



China's Global Influence: Perspectives and Recommendations



Edited by
Scott D. McDonald
Michael C. Burgoyne

14

Technology and Innovation in China's Strategy and Global Influence

Elsa B. Kania¹

¹ The views and recommendations expressed in this chapter are those of the author and do not necessarily reflect the policy or position of the US Department of Defense or US Government.

The United States and the People's Republic of China (PRC) are entering an era of intense competition for global power, influence, and leadership. At the heart of this great power rivalry is a struggle over emerging, strategic technologies that are believed to be vital to future national competitiveness. In recent history, and throughout the Cold War, America's technological superiority has been vital to US military, and indeed strategic, advantage. However, the PRC is emerging as a powerhouse—and would-be superpower—in critical technologies, from artificial intelligence (AI) to fifth-generation telecommunications (5G) and even quantum technology, posing new challenges to US power and leadership in the process. Chinese leaders have long placed indigenous innovation (自主创新) at the center of their agenda for national rejuvenation. In the “new era” of Xi Jinping's leadership, the PRC has prioritized a strategy for innovation-driven development that leverages the perceived opportunity presented by rapid advances in such disruptive technologies. At the same time, China's apparent emergence as a global leader in these new frontiers constitutes a critical dimension of its strategy to advance its national interests and exercise international influence commensurate with its increasing capabilities.

HISTORICAL INFLUENCES AND PERSPECTIVES

China was subject to predation by foreign powers as a result of its technological backwardness in the past and intends to become a global leader in science and technology in the future.² The experience of China's “Century of Humiliation” is seen as a powerful reminder of the dangers of falling behind other great powers who can take advantage of their greater strength to exploit any weaknesses. These memories motivate Chinese leaders to embrace a strategy of “national rejuvenation” that is seen as requiring China's emergence at the forefront of today's technological revolutions. From the time of Mao Zedong up to Xi Jinping, Chinese leaders have highlighted the importance of self-reliance and indigenous innovation.³ This paradigm of “techno-nationalism” was the animus for China's launch of the “Two Bombs, One Satellite” program through which the PRC developed its first atomic bomb, intercon-

2 This objective of leading in science and technology has even been written into the Party constitution. See “Constitution of the Chinese Communist Party [中国共产党章程],” Partial revision from the 19th National Congress of the Communist Party of China, adopted on 24 October 2017 [中国共产党第十九次全国代表大会部分修改, 2017年10月24日通过], <http://www.12371.cn/2017/10/28/ART11509191507150883.shtml>.

3 Neil Thomas, “Mao Redux: The Enduring Relevance of Self-Reliance in China,” 25 April 2019, <https://macropolo.org/analysis/china-self-reliance-xi-jin-ping-mao>.

tinental ballistic missile, and satellite.⁴ Today's science and technology (S&T) major programs and megaprojects often harken back to these historical antecedents for inspiration. These past experiences also seem to have underlined concern with the perils of surprise by a potential adversary's technological advancements.

China remained in a position of technological inferiority, relative to the United States throughout the 1990s. In the aftermath of the Cold War, America had emerged as a global hegemon that was nearly unrivalled.⁵ Beyond the acute concerns of regime insecurity that persisted in the aftermath of the Tiananmen massacre, the Chinese military was rudely awakened to the changing character of warfare following US successes in the Gulf War, prompting the 1993 change in China's military strategic guideline (军事战略方针) to focus on fighting "local wars under modern high-tech conditions."⁶ Moreover, the Chinese People's Liberation Army (PLA) started to reorient its armaments development, seeking to close the gap in military technologies through not only focusing on asymmetric capabilities but also looking for new opportunities to achieve advantages that might offset US military power.⁷ This agenda emerged as an urgent imperative after the 1996 Taiwan Strait Crisis, considering the PLA did not have an effective response to the US aircraft carrier deployment.⁸ Thereafter, the accidental bombing of the Chinese embassy in Belgrade, which was interpreted as a deliberate assault, prompted the launch of the "995 Plan," named for this May 1999 incident.⁹ Reportedly,

4 Evan A. Feigenbaum, *China's Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age* (California: Stanford University Press, 2003).

5 Some scholars would argue that the US still is and will remain unrivalled. Michael Beckley, *Unrivaled: Why America Will Remain the World's Sole Superpower* (New York, Cornell University Press, 2018).

6 M. Taylor Fravel, "Shifts in Warfare and Party Unity: Explaining China's Changes in Military Strategy," *International Security* 42, no. 3 (2017): 37-8.

7 Elsa B. Kania, "Battlefield Singularity: Artificial Intelligence, Military Revolution, and China's Future Military Power," *Center for a New American Security*, 28 November 2017, <https://www.cnas.org/publications/reports/battlefield-singularity-artificial-intelligence-military-revolution-and-chinas-future-military-power>.

8 Barton Gellman, "U.S. and China Nearly Came to Blows in '96," *Washington Post*, 21 June 1998, https://www.washingtonpost.com/archive/politics/1998/06/21/us-and-china-nearly-came-to-blows-in-96/926d105f-1fd8-404c-9995-90984f86a613/?noredirect=on&utm_term=.f147fad82e5a.

9 In particular, the "995 Plan," which focused on the development of asymmetric capabilities to target US weaknesses was launched in response to the May 1995 Belgrade bombing. See: Zhang Wannian, *Biography of Zhang Wannian* [张万年传], Liberation Army Press, 2011, 416, quoted in Tai Ming Cheung, *Forging China's Military Might: A New Framework for Assessing Innovation* (Maryland: Johns Hopkins University Press, 2014). See also Tai Ming Cheung, Thomas Mahnken, Deborah Seligsohn, Kevin Pollpeter, Eric Anderson, and Fan Yang, "Planning for Innovation: Understanding China's Plans for Technological, Energy, Industrial, and Defense Development," *US-China*

this program has contributed to the development of weapons systems ranging from “carrier killer” missiles and stealth fighter jets to unmanned systems and advanced electronic warfare capabilities.¹⁰

In the years that followed, the PLA’s pursuit of “informatization” (信息化) occurred in tandem with efforts to leverage information technology to advance the nation’s societal and economic development,¹¹ but China remained in a position of relative dependence upon foreign technologies. The risks and potential vulnerabilities that reliance upon foreign technologies might cause were thrown into stark relief in 2013 by the Snowden incident, which indicated the extent to which China’s information technology ecosystem had been allegedly penetrated through US cyber espionage activities. In later speeches, Xi has emphasized, “Internet core technology is the greatest vital gate, and the fact that core technology is controlled by others is our greatest hidden danger.”¹² Such concerns over ensuring the “security and controllability” (安全, 可控) of technology have since remained a major driver for indigenous innovation that has become particularly prominent under Xi Jinping’s leadership. In particular, a number of policy decisions, including the new Cyber Security Law and the establishment of the Cybersecurity Administration of China (CAC) can be characterized as responses to that incident against the backdrop of an increasing awareness of cyber threats.¹³

Today, China’s Party-state sees innovation as vital to “national rejuvenation” and aspirations of global leadership. Pursuing advances in new strategic emerging industries and technologies, the Chinese govern-

Economic and Security Review Commission, July 2016, p. 25-27.

