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Now I Know my ABCs: U.S.-China Policy on AI, Big Data, and Cloud Computing

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I S S U E S

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Papers in the AsiaPacific Issues series feature topics of broad interest and significant impact relevant to current and emerging policy debates. The views expressed are those of the author and not necessarily those of the Center.

SUMMARY Artificial Intelligence (AI), Big Data, and Cloud Computing (ABC) have generated unprecedented opportunities and challenges for economic competitiveness, national security, and law and order, as well as the future of work. ABC policies and practices have become contentious issues in U.S.-China bilateral relations. Pundits see a U.S.-China AI race and are already debating which country will win. Kaifu Lee, the CEO of Sinovation Ventures, believes that China will exceed the United States in AI in about five years.¹ Others argue that China will never catch up.² This essay focuses on two issues: the comparative ABC strengths of the United States and China in data and research and development (R&D); and the emerging ABC policies and practices in the two nations. Empirical analysis suggests that the United States and China lead in different areas. Compared to China's top-down, whole-of-government, national-strategy approach, the U.S. ABC policy has been less articulated but is evolving.

A U.S.-China ABC Duopoly: Data and R&D

Data: Quantity, Quality, and Purposes. China had over 800 million internet users as of 2018, more than the European Union (EU) and the United States combined. Thanks to the size of its growing middle class and the rapid diffusion of the mobile internet, China's digital economy is second only to that of the United States. China has become the global leader in e-commerce, mobile payments, and gaming. However, the economic and social value of big data depends not only on volume but also on variety and veracity. Data quality may constrain the value of Chinese big data. In addition, problematic data practices and weak privacy protection could hinder the globalization of Chinese tech firms. Not surprisingly, Jim Breyer, a renowned venture capitalist famous for his early investment in Facebook, claimed that "United States companies simply have better data, they understand how to analyze that data, and if we're thinking about big breakthroughs... the U.S. companies have, currently, a very significant lead versus the Chinese companies."³ Moreover, how data are collected, curated, and used for commercial or coercive purposes is shaped by and is shaping ABC policies and practices in China and the United States both independently and interdependently.

China's digital economy is second only to that of the United States

Research and Development (R&D). The quantity and quality of AI research papers published by Chinese scientists have been on the rise. An example widely used to demonstrate China's AI power is the decision by the Association for the Advancement of AI to postpone its 2017 annual conference to accommodate the Chinese New Year. Nonetheless, originality remains an area for improvement for scientists in China. The United States commands a visible lead in AI talent, which grows bigger as talent levels increase. A report suggested that China's share in the World

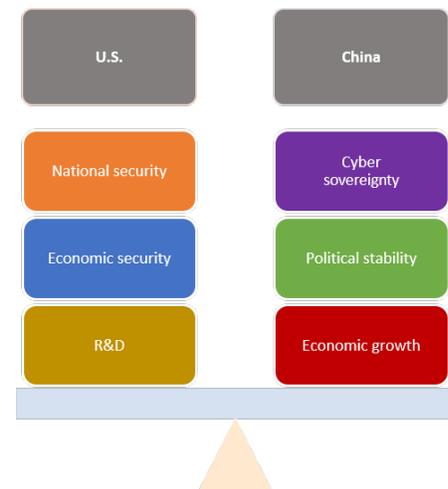
Top 1,000 computer scientists was only 0.5 percent of that of the United States in 2018.⁴

Emerging Patterns of ABC Policies and Practices

While the broad policy goals of using ABC for economic growth and national security may be similar in the United States and China, there are notable differences in how ABC policy priorities are developed and executed (Figure 1). The Chinese approach emphasizes a balance of economic development and political stability, a strategy that has led to the state's growing persistence in cyber-sovereignty as well as to policy changes regulating state-corporate dynamics. The U.S. emphasis on national security, in turn, has led to a growing confrontation with China. ABC policies and practices are evolving rapidly as policymakers in both countries adjust bilateral relations, inter-agency coordination, and relations with domestic and international tech giants.

China. In addition to market size and the investment frenzy from the private sector, Chinese government policies (and the deliberate lack thereof) have also been widely credited as a main driver of

Figure 1. U.S.-China ABC Policy Mission



Because of big data development, Guizhou, one of China's poorest provinces, achieved one of the highest annual GDP growth rates in the nation

China's digital transformation. At least on paper, few countries have a digital policy framework as articulate and systematic as the Chinese. Overall, China's ABC policies center on the dual goals of political stability and economic development.⁵ By taking this approach, the Chinese government has been playing multiple roles as regulator, investor, and buyer, simultaneously promoting cyber-sovereignty through regulating cross-border data flow and developing a new mode of control and cooption of domestic and foreign firms.

