), www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html (last visited Nov. 15, 2017).

131. Bughin, *supra* note 10, at 4.

in the pool of venture capital for AI technology and the loss of knowledge spillovers from Chinese companies operating in the U.S.

Placing restrictions on one of the biggest foreign investors in the U.S. AI industry may effectively reduce the pool of venture capital in the U.S. as well as reduce the potential for knowledge spillovers as a result of Chinese investment. CFIUS review effectively places a large burden on early-stage companies that may be considering an infusion of Chinese investment.[132] This would likely reduce foreign investment because some companies would not be willing to risk the financing delays that come with CFIUS review.[133] The recent U.S. government report downplays the potential reduction in the pool of venture capital due to the fact that Chinese investment still only makes up a small share of the total venture investment in the technology sector.[134] In an era of tighter funding, however, Chinese investments are still a significant factor in Silicon Valley venture capital funding. One AI start-up founder who received funding from Tencent and other Chinese investors acknowledged candidly that, "start-up fundraising in Silicon Valley wouldn't function without Chinese money."[135] If the U.S. acts to place greater restrictions on foreign investment, it will reduce the pool of venture capital and the U.S. economy may miss out on funding the next great AI start-up company.

The U.S. regulatory action also has the potential to deprive the U.S. AI industry of knowledge inputs from Chinese firms and Chinese talent that can increase the competitiveness of the industry. Focus on the transfer of technology from the U.S. to China ignores the fact that U.S. companies can gain knowledge from collaborating with Chinese companies. In the United States, much of the emerging talent in the industry is Chinese, as Chinese authors lead the world in publishing journal articles on "deep learning," which is a critical issue in developing AI.[136] The collaboration with Chinese scientists and entrepreneurs made possible by Chinese investment provides an important input to innovation in the U.S. industry. In addition, if Chinese investment in the U.S. AI industry dries up, U.S. researchers may lose access to the rich pool of Chinese datasets that are so valuable to machine-learning applications. China is rich in the data used to train these systems due to the fact that there are fewer privacy restrictions to

132. Brown & Singh, *supra* note 3, at 26.

133. *Id*.

134. *See Id.* (Chinese total venture financing in the U.S. is 2-3%, and the contribution to the technology mergers & acquisitions market is about 12% of the total.).

135. Elizabeth Dwoskin, *China is Flooding Silicon Valley with Cash. Here's What Can Go Wrong,* THE WASH. POST (Aug. 6, 2016), www.washingtonpost.com/business/economy/new-wave-of-chinese-start-up-investments-comes-with-complications/2016/08/05/2051db0e-505d-11e6-aa14-e0c1087f7583_story.html?utm_term=.b6f2edbe0f43.

136. U.S. Nat'l Sci. & Tech. Council, *supra* note 129, at 13.

data collection than in Western countries.[137] Indeed, Kai-Fu Lee founder of Microsoft's Beijing Research Lab, in his recruiting trip to MIT in 2017, uses the fact that China has "way more data" to sell students on starting their company in China instead of Silicon Valley.[138]

Chinese companies that do continue to invest in U.S. AI technology, despite new restrictions, will face increased transaction costs and regulatory uncertainty. Regulatory uncertainty generally deters business investment and creates cost uncertainty for foreign investors. This uncertainty is partially created by the broad definition of national security, making it increasingly difficult to determine which investments will be declared security threats.[139] Not only do potential foreign investors need to consider the additional transaction costs and risks of security reviews, but also the fact that additional concessions may be required to finalize the transactions.[140] The burdens of the current CFIUS process are already placing a strain on potential foreign investment, additional restrictions may discourage foreign investment further. The combination of reductions to the pool of venture capital and the loss of potential knowledge inputs, and increased transaction costs may drag down start-up activity in the AI industry and rob the U.S. economy of the future innovations that will drive productivity gains and competitive advantage.