10 Ibid., and see also: Elsa B. Kania, “Not a New Era: Historical Memory and Continuities in U.S.-China Rivalry,” *Strategy Bridge*, 7 May 2019, <https://thestrategybridge.org/the-bridge/2019/5/7/not-a-new-erahistorical-memory-and-continuities-in-us-china-rivalry>.

11 For instance, see the “National Informatization Development Strategic Guideline [国家信息化发展战略纲要],” 2016, <http://www.scio.gov.cn/xwfbh/xwfbh/wqfbh/33978/34896/zy34900/Document/1485324/1485324.html>.

12 “Xi Jinping’s Speech at the Cyber Security and Informatization Work Conference was Published in Full [习近平在网信工作座谈会上的讲话全文发表],” *Xinhua*, 25 April 2016, http://www.xinhuanet.com/politics/2016-04/25/c_1118731175.html. For a full translation, see this version by Rogier Creemers, Xi Jinping, “Speech at the Work Conference for Cybersecurity and Informatization,” April 2016, <https://chinacopyrightandmedia.wordpress.com/2016/04/19/speech-at-the-work-conference-for-cybersecurity-and-informatization/>. His remarks continued in ways that ring true to the recent experiences of ZTE and Huawei: “An Internet enterprise, however great its size is, however high its market cap is, if it critically relies on the outside world for core components, the vital gate of the supply chain is grasped in the hands of others, this can be compared to building a house on another person’s foundation, however large or beautiful it is, it might not stand the wind or the rain, or might even collapse at the first blow...”

13 “Report Underlines China’s Cyber Security Challenges,” 26 June 2014, http://www.china.org.cn/china/2014-06/26/content_32776219.htm.

ment has promoted a number of new “national champions,” including tech giants Baidu, Alibaba, Tencent, and (infamously) Huawei. These companies are recognized as successful in their own right, but have also benefited from strong, and seemingly increasing, state support. The global expansion of Chinese technology companies has occurred at the nexus of commercial and geopolitical objectives, often branded as an integral element of China’s One Belt, One Road (OBOR; 一带一路)¹⁴ initiative, which is a signature program of Xi Jinping that has been written into the CCP constitution.¹⁵ Within this construct the “digital Silk Road” (数字丝绸之路) relates to China’s agenda to advance the globalization of indigenous Chinese technical standards in ways that could inherently advantage Chinese companies.¹⁶ At the same time, China has taken on greater centrality in international S&T cooperation in ways that enable its indigenous technological advancement,¹⁷ while also assuming increased importance in some global supply chains.¹⁸ Concurrently, China has sought to enhance its global “discourse power” (话语权) through establishing greater presence and involvement in the creation of new legal and governance frameworks in ways that contribute to the legitimation and promulgation of the norms and models that align with PRC preferences.

INNOVATION FOR REJUVENATION

Xi Jinping has placed innovation at the center of his agenda for the “China Dream.”¹⁹ Under his leadership, China launched the “Outline of the National Strategy for Innovation-Driven Development” (国家创新驱动发展战略纲要) in 2016.²⁰ As this strategy highlights, the capability

14 The Editors have chosen to conform to the “One Belt, One Road” formulation of the initiative as initially propagated and as it is still discussed in Chinese language documents. For a complete explanation of this decision, see the introduction to this volume, p 9.

15 “Constitution of the Chinese Communist Party.”

16 See the author’s prior writings on the subject for a more detailed discussion, including Elsa B. Kania, “China’s Play for Global 5G Dominance—Standards and the ‘Digital Silk Road,’” *Strategist*, 27 June 2018, <https://www.aspistrategist.org.au/chinas-play-for-global-5g-dominance-standards-and-the-digital-silk-road>.

17 The extent to which S&T collaboration has been highlighted within “One Belt, One Road:” https://web.archive.org/web/20190530222123/http://www.most.gov.cn/ztl/qgkjcxdhkyzn/yw/201705/t20170527_133171.htm.

18 “US-China Tariffs in Charts: Global Supply Chains at Risk,” *Financial Times*, 5 July 2018, <https://www.ft.com/content/bd99c39c-8024-11e8-bc55-50daf11b720d>.

19 For context on this agenda for national rejuvenation, see Timothy R. Heath, *China’s New Governing Party Paradigm: Political Renewal and the Pursuit of National Rejuvenation* (New York: Routledge, 2016).

20 See the official strategy released on innovation-driven development, “The CCP Central

to innovate is considered a core enabler of national power, and China's past weaknesses and experiences of predation are often attributed to "missing" and failing to keep pace with scientific and technological revolutions. These authoritative guidelines assert, "disruptive technologies are constantly emerging, continually reshaping the world's competitive landscape, changing the balance of forces among states."²¹ Presently, "our nation is not only facing a rare historic opportunity to catch up and leapfrog ahead but also confronting the serious challenge of a gap that could widen."²² This assessment of the potential opportunities and challenges that arise from emerging technologies has motivated the elevation of artificial intelligence (AI) among a total of sixteen megaprojects (重大项目) that range from robotics to aerospace and quantum computing.²³ In certain respects, China's level of prioritization of and investment in disruptive technologies can be characterized as reactive, reflecting a response to concerns that US advances could place China again in a position of relative weakness. However, this pursuit of global leadership in new strategic technologies is also aimed at taking advantage of what is perceived as a unique historical moment. China has the potential to achieve a first-mover advantage, given that the US and China are starting from the more or less same level in these fields and industries.

