UNTANGLING THE WEB: WHY THE U.S. NEEDS ALLIES TO DEFEND AGAINST CHINESE TECHNOLOGY TRANSFER

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EXECUTIVE SUMMARY

To defend against the transfer of sensitive technical information to China, the United States and its allies will need to be targeted, collaborative, and agile in their response. The Chinese government undertakes multiple, coordinated efforts to obtain sensitive information from U.S. and allied researchers. Many of these pathways and access points for technology transfer are legal or extralegal and therefore poorly understood or monitored by Western intelligence agencies.

In this paper, we aggregate preliminary data on three tools the Chinese Communist Party (CCP) uses to incorporate foreign technical information: scholarships for Chinese Ph.D. students abroad, technology entrepreneurship competitions, and foreign direct investments and acquisitions made by Chinese technology companies. Drawing on original datasets, we show how the United States and its allies can work together to protect sensitive technical information.

The goal of allied cooperation should not be to restrict China's access to all technologies, but to instead focus on countering particular acquisition methods and protecting specific technologies. When deciding which kinds of technologies deserve special protection, the United States and its allies should assess the potential risks to U.S. and allied economic security, the resilience of American and allied companies to withstand potential reprisal and loss of market share, and the rules of the road that will protect liberal democratic values and strengthen long-term economic competitiveness. Based on this analysis, we recommend the United States and its allies pursue two broad policy initiatives: gather more data — including open-source, publicly available records of technology transfer beyond China's Thousand Talents Plan — and coordinate investment screening procedures while mitigating risks to U.S. and allied companies.

INTRODUCTION

On January 28, U.S. federal authorities arrested Charles Lieber of Harvard University on charges of misleading the Department of Defense and the National Institutes of Health about his connections to China's Thousand Talents Plan. Thousand Talents is the most prominent of hundreds of similar initiatives that China undertakes to acquire foreign technology and know-how.

Lieber may be among the most well-known scientists suspected of participating in the Thousand Talents Plan, but his case is hardly the only cause for concern. In separate indictments the same day, U.S. authorities charged two other academics in the United States with providing false or misleading statements about their ties to China: one, a People's Liberation Army (PLA) Lieutenant who allegedly failed to disclose her ties to the Chinese military while studying at Boston University; the other, a former cancer-cell researcher at Beth Israel Deaconess Medical Center in Boston charged with attempting to siphon biological research back to China.[1]

China's efforts to attract overseas faculty are part of a larger technology transfer ecosystem centered around moving information and talent to China. In some cases,

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China's talent programs target students; in other cases, they seek to acquire foreign technology through strategic investments in infrastructure and research. The Director of the U.S. National Counterintelligence and Security Center, William Evanina, clarified in 2019 that "99.9% of Chinese students" in the United States "are here legitimately and doing great research and helping the global economy."[2] Still, the Chinese government continues its overseas talent push and appears to be casting an ever-widening net. How should the United States respond?

The question isn't hypothetical. While overseas talent recruitment programs constitute only a fraction of what has been called China's "multi-pronged approach to building up its talent base," it is a fraction amenable to discrete policy interventions.[3] An effective response begins with the understanding that the United States cannot tackle this challenge by going it alone.

The United States is a major target for Chinese industrial espionage, but far from the only one. This paper focuses on three tools the Chinese Communist Party uses to transfer foreign technical information from the United States and allied countries: scholarships for Chinese Ph.D. students abroad, technology entrepreneurship competitions, and foreign direct investments and acquisitions made by Chinese technology companies.[4]

Below we offer preliminary data on China's international talent recruitment programs, Chinese investment practices, and opportunities for the United States to cooperate with allies and partners for protecting sensitive technical information. We conclude with policy recommendations for the United States and its allies that distinguish between the overwhelming majority of Chinese students and scholars who study abroad for legitimate purposes and the small number who participate in the transfer of sensitive information.