First, a series of regulatory and legislative work ranging from national to regional and local policies, laws, plans, and programs has been designed and deployed in a top-down, whole-of-government approach. Among U.S. lawmakers and policymakers, the Made in China 2025 Plan has attracted the most attention, becoming known as "the central villain, the real existential threat to U.S. technological leadership."⁶ However, that ambitious national plan is just one of several the Chinese government hopes will transform the country into a global hi-tech powerhouse.

President Xi set the tone when inspecting the Chinese Academy of Sciences in July 2013 by proclaiming that those who control data control power ["谁掌握了数据谁就掌握了主动"]. In March 2017, the subject of AI entered the Chinese Prime Minister's annual report on the Work of the Government and was designated as a national strategy. In July 2017, the State Council released the New Generation AI Development Plan. As Eric Schmidt, then executive chairman of Alphabet/Google, said to a Pentagon audience about the plan: "By 2020 the Chinese will have caught up. By 2025 they will be better than us. And by 2030 they will dominate the industries of AI."⁷ In his keynote speech at the 19th Party Congress in October 2017, President Xi reiterated the country's commitment to the integration of the digital economy—including the Internet,

big data, and AI—with the brick-and-mortar economy. In December 2017, while chairing the 2nd group study of the politburo, China's power center, President Xi reinforced the call to build a digital China by pushing the national big data strategy for economic and social development.

Second, after quickly gaining financial and institutional support from the pertinent ministries of the central government and various levels of local government, these policies have led to the rapid development of national big data pilot zones and research labs as well as ministerial, provincial, and municipal big data or AI demonstration bases and parks. For example, following the National Big Data Development Plan promulgated in 2015, most Chinese provinces released provincial big data industry development plans or development initiatives by 2016. In 2018, the central government set the new goals of establishing between 10 and 15 big data comprehensive pilot zones and a new batch of big data industry clusters and demonstration bases by 2020.

Most notably, Guizhou, one of China's poorest provinces, was selected as China's first national big data pilot zone. While Guizhou's geographic and climatic conditions are promising for building data centers, President Xi's trust in local allies—especially Mr. Chen Min'er and Mr. Chen Gang—was another important factor. Inspecting Guizhou National Big Data Zone in 2015, President Xi was convinced that "it is indeed reasonable for Guizhou to develop big data" ["贵州发展大数据确实有道理"]. Because of big data development, Guizhou achieved one of the highest annual gross domestic product (GDP) growth rates in the nation, and both Chens have received fast-track promotions, setting an example for other provinces to imitate.

The hand of the state is visible in developing and financing policy initiatives. Accustomed to encouraging digital entrepreneurship

through providing land and setting up incubators, governments at different levels have been increasingly acting as venture capitalists. For instance, capitalists, while Chinese sovereign wealth funds have invested in leading Chinese tech unicorns. At the local level, for example, Shenzhen Capital Group (SCGC), founded by the Shenzhen municipal government, is China's leading domestic venture capital firm, with a digital portfolio ranging from smart city infrastructure to consumer goods in virtual and augmented reality.

Third, the Chinese government has been exploring new modes of control over established and emerging tech giants.⁸ China's digital economy has primarily developed through grassroots entrepreneurs outside of the state-owned sector. The most prominent example is BAT: Baidu, a Chinese search engine; Alibaba, an e-commerce firm; and Tencent, a Chinese social media platform and the world's largest game company. Benefiting from the withdrawal of Google as well as the blocking of Facebook, YouTube, and Twitter, the BAT companies dominate the consumer market. In the past several years, the Chinese tech ecosystem has become one of most vibrant in the world, including not just global tech giants such as BAT but also their fast-growing junior peers, including Didichuxing, Bytedance, SenseTime, IflyTech, and Cloudwalk. Each member of BAT has been selected as a national champion of AI.⁹

The government has used the carrots and sticks of government procurements and regulations to bring domestic tech firms into the fold. China's three big state-owned telecoms—China Telecom, China Unicom, and China Mobile—remain a formidable presence in the big data industry. Together with IT equipment manufacturers such as Huawei, ZTE, Xiaomi, Inspur, and Jingdongfang, they dominate the Chinese digital infrastructure. A mixed-ownership reform

of state-owned telecom behemoths began in 2017, welcoming BAT investment and board membership for greater integration of public- and private-sector digital resources. The government also floated the idea of taking a 1 percent government stake in exchange for board representation in Alibaba and Tencent. A Tencent executive told the Wall Street Journal that “this is the thing that keeps Pony [Ma the founder of Tencent] up at night.”¹⁰ Another proposal raised during China's parliamentary sessions in 2018 invited Chinese tech firms listed in overseas stock markets to return to the Chinese stock market. One after another, Chinese tech tycoons expressed their support for a speedy homecoming. Implementation has since stalled, however, due to volatile Chinese stock market performance.