China's aspirations to lead, even dominate, in these strategic technologies reflect an assessment of their criticality to future national competitiveness, while also indicating its intention to contest global leadership on multiple fronts. Notably, China's launch of the "New Generation Artificial Intelligence Development Plan" (新一代人工智能发展规划) in July 2017 revealed ambitions to emerge as the "world's premier innovation center" for AI by 2030.²⁴ In his remarks to a Politburo study ses-

Commission and State Council Release the 'National Innovation-Driven Development Strategy Outline' [中共中央 国务院印发 '国家创新驱动发展战略纲要'], *Xinhua*, 19 May 2016, accessed 15 March 19, http://news.xinhuanet.com/politics/2016-05/19/c_1118898033.htm. See also Xi Jinping's remarks on this approach in the context of military modernization, "Xi Jinping: Comprehensively Advance an Innovation-Driven Development Strategy, Promote New Leaps in National Defense and Military Construction [习近平: 全面实施创新驱动发展战略 推动国防和军队建设实现新跨越]," *Xinhua*, 13 March 2016, http://news.xinhuanet.com/politics/2016-03/13/c_1118316426.htm.

21 "The CCP Central Commission and State Council Release the 'National Innovation-Driven Development Strategy Outline.'"

22 Ibid.

23 "S&T Innovation 2030—'Megaproject Newly Adds AI 2.0' [科技创新2030—重大项目再添 '人工智能2.0']," *S&T Daily*, 24 May 2017, http://www.stdaily.com/zhuanti01/rgzn/2017-05/24/content_546702.shtml.

24 "State Council Notice on the Issuance of the New Generation AI Development Plan [国务院关于印发新一代人工智能发展规划的通知]," 20 August 2017, <http://www.gov.cn/zhengce/>

sion on promoting the healthy development of artificial intelligence, Xi emphasized, “Accelerating the development of a new generation of AI is an important strategic handhold for China to gain the initiative in global science and technology competition.”²⁵ He urged China to “occupy the commanding heights (制高点) of “crux and core technologies (关键核心技术).”²⁶ While these ambitions have only recently started to command headlines around the world, Xi’s emphasis on “core technologies” has been consistent throughout his tenure. For instance, in a major address at a conference for cyber security and informatization in April 2016, he discussed the importance and opportunities of core technologies:

What are the core technologies? As I see it there are three areas that we can grasp. The first is basic technology, commonly used technology. The second is asymmetric technology, or “trump card” (杀手锏) technology. The third is advanced technology, or disruptive technology. In these areas, we are at the same starting line with the outside world, if we are able to take the lead in deployments and concentrate on our attack, we might well be able to realize a transformation from running at their heels to running abreast with or even ahead of them.²⁷

Traditionally, Chinese leaders have tended to employ distinctly militaristic language in their discussions of technological competition. For instance, Xi declared in that same speech, “Attack strategic passes in a coordinated manner. Assault the fortifications of core technology research and development well...Concentrate the most powerful forces to act together, compose shock brigades and special forces to storm the passes.”²⁸ Similarly, as Chinese scientists have looked to advance research in quantum computing, prominent scientist Guo Guangcan from the

content/2017-07/20/content_5211996.html.

25 For an English translation, see Elsa Kania and Rogier Creemers, “Xi Jinping Calls for ‘Healthy Development’ of AI (translation),” *New America*, 5 November 2018, <https://www.newamerica.org/cybersecurity-initiative/digichina/blog/xi-jinping-calls-for-healthy-development-of-ai-translation/>.

26 “Xi Jinping: Promote the Healthy Development of Our Nation’s New Generation of Artificial Intelligence” [习近平：推动我国新一代人工智能健康发展], *Xinhua*, 31 October 2018, http://www.xinhuanet.com/politics/2018-10/31/c_1123643321.htm.

27 For a full translation, see the version by Rogier Creemers: Xi Jinping, “Speech at the Work Conference for Cybersecurity and Informatization.”

28 Ibid.

Key Laboratory of Quantum Information has emphasized, “To win the battle for quantum supremacy, we must not be ‘guerrillas;’ necessarily, we must organize a ‘group army.’”²⁹ In practice, these campaigns to contest technological leadership have involved major increases in support for research and development guided by a range of S&T plans that reflect greater concentration on talent as a strategic resource, through talent plans and new initiatives in education that aim to build up a more robust human capital ecosystem.³⁰ There are also new mechanisms for investment through government guidance funds (引导基金) that often amount to tens of billions in funding, particularly in emerging technologies.³¹

Beyond pragmatic and realpolitik considerations, there are elements of pride, prestige, and nationalism in play. Implicitly, Chinese leaders see growing prowess in technologies as a potent indicator of national rejuvenation that is often the subject of political work and propaganda aimed at both internal and external audiences.³² The level of hype that apparently characterizes official coverage of Chinese advances in AI and quantum technology in China’s state media and even international reporting that echoes such claims, seems to reflect the influence of such “publicity” or propaganda (宣传).³³ The apparent enthusiasm for innovation extends to Xi Jinping himself, who has touted such advances as China’s launch of the world’s first quantum satellite in his own official remarks and addresses.³⁴ Such global firsts make for powerful messag-

29 “Observing the Global Battle for ‘Quantum Hegemony’[全球“量子霸权”争夺战观察],” *Xinhua*, 14 February 2018, http://www.xinhuanet.com/science/2018-02/14/c_136972095.htm.

30 While these plans and mechanisms merit more detailed discussions, I will limit my emphasis on these instruments in this paper given the focus of the workshop on influence. For instance, the Chinese Ministry of Education has launched a plan for AI in higher education in April 2018. See Elsa Kania, “China’s AI Talent ‘Arms Race,’” *Strategist*, 23 April 2018, <https://www.aspistrategist.org.au/chinas-ai-talent-arms-race/>.

31 See, for instance, this 1 billion RMB guidance fund for artificial intelligence in the Haidian District of Beijing. “Haidian Released AI Support Policy, Established 1 Billion RMB Industry Guidance Fund [海淀发布人工智能扶持政策, 设立10亿元产业引导基金],” *Sohu*, 27 May 2019, http://wecache.googleusercontent.com/search?q=cache:DQ3IJJBl0zsJ:www.sohu.com/a/316864924_439726+&cd=1&hl=en&ct=clnk&gl=us.

32 In fact, there was a dedicated campaign of media and publicity or “propaganda” work (新闻宣传工作) undertaken with the guidance of the Central Propaganda Department News Bureau and the Strategic Support Force Political Work Department, characterized as successful in ensuring extensive coverage across a range of media for this milestone, setting off a “quantum storm” (量子风暴); and “Space Science Guiding Special Projects Communication Strategy Analysis [空间科学先导专项传播策略分析],” <http://www.bsc.cas.cn/jlyd/ywyj/201706/P020170622527613667684.docx+&cd=1&hl=en&ct=clnk&gl=gr>.