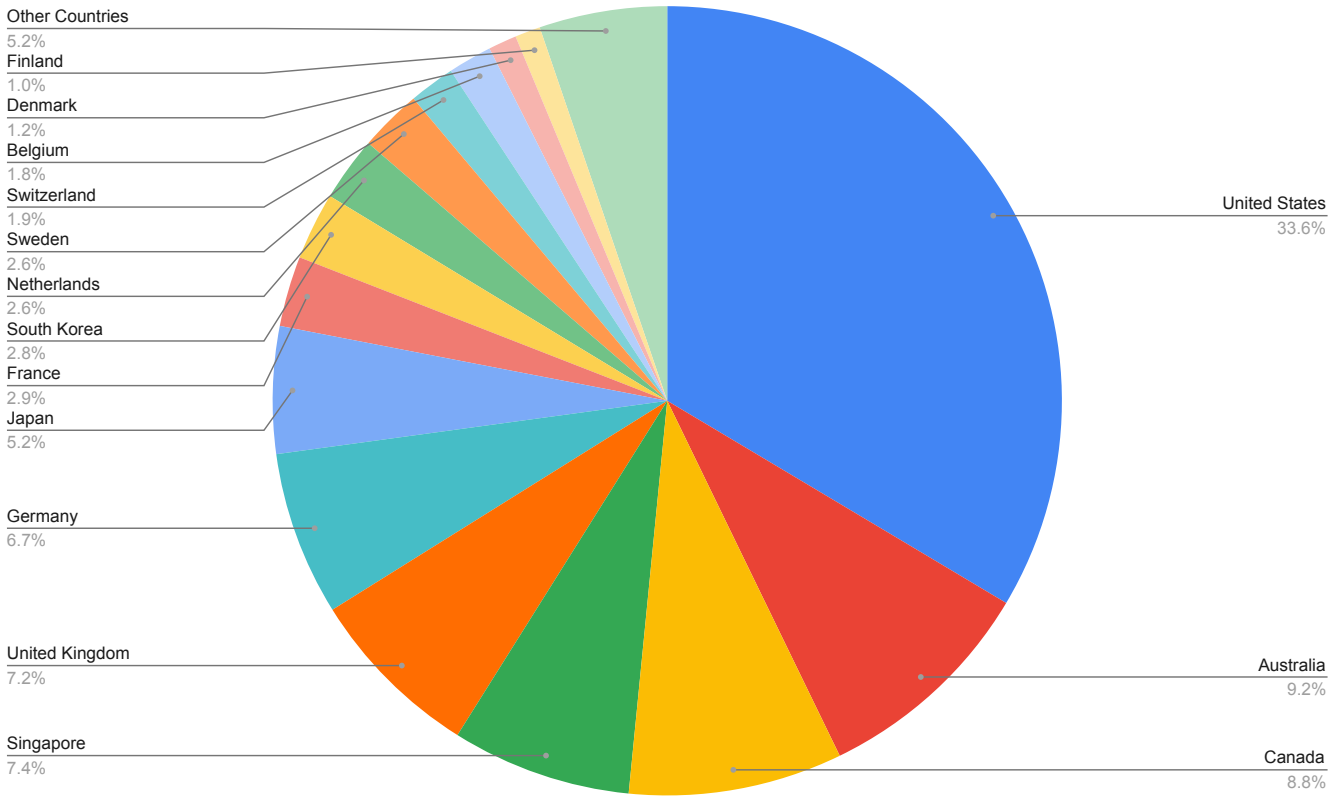
SCHOLARSHIPS FOR CHINESE PH.D. STUDENTS ABROAD

The China Scholarship Council (CSC), officially the "National Education Fund Management Committee," is the body responsible for administering China's National Scholarship Fund — last valued at 3.32 billion yuan ($469 million).[5] CSC awards scholarships to tens of thousands of Chinese students every year who want to study abroad, including undergraduates, graduates, Ph.D. students, and postdoctoral fellows. Ph.D. students and postdocs are most likely to study cutting-edge technologies of consequence to national security.[6]

One of the scholarships CSC administers, the National Outstanding Self-funded International Student Scholarship (NOSIS), is a merit award for Ph.D. students and postdocs who are studying at elite foreign universities, but whose studies are not otherwise funded by the Chinese government. The scholarship is designed to persuade Chinese students to return to China after their studies abroad, or otherwise "encourage them to return to work or serve the country in various forms."[7] Awards can range in value from $6,000 to $10,000, and applicants must have already completed at least one year of graduate study. CSC has awarded NOSIS scholarships to 6,415 Chinese students since the program was established in 2003, and continues to fund 500 students per year.[8] NOSIS recipients represent only a fraction of Chinese Ph.D. students abroad (CSC sponsors 10,000 Chinese Ph.D. students and postdoctoral researchers to study abroad each year). However, the Chinese Communist Party actively courts this group of self-funded Ph.D. students and postdocs. An analysis of NOSIS recipients offers insight into the Chinese government's wider technology transfer priorities.[9]

Of the 2,500 Chinese Ph.D. students and postdocs who received NOSIS scholarships between 2014 and 2018, only one third (839 people) were studying in the United States:

FIGURE 1: CHINESE NOSIS SCHOLARSHIP AWARDEES BY COUNTRY OF PH.D. OR POST-DOC STUDY, 2014–2018



Source: Authors' calculations based on data from the China Science News Agency and China Scholarship Council, 2014-2018.