## *B. Relocation of Research and Development Centers Abroad*

The potential relocation of U.S. AI research and development centers to other countries is another negative drawback to increases in investment restrictions. The very nature of AI technology makes it relatively easy to relocate these projects when favorable economic conditions are available elsewhere. Participants in AI projects may be located in multiple countries and have no formal contractual relationship with one another.[141] The low cost of infrastructure and small physical footprint associated with AI projects means that firms can simply move development work offshore if regulations prove too onerous.[142] In addition, attempts by any one country to regulate participation in such projects may not impact the development of such projects.

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137. Will Knight, *China's AI Awakening,* M.I.T. TECH. REV., 68 (Oct. 10, 2017), www.technologyreview.com/s/609038/chinas-ai-awakening/.

138. *Id.* at 69.

139. James F. Carroll, *Back to The Future: Redefining The Foreign Investment and National Security Act's Conception of National Security*, 23 EMORY INT'L L. REV. 167, 188 (2009).

140. Travalini, *supra* note 74, at 796.

141. Scherer, *supra* note 5, at 372.

142. *Id.*

At the moment, investment in AI research and development currently remains concentrated in a few technology hubs in the U.S. and China, with Europe lagging far behind.[143] However, China is also helping to establish and fund new research and development centers in Europe.[144] If the U.S. enacts more restrictions on Chinese investment, China may simply redirect that investment to Europe. Indeed, it appears that Europe would be ready to step into any void created by an American abdication of leadership in innovation.

Currently, the only strong AI start-up cluster in Europe is in London, but start-up activity in Germany, France, and the Nordic region is growing. In addition, Facebook is already opening an AI lab in Paris that will supplement its U.S. facilities and make it easier to recruit European talent.[145] Google recently invested $4.5 million in the Montreal Institute for Learning Algorithms, a research lab at the University of Montreal, Canada.[146] If legislation is overly aggressive, these U.S. AI companies may even consider relocating their research and development activities overseas to take advantage of talent and data synergies that are restricted in the U.S.

The relocation of AI research and development centers abroad would also reduce the Defense Department's access to next-generation technology as the new breakthroughs would increasingly occur outside of the country. Investment restrictions would further increase the distance between U.S. technology industry and the government, which is already strained due to fallout from the Edward Snowden affair.[147] At present, Peter Theil's company, Palantir, is one of the few U.S. companies that is working with the Pentagon's Defense Innovation Unit Experimental (DIUx) Facility, which incorporates AI into defense applications.[148] The lack of cooperation between the U.S. government and private industry undercuts U.S. security by reducing opportunity for synergies with the very same domestic commercial companies that the military depends upon for "off-the-shelf technology procurement."[149] In this manner, improving the economic position of U.S. commercial industry and keeping research and development close to home has the side-effect of improving national security.[150] Therefore, not only would restricting investment have the potential to drive research abroad, and cause the U.S. industry to lose out on

143. Bughin, *supra* note 10, at 13.
144. Alderman & Ray, *supra* note 13.
145. Bughin, *supra* note 10, at 10.
146. *Id.*
147. Allen & Chan, *supra* note 17, at 52.
148. Markoff & Rosenberg, *supra* note 29.
149. Fitzgerald, *supra* note 56, at 70-71.
150. Kurtis J. Zinger, *An Overreaction that Destroyed an Industry: The Past, Present, and Future of U.S. Satellite Export Controls*, 86 U. COLO. L. REV. 351, 375 (2015).

new jobs created by this investment, it would also weaken the U.S. security position.