33 More sourcing on S&T-related propaganda.

34 “President Xi Jinping Presents 2018 New Year’s Message [国家主席习近平发表二〇一八年新年贺词],” *Xinhua*, 31 December 2018, http://www.xinhuanet.com/2017-12/31/c_1122192418.htm+&cd=1&hl=en&ct=clnk&gl=au.

ing and propaganda. In some cases, official announcements may also be intended for purposes of signaling, misdirection, or disinformation. This dynamic may be especially salient for potential advances in military capabilities that are difficult to confirm or verify, such as leaked pictures of railguns and demonstrations of drone swarms numbering in the hundreds and even thousands.³⁵

THE NEW NATIONAL TEAM

Increasingly, China's tech sector has become critical to its dynamism and development of a vibrant digital economy. Relative to the state-owned enterprises that were traditionally prominent in China's economy, these tech companies have been private and *notionally* independent from the state, often emerging and competing with limited state support and involvement to start. At the same time, many of these companies have been the beneficiaries of robust backing, from funding to preferential treatment and protection from foreign competitors.³⁶ While some of these companies started out copying the models or, in some cases, stealing the technologies of international competitors, their progress has been undeniable in technologies and applications that range from new directions in e-commerce to natural language processing and quantum communications.³⁷ Although China was once dismissed as a copycat incapable of true innovation, there are numerous and compelling indicators that belie that assumption, including the growing number of patents and publications from Chinese companies and researchers. Of course, this apparent dominance can also be overhyped and exaggerated, and quantitative indicators should not be taken as reliable metrics for quality or advancement.³⁸ At the same time, the successful expansion of these companies has started to raise concerns about the geopolitical implications of this technological expansion, including the potential impact on democratic governance worldwide.

35 "200 UAV Swarm Flight: China Once Again Refreshed the Fixed-Wing UAV Swarm Flight Record [200架无人机集群飞行: 我国再次刷新固定翼无人机集群飞行纪]," *Xinhua*, 15 May 2018, http://www.xinhuanet.com/2018-05/15/c_1122835745.htm.

36 "Huawei a Key Beneficiary of China Subsidies that US Wants Ended," *Agence France Presse*, 30 May 2019, <https://www.afp.com/en/news/1272/huawei-key-beneficiary-china-subsidies-us-wants-ended-doc-1gs9er2#.XO94awoXDSI.twitter>.

37 For a great description and characterization of this infrastructure, see Kai-Fu Lee, *AI Superpowers: China, Silicon Valley, and the New World Order* (New York: Houghton Mifflin Harcourt, 2018).

38 There is plenty of reason to doubt the quality of those patents. Lulu Yilun Chen, "China Claims More Patents Than Any Country—Most Are Worthless," *Bloomberg*, 26 September 2018, <https://www.bloomberg.com/news/articles/2018-09-26/china-claims-more-patents-than-any-country-most-are-worthless>.

At present, the Chinese Communist Party (CCP) appears to be in the process of asserting ever tighter control over Chinese tech companies as it pushes “Party-ification” (党化), and even the most successful companies have not been exempt from these requirements.³⁹ As Xi has declared, “The Party leads everything.” Within the past couple of years, a growing number of tech companies have established or expanded their own Party Committees,⁴⁰ including the vast majority of China’s top 100 tech and Internet companies.⁴¹ In fact, most, if not all, of China’s prominent tech companies have decided to do so, and often prominently, in response to new requirements and expectations. In a notably candid—and later censored—remark, Wang Xiaochuan, CEO of Sogou said at the “Two Sessions” (两会) in the spring of 2018:

We’re entering an era in which we’ll be fused together. It might be that there will be a request to establish a (Communist) Party committee within your company, or that you should let state investors take a stake...as a form of mixed ownership. If you think clearly about this, you can really resonate together with the state. You can receive massive support. But if it’s your nature to go your own way, to think that your interests differ from what the state is advocating, then you’ll probably find that things are painful, more painful than in the past.⁴²

Although the incorporation of Party branches and committees into major tech companies is not a new phenomenon, the scope of their influence appears to have increased considerably in recent years. For instance,

39 See the discussion of “Party-ification” in the USCC’s annual report: “U.S.–China Security Relations,” US-China Economic and Security Review Commission, 2018 Annual Report, accessed 15 March 2019, https://www.uscc.gov/sites/default/files/Annual_Report/Chapters/Chapter%202%20Section%201-%20Year%20in%20Review%2C%20Security%20and%20Foreign%20Affairs_0.pdf, and Jeremy Page and Chun Han Wong, “Xi Jinping Is Alone at the Top and Collective Leadership ‘Is Dead,’” *Wall Street Journal*, 25 October 2017, accessed 15 March 2019, <https://www.wsj.com/articles/chinas-xi-elevated-to-mao-status-1508825969>.

40 Emily Feng, “Chinese Tech Giants like Baidu and Sina Set up Communist Party Committees,” *Australian Financial Review*, 11 October 2017, <https://www.afr.com/news/world/asia/chinese-tech-giants-like-baidu-and-sina-set-up-communist-party-committees-20171011-gyvh5u>.

41 “China’s Internet Companies Are Surging with a ‘Party Building Tide’ [我国互联网企业涌动 ‘党建潮’]” *China Organization and Personnel Report*, 28 March 2018, <http://dangjian.people.com.cn/n1/2018/0326/c117092-29889441.html>.

42 See the initial quotation and translation available via Twitter thanks to journalist Simon Rabinovitch. Accessed 15 March 2019, https://twitter.com/S_Rabinovitch/status/973794048896065538. The original article has since been deleted.

Alibaba established its Party Committee around 2008, Tencent in 2011, and iFlytek in 2012.⁴³ Since technically any company with more than three CCP members is required to form at least a Party branch, smaller start-ups are increasingly expected to establish Party committees at earlier stages in their development, though it does not appear this requirement was enforced as consistently or extensively in the past. At present, virtually all of China's top 100 tech companies do have their own Party committees.⁴⁴ There are often tangible and material benefits to cultivating close relations with the Party, though not all companies will be eager to cultivate that closeness, because that mechanism can also provide a mechanism for coercive influence by the Party.⁴⁵

In the Xi era, the CCP has increased its emphasis on the “Party building” (党建) activities within tech companies, even seeking to expand the Party's reach into foreign firms that are operating in China.⁴⁶ In practice, the Party committees' activities range from “watch parties” for major Party events, such as the 19th Party Congress, to contributions to public opinion monitoring online that contributes to a “cleaner” cyberspace.⁴⁷ Although Chinese companies often claim their influence is limited essentially to matters of “human resources” and “operations management,”⁴⁸ there are indications that their purview does extend into questions of operations and compliance.⁴⁹ While companies may often benefit from increased mobilization of state resources and support, such intrusive measures could undermine the capability of these new national

43 “What Kind of Party Committees Do Internet Companies Have? [互联网公司的党委是什么样的?],” 2 July 2015, http://webcache.googleusercontent.com/search?q=cache:fPhUdgRTkYJ:www.cnispunior.org/News_View.asp%3FNewsID%3D597+&cd=4&hl=en&ct=clnk&gl=au.