One of the largest organized cohorts of NOSIS recipients is based in the United Kingdom. A fraternal organization of U.K.-based NOSIS winners, the Association of Self-Financed Outstanding Scholarship Awardees in the U.K., now boasts 462 members — one third of whom have returned to China.[10] On its website, the association advertises itself as "a transit point for high-tech innovation and entrepreneurship projects ... to promote international cooperation in innovation and entrepreneurship, and help China's talent-led development strategy."[11] This association of scholarship winners is just one of many groups that self-identify as transferring technology to China. Associations of Chinese professionals and scholars that claim to exchange technical information, recruit scientists to work in China, or mention specific Chinese talent programs raise questions about which research is prudent to share and which policy tools the United States and allies should use to protect critical, dual-use technologies.[12]

TECHNOLOGY ENTREPRENEURSHIP COMPETITIONS

Another method by which the Chinese government seeks to attract technological information and talent is through national and provincial technology entrepreneurship competitions. Ranging from a few dozen to several hundred participants, these contests "encourage talented individuals from around the world to seek out China as a place to start and grow new businesses."[13] Chinese talent competitions aim to identify top scientists and researchers who have invented a product or service that can be commercialized, and to give them cash prizes in the hopes that they might establish businesses in China.[14] This paper focuses on two contests in particular: the Chunhui Cup and the Hangzhou "Maker World" Competition.

The Chunhui Cup

Set up in 2006 and jointly run by China's Ministry of Education and Ministry of Science and Technology (MOST), the Chunhui Cup is China's largest, most prestigious talent-spotting and technology startup competition. Applicants are selected based on the reputation of their graduate institution, the alignment of their technology project with national technology priorities, and whether they hold relevant patents, among other criteria.[15] MOST favors projects related to "high-tech sectors, such as electronic information, biopharmaceuticals, resource and environment, optical-mechatronics, new materials and energy, technological agriculture, modern service, and cultural innovation."[16] According to our estimates, only 39% of participants in this competition come from the United States; 61% come from other countries, including Canada, Australia, and those in Western Europe.

TABLE 1: DISTRIBUTION OF CHUNHUI CUP AWARDEES BY FIELD OF TECHNOLOGY (2018)

Technology sector	Number of awardees	Percentage of awardees
Modern service industry	59	20%
Digital information	55	19%
Biology and medicine	41	14%
High-tech services	35	12%
Other high-tech fields	30	11%
Advanced manufacturing	23	8%
Renewable energy	17	6%
Resources and environment	14	5%
New materials	13	5%
Total	**287**	**100%**

Source: Authors' calculations based on data from the Xiamen Human Resources and Social Security Bureau, 2018.