Fourth, China has been promoting cyber-sovereignty through the control of cross-border data flow and the demand for data localization. Both domestic and foreign companies are required to store data from China within China's borders. Additionally, China has been accused of forced technology transfer, censorship, and intimidation against American tech firms. Transnational corporations have been both complying—via forming joint ventures with local, often state-owned partners—and complaining at the same time. To build a data center in Guizhou, Apple joined with Cloud Guizhou, a state-owned firm with financial backing from the provincial government. Amazon built its major data center in Ningxia, a Northwestern province, together with Western Cloud Base, whose founder has deep government relationships. As evident in recent U.S.-China trade negotiations, American businesses have shown their concern by lobbying the U.S. government to pressure China for greater and more open market access.

The United States. The Trump administration's first National Security Strategy described “U.S.

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The Trump administration's ABC approach has centered on national security and added economic security as an integral part of national security

efforts to counter the exploitation of information by rivals” as “tepid and fragmented,” lacking “a sustained focus,” and “hampered by the lack of properly trained professionals.”¹¹ This assessment may be applicable to the U.S. government’s ABC policies and efforts. In May 2018, the Trump administration released a fact sheet highlighting its AI efforts and achievements in terms of military and unclassified R&D investment, government service, regulatory barrier removal, talent training, and international collaboration.¹² Yet, compared to China, America’s ABC policy has been less articulate and less systematic. While acknowledging the importance of ABC to national security and government efficiency, the federal government has been facing challenges such as aging IT infrastructure, a shortage of IT talent, and tight budgets.¹³ The government shutdown from December 2018 to January 2019 may further reduce the appeal of federal jobs for ABC talent.

First, the Trump administration’s ABC approach has centered on national security and added economic security as an integral part of national security. The National Defense Authorization Act (NDAA) for Fiscal Year 2019 gave the Pentagon \$716 billion, its largest-ever budget.¹⁴ The Department of Defense (DoD) spent \$7.4 billion in 2017 on ABC, setting AI as the cornerstone of America’s military dominance.¹⁵ Launched in 2017, the Electronics Resurgence Initiative of the Defense Advanced Research Projects Agency is a five-year program with a budget of \$1.5 billion for chip design, architecture, materials, and integration. The Army Futures Command, with a budget of \$100 million and a staff of 500, is seeking collaboration with universities to develop next-generation technologies for defense.¹⁶ The DoD has launched Project Maven, aimed at integrating big data and machine learning for AI support on the battlefield within 2–3 years. The DoD’s Joint Enterprise

Defense Infrastructure (JEDI) acquisition, valued at \$10 billion over a decade, has created competition between Amazon and other tech firms such as Oracle, IBM, Microsoft, and Google.

Second, compared to past administrations, the Trump administration has been more confrontational with China, having accused it of forced technology transfer and intellectual property theft. It has also demanded that the Chinese government give up its Made in China 2025 Plan—something that the Chinese government and public have rejected, labeling it as an imperialistic intrusion in a sovereign state’s right of development.

The U.S. inter-agency Committee on Foreign Investment in the United States (CFIUS) has been increasing its scrutiny of Chinese investment in critical U.S. infrastructure and technology. The Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA) was overwhelmingly approved in 2017 by the House and later incorporated into the NDAA for fiscal year 2019. The act further tightens U.S. national security reviews of American exports and bars federal government and its contractors from purchasing or using technologies from the Chinese firms ZTE or Huawei. After being blocked from acquiring MoneyGram by CFIUS in 2018, Alibaba has redirected its global cloud computing expansion to international markets outside of the United States. Huawei, the largest telecommunication equipment firm in the world, experienced major setbacks in the U.S. market in 2018, starting from AT&T’s withdrawal from a deal for distributing Huawei smartphones in January and ending with the arrest of Huawei’s chief financial officer in Canada at the request of the United States in December. Following both the Department of Justice’s indictment for alleged trade secret theft and fraud and the State Department’s warning to European allies against using Huawei telecommunications equipment for 5G rollouts in early 2019, the Trump administration issued an executive order

banning Huawei from operating in the United States. The Bureau of Industry and Security (BIS) of the U.S. Department of Commerce also added Huawei to its Entity List in May.¹⁷