44 “China's Internet Companies Are Surging with a ‘Party Building Tide.’”

45 For an example of some of the practical benefits, see Hongbin Li Lingsheng Meng, Qian Wang, and Li-An Zhou, “Political Connections, Financing and Firm Performance: Evidence from Chinese Private Firms,” *Journal of Development Economics* 87, no. 2 (2008): 283-299.

46 “Exclusive: In China, the Party's Push for Influence Inside Foreign Companies,” *Reuters*, 24 August 2017, <https://www.reuters.com/article/us-china-congress-companies-idUSKCN1B40JU>.

47 Chauncey Jun, “What Communists Do in China's Tech Companies,” *Inkstone*, 4 December 2018, <https://www.inkstonenews.com/opinion/chauncey-jung-what-communists-do-chinas-tech-companies/article/2176349>.

48 According to a statement from the State Council Information Office, “company party organizations generally carry out activities that revolve around operations management, can help companies promptly understand relevant national guiding principles and policies, coordinate all parties' interests, resolve internal disputes, introduce and develop talent, guide the corporate culture, and build harmonious labor relations.” See “Exclusive: In China, the Party's Push for Influence Inside Foreign Companies.”

49 Christopher Balding, “China Is Nationalizing Its Tech Sector,” *Bloomberg*, 12 April 2018, <https://www.bloomberg.com/opinion/articles/2018-04-12/china-is-nationalizing-its-tech-sector>.

champions for innovation.⁵⁰ At present, there are deep concerns regarding the ways in which the Party-state could guide or control the activities of tech companies through such opaque mechanisms as Party presence in corporate leadership, exacerbated by the lack of clarity and accountability on these issues.⁵¹ There are also apparent mechanisms through which companies might be compelled to support and cooperate with, or conceal their knowledge of, “national intelligence work,”⁵² based on Article 7 of China’s “National Intelligence Law” (国家情报法), which has evidently formalized requirements that were perhaps previously imposed through the exercise of extra-judicial authorities.⁵³

Given this apparent deepening of the Party-state-tech nexus, the global expansion of Chinese tech companies has provoked concerns that their reach could become a new vector for Beijing’s global influence. Often, these activities might be motivated by commercial interests on the part of the companies involved, but also appear to correspond with geostrategic objectives. In particular, major players, notably Huawei, have been harnessed in the service of such national priorities as the Digital Silk Road.⁵⁴ As of spring 2019, Huawei has signed over 40 contracts in 5th generation mobile telecommunications (5G) across Europe, Asia, Africa, and the Middle East, despite increased concerns over security and US attempts to discourage allies and partners from partnering with it.⁵⁵ This push for 5G has emerged as a core component of the Digital Silk Road, an initiative that Xi has personally highlighted as an opportunity to strengthen cooperation with partner countries on digital economy, cyber security, and information infrastructure construction.⁵⁶ Increas-

50 Ibid.

51 “More Clarity Needed on Role of Communist Party in Listed Firms,” *South China Morning Post*, 25 July 2018, <https://www.scmp.com/business/article/2156698/foreign-investors-will-need-more-clarity-role-communist-party-organisations>.

52 Samantha Hoffman and Elsa Kania, “Huawei and the Ambiguity of China’s Intelligence and Counter-Espionage Laws,” *Strategist*, 13 September 2018, <https://www.aspistrategist.org.au/huawei-and-the-ambiguity-of-chinas-intelligence-and-counter-espionage-laws/>.

53 People’s Republic of China, *National Intelligence Law*, art 7, accessed, 3 July 2019, http://www.npc.gov.cn/npc/xinwen/2017-06/27/content_2024529.htm.

54 For an authoritative accounting of this initiative, see Nadège Rolland, “China’s New Silk Road,” *National Bureau of Asian Research* 12 (2015).

55 Krystal Hu, “Huawei Is Still Winning 5G Contracts Around the World Despite the U.S. Ban,” *Yahoo Finance*, 17 April 2019, <https://finance.yahoo.com/news/huawei-is-still-winning-5g-contracts-around-the-world-despite-the-us-ban-193456655.html>.

56 “Xi Jinping at the National Cyber Security and Informatization Work Meeting: Construct a 21st Century Digital Silk Road [习近平在全国网络安全和信息化工作会议上强调：建设21世纪数字丝绸之路],” *Xinhua*, 21 April 2018, <https://webcache.googleusercontent.com>

ingly, technology companies are at the forefront of the execution of this agenda. For instance, as a “5G pioneer,” ZTE has committed to supporting the development of the Digital Silk Road, leveraging its 5G trials and partnerships in Europe and the Asia-Pacific.⁵⁷ Often, Chinese tech leaders and stakeholders are quite open in highlighting how their activities in expanding the Digital Silk Road will provide the “China Model” and “China Program” to the world.⁵⁸

Increasingly, OBOR has encompassed the expansion of S&T cooperation and research partnerships. The “Space Information Corridor” has promoted deeper integration and partnership with ASEAN nations and globally on space science and technology, including providing services for navigation and satellite communications.⁵⁹ At the same time, China has expanded global partnerships for data sharing, including a global platform for big data from satellites—particularly remote sensing—and from sea- and ground-based observation platforms, shared among OBOR countries.⁶⁰ Such initiatives may facilitate global situational awareness and surveillance capabilities, while bolstering strategic partnerships worldwide.⁶¹ For instance, in September 2018, the first International Conference on Digital Economy and Digital Silk Road marked the establishment of a “data port” created in partnership between China and the Philippines.⁶² The launch of the Digital Silk Road International Industry Alliance initiated by China, which brings together

tent.com/search?q=cache:v7IGTbYev-0j:https://www.yidaiyilu.gov.cn/xwzx/xgcdn/53674.htm+&cd=7&hl=en&ct=clnk&gl=us.