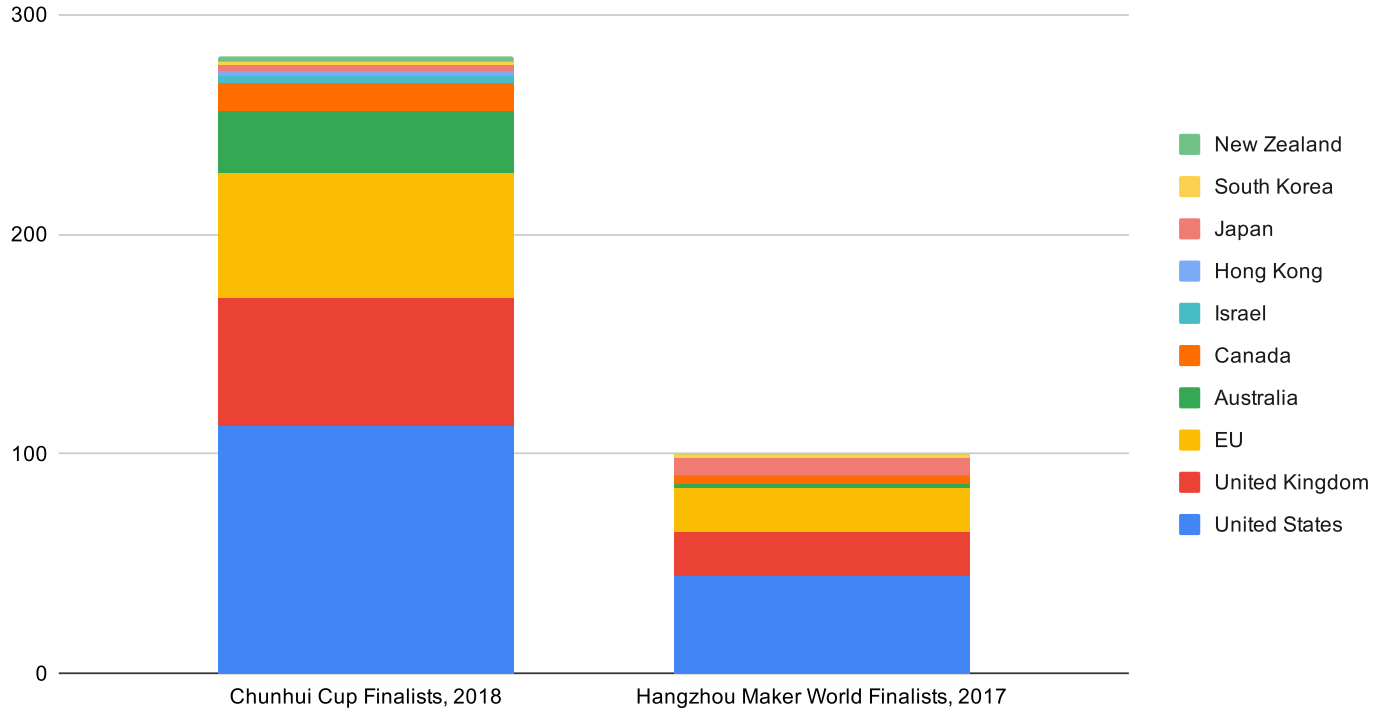
The Hangzhou "Maker World" Competition

Municipal-level talent competitions are one way by which Chinese provinces compete not just with other countries, but also with each other to attract overseas Chinese and foreign talent.[17] To compare technology entrepreneurs at the provincial level, we focus on the Hangzhou-based "Innovation and Entrepreneurship Competition for Overseas Talents ('Maker World' Competition)," but there are similar competitions in provinces throughout China.[18] The Chinese Association of Science and Technology and the local chapter of the Communist Party organize the Maker World Competition in Hangzhou, which focuses on "smart industry, high-tech industry, strategic emerging industry and traditional industrial upgrading."[19] Approximately one hundred awardees receive cash prizes each year, ranging from 200,000 to 5 million RMB ($30,000 to $700,000) each.[20]

The registration forms for competitions ask that applicants list the stage of their product's industrialization (R&D, Incubation, Pilot, or Industrialization), a detailed business plan for growth in China, as well as any relevant patents the inventors may hold in the United States, China, or other countries.[21] Of the projects we reviewed, most finalists list several specific patents.

Available data on China's elite talent competitions is limited, but snapshot data on award-winners from two competitions in 2017 and 2018 may offer a glimpse into recruitment priorities:

FIGURE 2: DISTRIBUTION OF CHINESE TECHNOLOGY ENTREPRENEURSHIP COMPETITION AWARDEES BY COUNTRY OF STUDY OR EMPLOYMENT

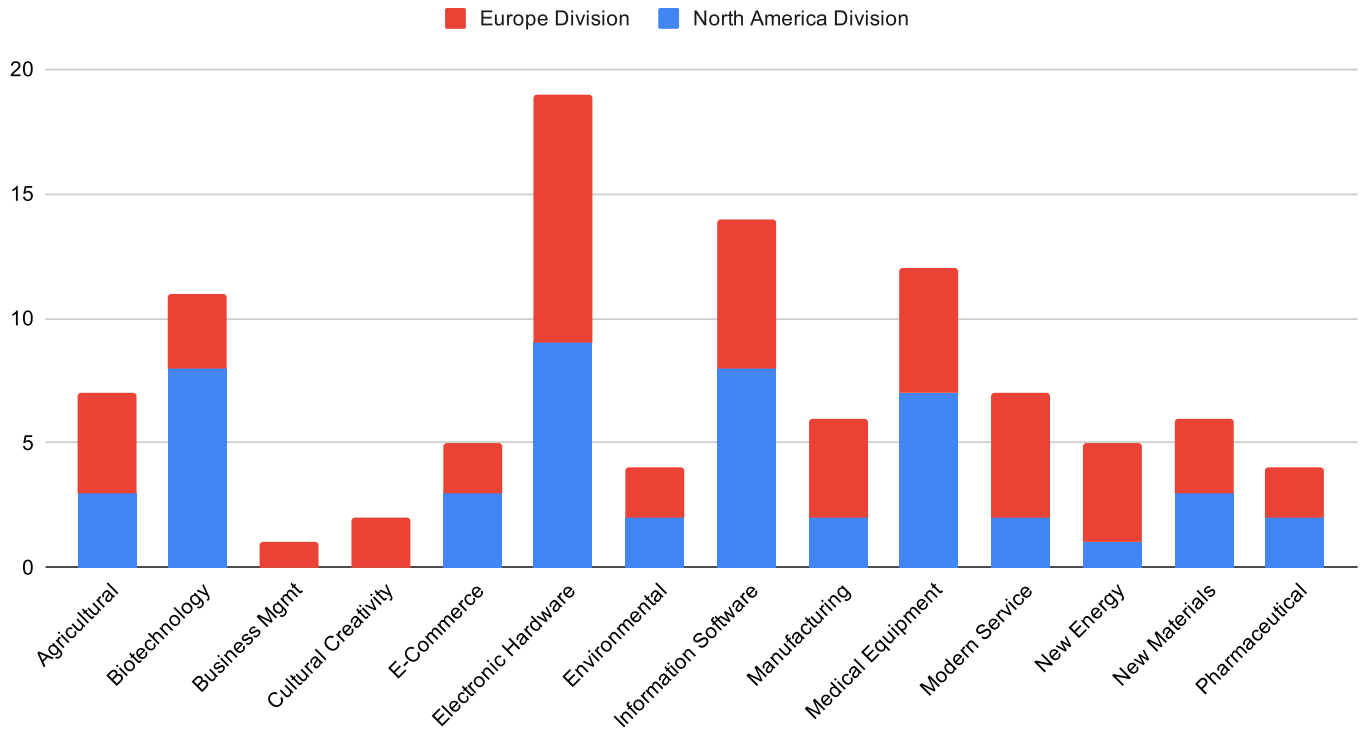


Source: Authors' calculations based on data from the Xiamen Human Resources and Social Security Bureau and Shimei Electric International Co., 2017-2018.