### *C. Relocation of the Expert Talent Pool*

If research and development centers are relocated to other countries, top experts in AI will be sure to follow, reducing the pool of AI talent in the United States. The U.S. government recognizes that in order for strategic AI research goals to be met, the U.S. will need a substantial research and development workforce.[151] Because most of that workforce will need to be reskilled to exploit advantages created by AI, countries seeking to become global hubs of AI development will need to compete to attract the best talent.[152] The U.S. strategic report recognizes that talent is in short supply and that universities and private industry are already engaged in a battle to recruit top AI talent.[153]

Many of the true experts in the field are already being snapped up by giants like Alibaba, Baidu, Amazon, Facebook, and Google. Gansha Wu, former director of Intel's lab in China, left his post to create Uisee Tech, a start-up self-driving car company.[154] Qi Lu, head of Microsoft's AI group, left to join Baidu in January 2017.[155] When Tencent opened its AI research facility in Seattle, it was headed by former Microsoft scientist, Yu Dong.[156] Tencent, in particular, is luring talent to its home AI lab in Shenzhen, China where it already has more than fifty researchers and 200 engineers.[157] Shenzhen has become a hub of AI research itself, with the headquarters of Chinese technology companies like Huawei and ZTE, in addition to Tencent.[158] In fact, competition for talent is so ferocious, that these tech giants are resorting to actively buying AI start-ups as a way to acquire technology experts. Some companies are paying between $5 to $10 million for each "acqui-hire."[159] The war for experts in AI has already begun and, with Chinese companies making sizable gains, U.S. actions to drive away one of the industry's biggest investors could encourage top talent to leave the United States.

Many in the industry believe that America's best chance at retaining talent and superiority in the AI industry is to maintain the "vibrant, open, R&D culture [that] has made it the global hub"

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151. U.S. NAT'L SCI. & TECH. COUNCIL, *supra* note 129, at 35.

152. Bughin, *supra* note 10, at 4.

153. U.S. NAT'L SCI. & TECH. COUNCIL, *supra* note 129, at 35.

154. Markoff & Rosenberg, *supra* note 29.

155. *Id.*

156. THOMSON REUTERS, *A Chinese Tech Giant is Setting Up an A.I. Research Lab on Amazon's Home Turf* (May 2, 2017, 3:03 AM), https://www.cnbc.com/2017/05/02/tencent-ai-research-lab-seattle.html.

157. *Id.*

158. Knight, *supra* note 137, at 70.

159. Bughin, *supra* note 10, at 11.

for ideas and investment.[160] The U.S. has fostered a culture of technological innovation in large part by embracing new ideas regardless of the nationality of the idea's creator. However, recent rhetoric by the Trump Administration on immigration and the proposal for reduction of H1B visas make it less likely these Chinese nationals, or other foreign nationals with STEM degrees, will want to apply their skills in the U.S. even if they have the opportunity.[161] When coupled with hostility to Chinese investors, these negative perceptions have the potential over time to decrease the likelihood that the U.S. will be able to attract and retain the best talent in AI. Canada launched a $117 million campaign in 2017 to attract scholars unhappy with political trends like Brexit and the election of Donald Trump.[162] The campaign is already having notable success, landing high-level STEM researchers from several prominent American universities.[163] Europe also stands ready to absorb top talent leaving the United States. After his election in early 2017, French President Emmanuel Macron seized on this perception and made an unprecedented public plea to lure U.S. scientists, academics, and entrepreneurs concerned with restrictions on science and innovation.[164]

Analysts have used a chess analogy to describe the current distribution of expert talent in the AI industry, saying that while the grandmasters are still in the United States, the Chinese have increasingly more master level scientists.[165] Although the U.S. may have the advantage in talent at present, the Chinese grandmasters of the next generation will be less likely to apply their talents in the U.S. with increased restrictions on Chinese investment. Moreover, a restrictive investment environment driven by anti-immigrant sentiment may discourage new STEM talent from coming to the U.S. and discourage current talent from staying. Therefore, given the global competitive landscape for recruitment, restricting investment from Chinese companies would be counterproductive to the goal of retaining top AI talent.

160. Simonite, *supra* note 37.

161. *Id.*

162. Press Release, TRI-AGENCY INSTITUTIONAL PROGRAMS SECRETARIAT OF CANADA, *Canada's Brain Gain. Round 2.,* (Mar. 29, 2018), www.canada150.chairs-chaires.gc.ca/news_room-salle_de_presse/news_releases-communiques_de_presse/2018/march-mars-2018-eng.aspx.