57 “ZTE Corporation Attends the 2017 World Internet Conference [中兴通讯出席2017世界互联网大会 5G先锋共建数字丝路],” *China Network*, 4 December 2017, http://science.china.com.cn/2017-12/04/content_40090835.htm.

58 “Jointly Construct the Digital Silk Road, Share the Network Development Dividends [共建数字丝绸之路，共享网络发展红利],” *Guangming Network*, 28 April 2019, http://www.legaldaily.com.cn/commentary/content/2019-04/28/content_7844568.htm.

59 See “The Belt and Road Space Information Corridor [一带一路空间信息走廊],” *China Daily*, 13 September 2018, <http://www.chinadaily.com.cn/a/201809/13/WS-5b99b2c5a31033b4f4655bde.html>.

60 “‘Digital Silk (Road) Earth Big Data Platform’ Released to Provide Multi-language Data Sharing [‘数字丝路地球大数据平台’发布 提供多语言数据共享],” *Xinhua*, 6 December 2018, <http://silkroad.news.cn/2018/1206/122769.shtml>.

61 “National (Aero)Space Bureau: Our Nation Will Unceasingly Expand the ‘One Belt, One Road’ National Information Outcomes Sharing ‘Circle of Friends’ [国家航天局：我国将不断扩大“一带一路”空间信息成果共享“朋友圈”],” 11 September 2018, http://webcache.googleusercontent.com/search?q=cache:Utwl4belYloj:www.gov.cn/xinwen/2018-09/11/content_5321128.htm+&cd=35&hl=en&ct=clnk&gl=us.

62 “China’s Big Data Companies Embark on the ‘Belt and Road’ [中国大数据企业走上“一带一路”],” *Xinhua*, 14 December 2018, http://news.xinhuanet.com/globe/2018-12/14/c_137663769.html.

industry stakeholders from China and participating countries, is also intended to facilitate such collaborations.⁶³ Also pursuant to and branded with OBOR, the export of Chinese AI technologies with applications in surveillance, including a new agreement between CloudWalk Technology and the government of Zimbabwe, also raise the risks that China's model of, and the requisite capabilities for, social control may be promulgated along the way, including through direct training.⁶⁴ There are plans to promote key projects that involve big data, the Internet of Things, and cloud computing, as well as projects for smart cities, to which as much as RMB100 billion might be invested in the next five years.⁶⁵

Pursuant to the Digital Silk Road, Chinese companies may gain access to new sources of data that can reinforce China's advantage in AI development, while expanding the deployment of Chinese cloud computing.⁶⁶ Alibaba Cloud has reportedly deployed over 200 data centers in over 14 locations around the world, including recent additions in India and Indonesia.⁶⁷ Tencent Cloud created its initial five overseas data centers in Hong Kong, Toronto, and Singapore, and recently announced intentions to add new data centers, including in Seoul and Mumbai.⁶⁸ However, this total is estimated to amount to less than half of the number of those that Amazon has at present. Baidu is also looking to establish a paradigm that combines a cloud strategy with plans for AI development. Zhang Yaquin, president of Baidu, believes the AI era also needs a general-purpose operating system, which is equivalent to building Android in the AI era. "Chinese companies have tried the operating system many times before, but they have all gone halfway. China has such opportuni-

63 "Digital Economy and Digital Silk Road International Conference Proposes to Jointly Build Digital Silk Road," *Zhejiang Daily*, 19 September 2018.

64 "Servicing One Belt One Road, Cloud Walk Science and Technology Signed a Strategic Cooperation Agreement with the Zimbabwe Government [服务一带一路 云从科技与津巴布韦签订战略合作协议]," *Sci-T Daily*, 29 March 2018, http://science.china.com.cn/2018-03/29/content_40273454.htm.

65 Ibid.

66 "Cloud Computing Big Data 'One Belt, One Road' International Cooperation Forum Held in Beijing [云计算大数据“一带一路”国际合作论坛在京举行]," 16 June 2017, <https://webcache.googleusercontent.com/search?q=cache:O35NWvIk2E8J:https://www.prnasia.com/story/180526-1.shtml+&cd=1&chl=en&ct=clnk&gl=us>.

67 See Alibaba Cloud's "Global Infrastructure," <https://www.alibabacloud.com/global-locations>.

68 "China's Cloud Computing Ushered in the 'Golden Window' Period [中国云计算迎来“黄金窗口”期]," CCTV, 12 October 2017, <http://webcache.googleusercontent.com/search?q=cache:bMBp2QxYsmoJ:news.cctv.com/2017/10/12/ARTIs11nQbcn8A5zZ5AecNj7171012.shtml+&cd=25&chl=en&ct=clnk&gl=us>.

ties and capabilities in the AI era.”⁶⁹ Unsurprisingly, Baidu is promoting its own DuerOS AI operating system.

While in the process of building up indigenous capacity, China will continue to encourage its own AI enterprises to pursue a “going out” (走出去) strategy.⁷⁰ This approach includes overseas mergers and acquisitions, equity investments, and venture capital, as well as the establishment of research and development centers abroad. Although such activities have become increasingly prevalent over the past several years, China’s “New Generation AI Development Plan” has added its official imprimatur to these efforts. This approach will undoubtedly prove controversial in some quarters and could provoke further frictions. Chinese investments in Silicon Valley AI startups have fueled the US decision to update the Committee for Foreign Investment in the US (CFIUS) to expand reviews of Chinese high-tech investments, especially in AI.⁷¹ Meanwhile, China has continued to expand its AI research collaborations and engagements in Europe and globally. For instance, some of the top universities in China and France have created an “AI alliance” that is intended to promote research cooperation.⁷² There have also been increases in China-Britain AI cooperation, which is occurring under the auspices of the “China-United Kingdom S&T Innovation Cooperation Strategy,” released in 2017.⁷³ Since the establishment of the Sino-British Joint Science Innovation Fund in 2013, 240 Chinese and British institutions have carried out more than 460 projects across over 40 funding schemes. Given the increased concerns over certain research collaborations, it remains to be seen if there will be greater scrutiny going forward.

SETTING THE STANDARDS

At the intersection of technical and geopolitical dimensions of technological competition, the Chinese government is actively seeking to lead in the creation of technical standards for a range of emerging

69 Ibid.

70 “State Council Notice on the Issuance of the New Generation AI Development Plan.”

71 Paul Mozur and Jane Perlez, “China Bets on Sensitive U.S. Start-Ups, Worrying the Pentagon,” *New York Times*, 22 March 2017, <https://www.nytimes.com/2017/03/22/technology/china-defense-start-ups.html?hpw&rref=business&action=click&pgtype=Homepage&module=well-regi-on®ion=bottom-well&WT.nav=bottom-well>.