While the plurality of technology entrepreneurs study in the United States, the majority (55 to 60%) come from other countries. Additionally, many of the entrepreneurs based outside the United States contribute to technological fields important to China's modernization, particularly in the new energy and modern service industries.

It is difficult to gauge the impact of projects funded in Chinese talent competitions; after all, there have been fewer than 2,000 awardees from these two competitions, and return rates are low.[22] At the same time, Chinese media reports highlight a handful of success stories, with some companies exceeding $10 million in value.[23] We lack sufficient evidence to judge the scope or scale of technology transfer via entrepreneurship competitions. Notwithstanding limitations in the data, one point is clear: if the United States wants to prevent enterprising foreign scientists from taking sensitive, dual-use innovations to China, it must work with allied and partner nations to mitigate the risks, bolster resilience in particular sectors, and set international rules of the road governing the transfer of sensitive technical information and the protection of intellectual property.

FIGURE 3: DISTRIBUTION OF HANGZHOU "MAKER WORLD" NORTH AMERICAN AND EUROPEAN DIVISION FINALISTS (2017), BY FIELD



Source: Authors' calculations based on data from Shimei Electric International Co., 2017.

DIRECT INVESTMENTS IN FOREIGN TECHNOLOGY COMPANIES

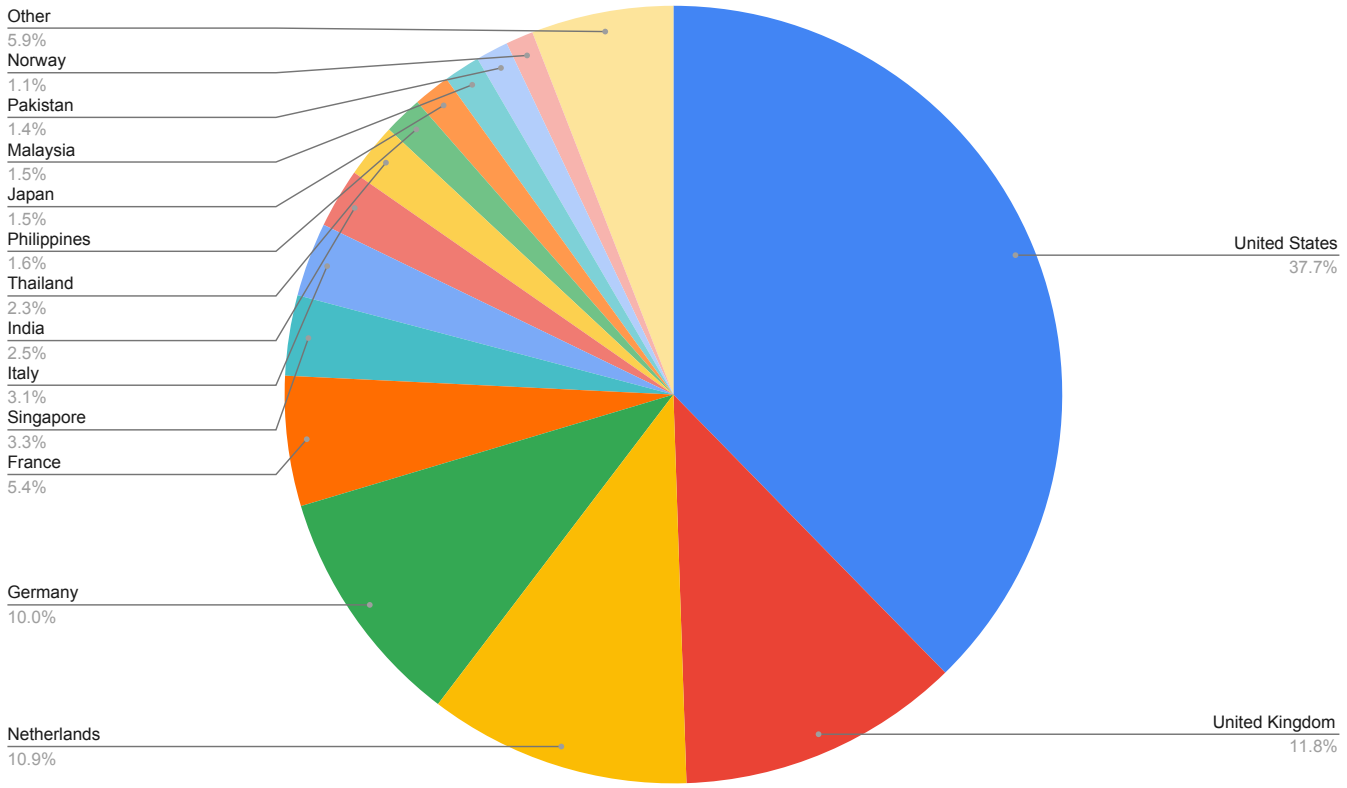
Another pathway through which Chinese firms obtain technical information and high-end talent is by acquiring or directly investing in foreign companies.[24] For decades, Chinese tech champions have used foreign direct investment "to promote diffusion of advanced technology and know-how in the Chinese economy."[25] As part of China's "Go Out" strategy, Chinese private and state-owned enterprises (SOEs) have leveraged mergers and acquisitions "to gain control of already established companies and in the process access their technology, expertise, brands and market access."[26] Despite recent reforms aimed at liberalizing SOEs and attracting foreign shareholders, the Chinese Communist Party still retains extensive control over the investment portfolios of most state-owned enterprises.[27]