163. *Id.*

164. *Macron Offers Refuge in France to U.S. Scientists, entrepreneurs*, THOMSON REUTERS (Feb. 4, 2017, 12:12 PM), www.reuters.com/article/us-france-election-macron/macron-offers-refuge-in-france-to-u-s-scientists-entrepreneurs-idUSKBN15J0RQ.

165. Markoff & Rosenberg, *supra* note 29.

### *D. Potential Trade Retaliation to Investment Restrictions*

A final important potential economic drawback to restrictions on Chinese investment in the U.S. is that it may trigger a retaliatory response. China already has the perception that its companies face higher scrutiny and have been disproportionately targeted by CFIUS. Over the 2010 to 2014 period, Chinese investors have accounted for 19% of the transactions reviewed by CFIUS, despite the fact that Chinese investment in the U.S. was considerably less than that from some EU nations.[166] Chinese companies accounted for only about 0.3% of all foreign direct investment in the United States from 2011 to 2013, but voluntarily filed 54 CFIUS notices, which was more than any other country.[167] In contrast, companies from the United Kingdom constituted 18% of foreign investment in the U.S. during this time period, but only accounted for 49 notices.[168] The substantial amount of voluntary filings suggests that Chinese companies are approaching the U.S. market with caution, but still face significant hurdles due to a disproportionate amount of scrutiny from CFIUS.

Ratcheting up restrictions on Chinese investors already targeted by higher scrutiny may provoke China to enact retaliatory restrictions on U.S. companies investing in China. China has already shown that it is more than willing to respond with restrictive measures of its own when it feels that its companies are being unfairly targeted. China hinted at this possibility when it responded to potential U.S. probe of Chinese intellectual property violations by saying that it would "resort to all proper measures" to defend its rights.[169] Beijing's Ministry of Commerce further advised that protectionist moves would damage bilateral economic relations as well as "hurt the business interests of companies in both countries."[170] These statements are not empty rhetoric as China has a history of responding in kind to what it deems as U.S. protectionist trade measures. Whether it be in response to increased tariffs, anti-dumping actions, or increased regulatory scrutiny, China has shown that they are more than willing to use their economic leverage to make the U.S. pay a price for what it deems as actions designed to hurt their economic interest.[171]

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166. Jackson, *supra* note 91, at 22.

167. Webster, *supra* note 76, at 269.

168. *Id*.

169. Andrew Mayeda, *China Signals Retaliation After Trump's Call for Trade Review*, BLOOMBERG POL. (Aug. 14, 2017), www.bloomberg.com/news/articles/2017-08-14/trump-calls-for-review-of-china-ip-practices-as-trade-ties-sour.

170. *Id*.

171. Kevin Hamlin et al., *When the U.S. Moves on Trade, China Hits Back Fast*, BLOOMBERG (Nov. 17, 2016, 10:01 AM), www.bloomberg.com/news/

If the U.S. acts to impose new restrictions on Chinese companies investing in the U.S., the most damaging response may be simply to restrict the access of U.S. companies to the lucrative Chinese market. Losing access to a market with billions of potential customers is what U.S. tech companies fear the most. Silicon Valley firms are already hesitant to be seen working too closely with the U.S. government for fear of losing access to the Chinese market. [172] Larger firms like Google and Facebook are already negotiating concessions with Chinese government in exchange for market access and action by the U.S. government could further reduce their leverage.[173] A regulatory move that has negative consequences for U.S. businesses abroad could further widen the gulf between the tech industry and the U.S. government.

Moreover, singling out China for new restrictions, as Senator Cornyn does, is unnecessarily provocative because CFIUS already keeps a list of countries of concern. Mandating such a list may simply create more uncertainty for foreign investors and encourage more elaborate disguising of problematic transactions.[174] Given that U.S. firms are the largest global foreign direct investors, new restrictions could also raise questions about openness of the U.S. to foreign direct investment from other countries.[175] Although it is unclear how increased CFIUS action targeting China would impact U.S. direct investment worldwide, new restrictions could encourage other countries to ratchet up their protectionist trade measures. Given the risk of damage to U.S. economic interests from retaliation, it would be counterproductive for the U.S. to single out China for increased investment scrutiny.