72 “China and France’s Top Universities Build ‘AI Alliance’ to Promote Artificial Intelligence International Cooperation,” *Xinhua*, 18 January 2018.

73 “AI, Another Breakthrough in Sino-UK Innovation Cooperation [人工智能中英创新合作又一风口],” *People’s Daily*, 3 November 2018, <http://world.people.com.cn/GB/n1/2018/1103/c1002-30380012.html>.

industries, from ultra-high voltage (UHV) transmission to the Internet of Things (IoT), and quantum communications.⁷⁴ The active development of indigenous standards and their subsequent internationalization is seen as a “golden opportunity” that can enable Chinese companies to achieve greater global market share, even dominance, often leveraging advantages of scale in ways that can reinforce their commercial competitiveness and worldwide expansion.⁷⁵ For instance, Huawei and China’s major telecoms have become central players in 5G standardization and commercialization, and their active pursuit ventures and partnerships worldwide will advance this agenda.⁷⁶ This potential influence in technology is linked to China’s global ambitions. For instance, Liu Qingfeng, the chairman of iFlytek has said, “If we can’t have discourse power in the field of artificial intelligence, we can’t leap into the high-end of the global value chain in the future, and we can’t have global influence.”⁷⁷ Indeed, the prestige that comes with China’s technological advancements has been characterized as an element of global discourse power.⁷⁸

The process of setting standards for 5G has seemingly epitomized this complex interplay between technical questions and considerations of competitive advantage. Huawei has clearly exerted strong influence in the formulation and establishment of standards for 5G, particularly promoting approaches that will benefit its own IP.⁷⁹ By many accounts, Huawei’s approach has been tantamount to “flooding” the process with its representatives and pursuing positions of leadership.⁸⁰

74 For another assessment of how this is playing out in AI in particular, see Jeffrey Ding, Paul Triolo, and Samm Sacks, “Chinese Interests Take a Big Seat at the AI Governance Table,” *DigiChina*, 20 June 2018, <https://www.newamerica.org/cybersecurity-initiative/digichina/blog/chinese-interests-take-big-seat-ai-governance-table/>. “Power Play: China’s Ultra-High Voltage Technology and Global Standards,” *MacroPolo*, April 2015, https://macropolo.org/wp-content/uploads/2015/04/PPS_UHV_English_R.pdf.

75 Elsa Kania, “China’s Play for Global 5G Dominance—Standards and the ‘Digital Silk Road.’”

76 “China Will Promote the Implementation of National Standards Such as 5G and Smart Cities in Countries Along ‘One Belt, One Road’ [我国将推动、智慧城市等国标在“一带一路”沿线国家应用实施],” *Xinhua*, 22 December 2017, http://www.xinhuanet.com/2017-12/22/c_1122155113.htm.

77 Ibid.

78 Liu Tianxing [刘天星], “Seize International S&T Discourse Power [掌握国际科技话语权],” *Guangming Daily*, 22 June 2017, http://epaper.gmw.cn/gmrb/html/2017-06/22/nw.D110000gmrb_20170622_1-13.htm.

79 As of mid-2018, representatives from Chinese companies held 10 of the 57 chairman and vice chairman positions on 3GPP panels. Newley Purnell and Stu Woo, “China’s Huawei Is Determined to Lead the Way on 5G Despite U.S. Concerns,” *Wall Street Journal*, 30 March 2018, <https://www.wsj.com/articles/washington-woes-aside-huawei-is-determined-to-lead-the-way-on-5g-1522402201>.

80 “Warner, Rubio Ask Intelligence Community for Public Report Detailing Chinese Participa-

As of spring 2019, Huawei had completed a total of 11,423 contributions to 5G standards, which reveal the level and forcefulness of its participation in the process, even though the quality and impact of these activities can be questionable.⁸¹ The fight for 5G centers upon not only the deployment but the research and development of technologies that will shape the future of this technology. In this context, the process of standards setting has become a focal point for issues that may impact future influence.

As AI becomes a focus of international competition, the “going out” of Chinese standards and approaches for AI development has become a clear priority.⁸² For instance, the China Artificial Intelligence Industry Development Alliance (AIIA), which represents industry players and was created with support from Chinese government stakeholders in October 2017, has sought to strengthen exchanges with international standardization organizations.⁸³ China’s highly strategic approach to standardization, including seeking greater discourse power in relevant international organizations, reflects an understanding of the competitive advantage that influence in this domain can confer.⁸⁴ Going forward, the Standardization Administration of China plans to issue “China Standards 2035” (中国标准2035) to promote the popularization of Chinese technical standards across a range of industries.⁸⁵ This standardization program has also been linked to the construction of OBOR by the Ministry of Industry and Informatization.⁸⁶

tion in 5G Standard-Setting,” press release, 1 March 2019, <https://www.warner.senate.gov/public/index.cfm/2019/3/warner-rubio-ask-intelligence-community-for-public-report-detailing-chinese-participation-in-5g-standard-setting>.

81 “Who Is Leading the 5G Patent Race?” *Iphytics*, 12 December 2018, <https://www.iam-media.com/who-leading-5g-patent-race>.

82 “Global Disputes Intensify and Accelerate the ‘Going Out’ of China’s AI Standards [全球之争加剧 中国AI标准加快 ‘走出去’],” *People’s Post and Telecommunication* [人民邮电报], 1 June 2018, <http://tc.people.com.cn/n1/2018/0601/c183008-30027519.html>.

83 AIIA was established in October 2017 under the leadership of China’s National Development and Reform Commission, Ministry of Science and Technology, Ministry of Industry and Information Technology, and the Central Network Information Office (i.e., Cyberspace Administration of China). The China Information and Communication Research Institute (CAICT) is also involved in leading initiatives, and there are over 200 AI enterprises involved.

84 “China Will Promote the Implementation of National Standards Such as 5G.”

85 “National Standards Committee: Currently Developing ‘China Standard 2035’ [国家标准委：正制定《中国标准2035》],” *China News*, 10 January 2018, <http://www.chinanews.com/gn/2018/01-10/8420700.shtml>.