Chinese foreign direct investment (FDI) has increased dramatically since the mid-2000s, particularly in countries highlighted by the Belt and Road Initiative (BRI).[28] Equity-based and infrastructure investments represent a small but significant portion of FDI, and a smaller percentage still are foreign technology companies.

Which countries are the largest destinations of Chinese technology-related FDI? We use data from the China Global Investment Tracker to examine large Chinese investments in foreign technology companies.[29] Compiled by the American Enterprise Institute and the Heritage Foundation, the CGIT dataset aggregates public information about investments, acquisitions, and infrastructure expenditures made by Chinese firms in other countries. The data comprise 3,300 transactions, compiled manually since 2005.

Since 2014, CGIT data indicates that Chinese businesses have made $56.8 billion in technology-related investments abroad, of which $36.7 billion (65%) was invested outside the United States.[30] The largest allied destinations of Chinese tech-related FDI were the United Kingdom, the Netherlands, Germany, France, and Singapore. While a majority of Chinese investments likely do not directly involve technology transfer, this data indicates the breadth of investments U.S. and allied screening procedures should seek to cover.

FIGURE 4: CHINESE TECHNOLOGY-RELATED DIRECT INVESTMENT BY DESTINATION COUNTRY (2014–2019)



Source: "China Global Investment Tracker"[31]

Distinct from concerns over Chinese FDI, American analysts tend to focus on "forced" technology transfer, whereby foreign businesses operating in China feel compelled to transfer technical information to Chinese counterparts in order to maintain market access.[32] Consider joint ventures between Chinese state-owned enterprises and foreign companies: according to a 2018 EU Chamber of Commerce poll, 20% of surveyed European businesses in China felt compelled to transfer technical information to maintain market access, up from 10% in 2017.[33] In March 2019, the Chinese government enacted a foreign investment law to curb the practice of forced transfer.[34] But ongoing reporting indicates that the problem is far from resolved, and some analysts contend Chinese reforms offer little more than lip service to appease American negotiators amid a wider U.S.-China trade dispute.[35]

Commercial technology transfer, be it through FDI or otherwise, is not a uniquely American problem — and a resolution in the form of a bilateral trade agreement will still leave U.S. allies vulnerable to predatory investments designed to absorb technological know-how and personnel.

AGILE ALLIANCES

To defend against Chinese technology transfer, the United States and its allies will need to be targeted, collaborative, and agile in their response.[36] The Chinese government undertakes multiple, coordinated efforts to obtain sensitive information from foreign researchers. Many of these pathways and access points for technology transfer are legal or extralegal and therefore poorly understood or monitored by

Western intelligence agencies.[37] The goal of allied cooperation should not be to restrict China's access to all technologies, but instead to focus on countering particular acquisition methods and protecting sensitive technologies, such as semiconductor manufacturing equipment.

One area of importance for the national security and economic well-being of the United States and its allies is artificial intelligence (AI). To better understand the AI-relevant priorities of U.S. allies and partners, we developed a cross-national survey of government officials on national AI R&D priorities, international coordination and data sharing preferences, AI talent development strategies, and perceptions of other countries' approaches to AI.[38]

Pathways 1 and 2: Student scholarships and competitions

While U.S. allies will likely vary in their strategic orientations toward China broadly and the question of technology transfer specifically, many U.S. allies and partners share a sense of urgency about this challenge. Just over half of survey respondents indicated that their government has concerns about foreign talent studying or working in fields with military or national security applications.[39] Sixty percent of officials stated that their governments have policies in place to counter the transfer of sensitive technologies.[40]

To determine the countries most relevant to defending against the transfer of sensitive technical information, we assessed a range of metrics, including the advanced technical and scientific information generated in each country, the number of Chinese cooperative technology associations operating in each country, the extent of law enforcement cooperation, and which U.S. allies and partners have policies in place to counter tech transfer.[41] Students are only one of many pathways through which China acquires sensitive technical information. More Chinese exchange students may correlate with a greater threat of espionage, even though the number of those participating in such activities is low.