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articles/2016-11-17/china-hits-back-fast-on-perceived-u-s-trade-slights-past-shows.

172. Markoff & Rosenberg, *supra* note 29.

173. Frank Tang, *Apple's Tim Cook and Google's Sundar Pichai Attend Chinese State-Run Internet Conference*, SOUTH CHINA MORNING POST (Dec. 3, 2017, 12:13 PM), www.scmp.com/news/china/economy/article/2122632/apples-tim-cook-and-googles-sundar-pichai-attend-chinese-state.

174. Matthew P. Goodman, *Global Economics Monthly: The China Challenge and CFIUS Reform*, CTR. FOR STRATEGIC & INT'L STUDIES (Mar. 3, 2017), www.csis.org/analysis/global-economics-monthly-china-challenge-and-cfius-reform.

175. Jackson, *supra* note 91, at 41.

## *E. Recommendations for a Smarter Policy*

Instead of increasing restrictions on Chinese investment in AI, a smarter policy would be to utilize the existing strengths of CFIUS, better fund government research organizations, and adopt an immigration policy that attracts top talent. Mitigation agreements and screening procedures utilized by CFIUS have shown that they can be effective in reducing the national security risk of foreign investment transactions. CFIUS should scrutinize transactions in a non-discriminatory, case-by-case manner according to concrete evidence of national security risk.[176] CFIUS should be able to maintain its flexibility by utilizing mitigation agreements, like selling off sensitive technology to domestic buyers, to reduce the potential for AI technology transfer to governments that are strategic competitors of the United States. For instance, in the Unocal-CNOOC transaction instead of effectively blocking the acquisition, CFIUS could have ordered Unocal to sell its seismic technology business to a third party, which would have denied the Chinese government access to this sensitive technology.[177] Structuring the transaction in this manner would have been an effective non-discriminatory utilization of the committee's powers that would be less likely to provoke a trade row.

If the concern is that certain foreign nationals cannot be trusted to refrain from the transferring advanced technology back to their home country, the appropriate course of action may be to better utilize CFIUS screening procedures. Employees of foreign corporations can be screened to help identify potential security vulnerabilities without blocking acquisitions.[178] This can be done through current CFIUS processes and may avoid the negative publicity that has the potential to kill the investment deal.

Instead of focusing on curtailing China's access to next-generation technology, the U.S. government should focus on providing funding and support for its own AI industry. The National Artificial Intelligence Research and Development Strategic Plan is a good start, but in order for the goals of the report to be achieved, the agencies involved in technological research and development need to be properly funded. China is putting huge amounts of funding behind its strategic "Made in China 2025" plan, whereas the budget plan introduced by the Trump Administration in 2017 contains huge cuts to the National Science Foundation (NSF), an agency that distributes grants for scientific research.[179] What's

176. Webster, *supra* note 76, at 246.

177. *Id.* at 244.

178. Carroll, *supra* note 139, at 199.

179. Joel Achenbach & Lena H. Sun, *Trump's Budget Seeks Huge Cuts to Science and Medical Research, Disease Prevention*, THE WASH. POST (May 22, 2017), www.washingtonpost.com/news/to-your-health/wp/2017/05/22/trump-budget-seeks-huge-cuts-to-disease-prevention-and-medical-research-

more, the same budget only slightly increased funding for the DOD science and technology budget, which includes programs like DARPA, the Defense Advanced Research Projects Agency.[180] Andrew Ng, who led advances in Facebook's AI program, did so with the help of DARPA and the NSF.[181] If the DOD has sufficient funding to produce technological innovations of its own, it may not need to rely heavily on "off-the-shelf" military technology. Therefore, funding programs that contribute to major advances in technology will enhance the U.S. economy as well as contribute to U.S. strategic national security goals.