86 “Implementation Opinions of the Ministry of Industry and Information Technology on the Standardization of the Industrial Communication Industry Serving ‘One Belt, One Road’ Construction” [工业和信息化部关于工业通信业标准化工作服务于“一带一路”建设的实施意见], Science and Technology Department, 12 November 2018, <http://webcache.googleuser->

China is looking to reinforce its foundation for leadership in quantum communications technologies through setting the standards for their future development. As of June 2017, the China Communications Standardization Association (中国通信标准化协会) established a Special Task Group on Quantum Communications and Information Technologies (量子通信与信息技术特设任务组), also known as ST7.⁸⁷ This task group includes the Quantum Communications Working Group and a Quantum Information Processing Working Group.⁸⁸ To date, ST7 already has initiated several projects and pursued research on the creation of two national standards and one industry standard. The early development of these standards is intended to “support the healthy development of quantum communication technology and its industrial applications in China.”⁸⁹ This approach to standardization may contribute to China’s influence in shaping the future of new industries and technologies. As the oft-quoted saying goes, “First-class companies make standards, second-class companies do services, and third-class companies make products.”⁹⁰

Beyond purely technical standards, China’s ambitions for leadership in artificial intelligence are extending to involve taking on more active involvement in the governance of these technologies. China’s “New Generation AI Development Plan” included a commitment to “actively participate in global governance of AI.”⁹¹ The plan discusses an intention to “strengthen the study of major international shared problems” in AI and “deepen international cooperation on AI laws and regulations.”⁹² China’s initial efforts to formulate legal and ethical frameworks for AI have been characterized by Chinese policy-makers as “a key premise and

content.com/search?q=cache:wG_MlujEJDIJ:www.miit.gov.cn/n1146290/n4388791/c6480447/content.html+&cd=27&hl=en&ct=clnk&gl=us.

87 “Quantum Communications Technology Research, Development, and Industrialization Accelerate [量子通信技术研发与产业化进程加快],” Guangdong Communications Administration, <https://www.gdca.gov.cn/gdcmsnet/gdcms/content/staticView%3Fpath%3D/56/3213.htm1+&cd=11&hl=en&ct=clnk&gl=us>.

88 Ibid.

89 Ibid.

90 “一流企业做标准，二流企业做服务，三流企业做产品” and see “5G Patent Competition Escalates; Chinese Companies Compete to Increase Investments [5G专利竞争升级 中国企业竞相加大投入],” *Shanghai Securities News* [上海证券报], 19 December 2017, http://webcache.googleusercontent.com/search?q=cache:jsaVSWvmj4EJ:news.xinhuanet.com/2017-12/19/c_1122132724.htm+&cd=10&hl=en&ct=clnk&gl=us.

91 “State Council Notice on the Issuance of the New Generation AI Development Plan.”

92 Ibid.

foundation for China to seize the commanding heights of the international AI industry and master the discourse power internationally.”⁹³ Thus far, this contestation of discourse power in AI has focused primarily on seeking to ensure the centrality of China’s AI industry. For instance, AI is expected to reshape global rules, and “only by pre-arranging and strengthening research in these domains will it be possible [for China] to acquire more discourse power in international competition related to AI in the future,” as the director of the Tencent Research Institute, which has undertaken influential policy analyses on the topic, argued.⁹⁴ In practice, these efforts to shape global approaches to AI may be used to defend against critiques and legitimize the ways in which the Chinese government is using AI for social control and public security—including censorship and surveillance—particularly at a time when there is growing backlash against these applications.

In certain respects, AI is also seen as a tool that can leverage and expand the influence of Chinese culture. For instance, iFlytek, which is known for its specialty in natural language processing, has partnered with the Chinese Foreign Languages Bureau to build an AI translation platform that can enable the “going out” of Chinese culture.⁹⁵ In May 2018, China hosted the Artificial Intelligence and Education World Conference, during which the participants reached a “Beijing consensus” on “healthy” development of AI. The final document included a number of laudable principles, but also was framed as intended to promote a “community of common destiny,” a concept that carries a specific salience in Chinese government propaganda on reshaping the current system for global governance.⁹⁶

93 Li Jialin [李佳霖], “AI Industry Legislation Accelerates [人工智能产业立法当加速],” 8 May 2018, http://webcache.googleusercontent.com/search?q=cache:GkmIrbFuL60J:paper.ce.cn/jjrb/html/2018-05/08/content_361854.htm+&cd=1&hl=en&ct=clnk&gl=us.

94 “China Aims at the Goal of Artificial Intelligence [中国瞄准人工智能强国目标专家解读],” 5 February 2018.

95 “China Foreign Languages Bureau and iFlytek Jointly Construct an AI Translation Platform [中国外文局与科大讯飞共建人工智能翻译平台],” *Xinhua*, 20 June 2018, http://webcache.googleusercontent.com/search?q=cache:ULvYOGmDN6EJ:www.xinhuanet.com/politics/2018-06/20/c_1123010365.htm+&cd=12&hl=en&ct=clnk&gl=us.

96 Liza Tobin, “Xi’s Vision for Transforming Global Governance: A Strategic Challenge for Washington and Its Allies,” *Texas National Security Review* 2, no. 1, November 2018, <https://tnsr.org/2018/11/xis-vision-for-transforming-global-governance-a-strategic-challenge-for-washington-and-its-allies/>.

CONSIDERATIONS FOR US POLICY AND STRATEGY

The US might explore multiple options for potential policy responses to these intersections between technology and China's strategic objectives and global influence.

- Ensure that US policies to constrain the global expansion of Chinese tech companies are carefully balanced and coordinated.
 - US policy initiatives must recognize the question of calibration of risk and should be carefully bolstered by available evidence in order to achieve greater traction and legitimacy. If US security concerns are perceived as excessive or motivated by protectionism, then efforts to constrain the global expansion of Chinese tech companies may have less influence.
- Consider creating an American alternative to the “Digital Silk Road” as a means of ensuring the US can provide positive contributions to the global expansion of information technology infrastructure.
 - The US government can only counter the appeal of Chinese technology companies as partners and providers of information infrastructure if able to provide a viable and attractive American alternative.
- Undertake more active and systematic initiatives to develop and promote technical standards for emerging technologies, as well as legal and normative frameworks that are consistent with US values and priorities.
 - Engage with allies and partners to explore new approaches to ensure the security and appropriate governance of emerging technologies.
- Expand scientific cooperation and research collaboration with allies and partners.
 - In a world of globalized innovation, American advantage can be best secured through leveraging the strength of these critical relationships and opportunities for cooperation.

- Coordinate with allies and partners on countering the expansion of China's tech transfer tactics, which can be enabled by this global expansion.
 - For instance, track the activities of organizations involved in tech transfer and talent recruitment that have links to the Chinese government or CCP united front work organizations.