Our findings indicate that Germany, the United Kingdom, Japan, Canada, France, and Australia are optimal partners to prevent the transfer of sensitive technical information to China. Other U.S. allies have relevant expertise in tracking and analyzing technology transfer programs, including the Czech Republic, Italy, the Netherlands, Singapore, South Korea, and Sweden.

Pathway 3: Foreign direct investment

When it comes to addressing Chinese technology transfer practices that manipulate the investment portfolios of state-owned enterprises, the United States and its allies will also need to adopt a coordinated approach.

To measure the potential vulnerability of allies and partners to Chinese technology transfer through foreign investment, we examined data on Chinese investment in the technology sector of each country over the past three years, Chinese tech investment relative to the net value of foreign direct investment inflow over the same period, and U.S. State Department assessments of each country's membership and compliance with multilateral export control regimes.[42] Finally, we include a measure from our survey: expressed interest in coordinating investment screening procedures with the United States.

Based on these indicators, we assess that the United Kingdom, Germany, Netherlands, France, Italy, and Japan are optimal partners for the United States to prevent the transfer of sensitive technical information through investments. Specifically, the European Union and Japan have made progress developing investment screening frameworks.[43]

The United States should not limit itself to a select group of partners. China will take the path of least resistance to acquire technology and will increasingly look to alternative suppliers. With limited time and resources, however, the United States should prioritize coordinating investment screening among countries most prone to technology-related investments and acquisitions by Chinese businesses. In addition to the aforementioned countries, New Zealand, Australia, Finland, and South Korea would make for important partners. The United States also stands to gain from coordinating with Latvia and Lithuania, which have established investment screening procedures specifically designed to protect critical infrastructure and dual-use technologies.

CONCLUSION AND POLICY RECOMMENDATIONS

China's technology transfer practices are broad-based and multifaceted. Student scholarships, tech competitions, and foreign acquisitions through strategic investments are only a few of the myriad pathways through which China acquires sensitive technical information. Some of these pathways are illegal; others are extralegal and take place in the gray zone between licit and illicit activities. To address this challenge, the United States and its allies should wield a scalpel, not a sledgehammer.

To this end, the United States and its allies should consider three guidelines for determining when and under what conditions to control access to sensitive technical information:

Risk: First, policymakers should consider the risks to U.S. and allied technology companies, which stand to lose talent and intellectual property if technology transfer continues unabated. At the same time, some of China's technology transfer programs enable Chinese companies and intelligence services to censor or surveil millions of people.[44] Not all technology sectors face the same level of risk: while some technologies like cryptography and machine learning algorithms have already diffused widely, the barriers to semiconductor fabrication and quantum computing are higher.[45] In the case of semiconductor technology, the CCP seeks to limit reliance on foreign chips by developing its domestic semiconductor industry. To do this, it is subsidizing its domestic semiconductor industry with $150 billion over a span of 10 years and attempting to acquire foreign technical information and talent.[46]

Resilience: Policymakers should also consider the ability of companies based in the United States and allied countries to respond to Chinese countermeasures. For example, after the U.S. Treasury Department placed sanctions on ZTE and Huawei, as well as dozens of other technology companies complicit in the surveillance and detention of Uighurs, Chinese media outlets warned that the CCP would soon blacklist American companies.[47] While such tit-for-tat responses should be expected in any trade negotiation, the United States and its allies must assess which technologies are at the heart of shared humanitarian and security concerns, and therefore deserve additional protections, even if such protections invite CCP reprisal.[48]

Rules of the Road: The United States and its allies have a vested interest in setting the rules of the road for artificial intelligence. This effort should build on and extend the Organisation for Economic Co-operation and Development's Principles on AI and the International Organization for Standardization working group initiatives on standards for data and AI safety and security. By coordinating policies on standard-setting in multilateral fora, the United States and its allies could more clearly demarcate where open networks of research collaboration are permissible and where certain technologies should be protected, such as semiconductor manufacturing equipment. This question is likely an area for productive dialogue, as partners are eager to coordinate policies and share best practices around norms and standards for AI. In fact, all surveyed officials were extremely or very interested in this avenue for international collaboration.

Targeted measures employed in coordination with allies and partners will protect sensitive technical information and counter particular methods of acquisition. Two broad policy directions are already underway and should be accelerated:

First, gather more data and raise public awareness. One of the barriers to studying Chinese technology transfer is the lack of available data on the subject.[49] The United States should prioritize working with Germany, the United Kingdom, Japan, Canada, France, and Australia to build an empirical base of knowledge on technology transfer, supported by robust data collection and analysis. The Office of the Director of National Intelligence (ODNI), relevant government agencies, and the Federal Bureau of Investigation (FBI) should coordinate with counterintelligence and law enforcement officials in these countries to gather and analyze data on technology transfers at scale, including open-source, publicly-available data collection; standardize visa screening procedures; and develop shared standards and metrics to evaluate transactions over the short-, medium-, and long-term.[50]

The United States and its allies will need to develop data-driven criteria and review declassification authorities for evaluating when and under what conditions it may be appropriate to publicly release sensitive information about Chinese technology transfer practices.[51] Rigorous data collection and analysis will enable more effective outreach campaigns to raise awareness among allied publics about technology transfer.