In the long run, however, a smarter policy would also include enacting immigration reform that makes it easier for AI experts that are foreign nationals to stay in the U.S. and contribute to American technological innovation. Many STEM (science, technology, engineering & mathematics) graduates from U.S. universities that are foreign nationals might prefer to stay in Silicon Valley and start new companies if they were able to obtain green card status. This policy might entail increasing the pool of H1B visas in exchange for a commitment from graduates to work in the U.S. for a certain number of years. In short, if the U.S. can better utilize the mitigation and screening tools already at the disposal of CFIUS, support its private industry with fully-funded government research and development organizations, and institute immigration reform that helps retain the best talent, the U.S. AI industry will be able to manage national security risks while avoiding the economic drawbacks of tighter regulation.

## VI. CONCLUSION

Artificial intelligence is an incredible new technology with the power to transform our entire world. Its commercial applications can be as simple as playing your favorite song in the morning at the command of your voice or as complex as sifting through numerous data sets to find patterns that lead to productivity improvements in manufacturing processes. Unfortunately, the transformative nature of AI also means that it has tremendous national security implications. AI's potential to alter the balance of economic and military superiority in the world means that there will be a global strategic competition to obtain and harness this technology.

Although the U.S. currently enjoys an edge in the research and development of AI, current policies may not do enough to maintain that technological edge. The Chinese government is devoting massive resources to the research and development of AI in order to

departments/?utm_term=.8a704c0230b1.

180. Bruce Sterling, *Trump's Cutting Military Science?! Hey, That's Serious*, WIRED (Jun. 2, 2017, 3:41 AM), www.wired.com/beyond-the-beyond/2017/06/trumps-cutting-military-science-hey-thats-serious/.

181. Simonite, *supra* note 37.

catch up to U.S. technological capabilities. The ambitious goals set by the Chinese government have caused Chinese tech companies to invest in the U.S. AI industry as a way to acquire the latest generation of AI technology. The open nature of AI technology, the integrated U.S. and Chinese AI industries, the "off-the-shelf" nature of military procurement, and the close connection of Chinese tech companies to the Chinese Communist Party have created an environment that funnels advanced technology directly from U.S. tech companies to Chinese government entities. This transfer pipeline has understandably sparked concerns in Washington, which have led to calls to curtail Chinese investment in AI through CFIUS. While CFIUS is a sophisticated committee that has the ability to weigh and mitigate the national security risk of foreign investment transactions, oftentimes it has been used as a blunt instrument to block transactions with Chinese investors due to overblown national security concerns.

While proposed CFIUS reforms have the potential to address legitimate security risks, they also have the potential to create even greater economic drawbacks. These drawbacks include handicapping the AI industry with capital and knowledge restraints that have the potential to reduce U.S. competitive economic advantage. In addition, increased foreign investment restrictions may cause research and development centers and expert talent to relocate overseas where they can more easily collaborate with Chinese companies and the best minds regardless of nationality. Finally, China may use its economic clout and respond to increases in investment restrictions by curtailing the access of U.S. companies to the Chinese market.

Instead of counterproductive investment restrictions, the U.S. should consider a smarter AI policy, which would include better utilizing the flexible mitigation and screening procedures of CFIUS to mitigate national security risks. The U.S. should more fully fund its government research and development organizations to support and collaborate with private entrepreneurs in the industry instead of slashing funding. Most importantly, the U.S. should craft an immigration policy that encourages foreign nationals with advanced technology degrees to stay in the U.S. and contribute to U.S. innovation. The age of smart machines needs a new age of smarter U.S. policy.[182] Policymakers need to make sure that overstated security risks are not weighed more heavily than long-run economic gains. Otherwise, this regulatory overreach has the potential to set back the AI industry, the U.S. economy, and U.S. national security interests for generations to come.

182. Andrea O'Sullivan, *Don't Let Regulators Ruin AI*, M.I.T. TECH. REV. (Oct. 24, 2017), www.technologyreview.com/s/609132/dont-let-regulators-ruin-ai/.