As part of a coordinated approach, U.S. and allied law enforcement agencies should look beyond the Thousand Talents Plan and collect information related to Chinese technology entrepreneurship competitions. Forums such as the Chunhui Cup and Hangzhou's Maker World Competition enable China to commercialize technologies originally pioneered in the United States and allied countries, but we lack a good evidentiary base for articulating the full extent of the problem and actionable policy options.

Second, coordinate investment screening procedures. The Office of the U.S. Trade Representative and the Committee on Foreign Investment in the United States (CFIUS) should continue to engage with their counterparts in allied and partner countries to build a common intelligence picture of the risks associated with fractional ownership and joint ventures. The Foreign Investment Risk Review Modernization Act (FIRRMA) instructs CFIUS to "establish a formal process to share information with foreign allied governments and coordinate and cooperate on investment security issues," with the understanding that countries adopting comprehensive foreign investment review processes may remain on CFIUS's list of "excepted foreign states."[52]

As the U.S. investment review process expands, however, some policymakers fear potential blowback to U.S. companies. Under FIRRMA, CFIUS is tasked with reviewing non-controlling investments in U.S. businesses related to critical technologies, infrastructure, or data collection.[53] Some analysts are concerned that the globalization of investment screening procedures may draw more scrutiny toward, or even shut out, American investments abroad.[54] Japanese regulators, for example, are considering reforms to the Foreign Exchange and Foreign Trade Act, which could limit foreign investments as small as one percent.[55] As the United States excludes some allies from CFIUS's whitelist, regulators will need to prepare for similar retaliation against American companies.[56]

The United States should continue its leadership in coordinating investment screening procedures, but partner with allies to ensure U.S. investments are not inadvertently caught in the crossfire.[57] CFIUS should prioritize negotiating with Germany, the Netherlands, France, Italy, and Japan to construct adequate investment screening procedures; eventually, it should consider expanding the list of "excepted foreign states" to include these countries and other crucial partners. Allies are vital if the United States is to establish comprehensive, data-driven screening procedures based on the risk of technology transfer.

China's technology transfer programs present a serious, but surmountable challenge. By gathering data on the extent of the problem and coordinating policies and practices to address it in a holistic and targeted way, the United States and its allies can protect sensitive technologies and promote the integrity of science and technology ecosystems among democratic nations.

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38 We developed this survey with colleagues at CSET. The population of cases is based on two criteria: (a) the country participates in a mutual defense treaty, strategic partnership, or cooperative defense agreement with the United States, and (b) the country has developed or announced a plan to develop a national AI strategy. Using these two criteria, our final case list comprises 38 countries and jurisdictions. We sent the survey to 27 countries from our final case list, plus the European Union. Fifteen government officials from 11 countries and the EU completed the survey. While 15 is a modest number of respondents, the individual responses provided a wealth of insights into the AI priorities, evolving AI strategies, and level of interest in international collaboration around AI among allies and partners. For more information on the survey methodology and results, please see, Andrew Imbrie, Ryan Fedasiuk, Catherine Aiken, Tarun Chhabra, and Husanjot Chahal, "Agile Alliances."

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40 Only one official from Colombia confirmed there are no policies in place to counter tech transfer. The remaining third of officials indicated they do not know whether such policies are in place.

41 For more information on these and other metrics, please refer to Andrew Imbrie, Ryan Fedasiuk, Catherine Aiken, Tarun Chhabra, and Husanjot Chahal, "Agile Alliances." For data on Chinese students abroad, see "Global Flow of Tertiary-Level Students," UNESCO, 2017, http://uis.unesco.org/en/uis-student-flow. UNESCO data captures the total number of Chinese students — undergraduate, graduate, and doctoral — studying in other countries. Regarding professional associations, the Chinese government constructs or sponsors associations of experts in scientific and technical industries to facilitate informal technology transfer from several countries. Many associations explicitly aim to incorporate foreign scientists and technical information into Chinese firms. See, e.g., William C. Hannas, James Mulvenon, and Anna Puglisi, *Chinese Industrial Espionage: Technology Acquisition and Military Modernization* (London: Routledge, 2013). As an estimate for how many organizations operate in each country, we conducted systematized Mandarin-language keyword searches in Baidu and Google. We tallied the number of groups that are constituents of world and regional "federations" of Chinese professional associations.

42 On foreign investment, we examined data from China Global Investment Tracker," American Enterprise Institute / Heritage Foundation. We include the following multilateral export control regimes: the Nuclear Suppliers Group, Missile Technology Control Regime, Australia Group, and Wassenaar Arrangement. For more information, please refer to Andrew Imbrie, Ryan Fedasiuk, Catherine Aiken, Tarun Chhabra, and Husanjot Chahal, "Agile Alliances."

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