Third, the Trump administration has been developing greater inter-agency coordination and public and private collaboration. Since President Trump took office, the Office of Science and Technology Policy (OSTP) experienced a decline in terms of size and expertise.¹⁸ Because the positions of both the U.S. Chief Technology Officer (CTO) and the director of OSTP were not filled for a long time, Michael Kratsios, the Deputy U.S. CTO and Deputy Assistant to the President at OSTP, has served as the government's de facto top tech official. In coordination with federal agencies, he has played a critical role since early 2017 in shaping national policies and the overall agenda on big data, innovation, and technology infrastructure. Mr. Kratsios was finally nominated and confirmed as the Chief Technology Officer of the United States in August 2019.

Meanwhile, the White House Office of American Innovation was set up by a presidential order, with Jared Kushner appointed its director in March 2017. Its mission is to “make recommendations to the President on policies and plans that improve Government operations and services, improve the quality of life for Americans now and in the future, and spur job creation.”¹⁹ Since then, the Office of American Innovation has served as the White House's main point of contact for the American tech industry and played an important role in introducing the Modernizing Government Technology (MGT) Act in December 2017. In May 2018, the OSTP helped convene an AI summit of top executives from Amazon, Facebook, Google, Intel, and thirty-four other major U.S. companies for policy proposals on the development of robots, algorithms, and AI, and Mr. Kushner gave the closing remarks. Soon

after, an interagency select committee was created as a subgroup within the National Science and Technology Council, with a mandate to “advise the White House on government-wide AI research and development priorities; establish partnerships between government, the private sector and independent researchers, and [to develop] policies to prioritize AI research, better leverage federal data and computing resources for the AI research community, and train the next generation of American AI researchers.”²⁰

In February 2019, President Trump launched the American AI Initiative, which “will focus the resources of the Federal government to develop AI in order to increase our Nation's prosperity, enhance our national and economic security, and improve quality of life for the American people.” Using a multipronged approach, the American AI Initiative has five key areas of emphasis: (1) investing in R&D; (2) making federal data and computing resources more available to research institutes and industries; (3) setting AI governance standards and providing guidance to assure public trust; (4) preparing the AI workforce; and (5) promoting international engagement and protecting “the advantage of the United States in AI and technology critical to United States national and economic security interests against strategic competitors and foreign adversaries.”²¹ The United States is the 19th country in the world to release such a national AI policy, plan, or initiative.²² The initiative was welcomed, but critics have pointed out the need to flesh out specific actions and commitments.

Policy Pitfalls and Recommendations

It is uncertain how much the ongoing U.S.-China trade negotiations will diffuse tensions. What is clear, however, is that how China develops its digital economy will not undergo significant structural changes overnight. While China

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While U.S. R&D investment increased by about 4 percent annually during 2010–2015, China's accelerated at an annual growth rate of 18 percent over the same time period

may give up the Made-in-China 2025 Plan, it is unlikely to give up the pursuit of the Chinese dream, of which ABC technologies are an integral part. What we may be seeing instead is the prologue of U.S.-China ABC competition.

China. Digital technologies in China reflect the contradictions and complexities of Chinese society: growing Internet access but a persistent digital divide; significant economic development but tightening political control; and new forms of civic engagement but pervasive surveillance.²³ The Chinese government has identified the capacity of concentrating resources to accomplish big projects [集中力量办大事] as its greatest institutional advantage. Even some in Washington have expressed admiration for the power of the Chinese government to quickly set priorities and move forward. However, with such capacity comes risks such as overinvestment, overcapacity, and a huge waste of resources as officials and entrepreneurs swarm to the next big thing the government picks. The meteoric boom and bust of the Chinese bike-sharing business, with the mountains of abandoned shared bikes and billions of investments lost, may serve as the latest case in hand. Driven by government officials' push for GDP growth, an AI "heat wave" has reached county level and generated ghost parks that lack talent or expertise. Fake AI firms and projects have frustrated investors. High R&D investment, high competition from established firms such as BAT, and high user acquisition costs mean that the survival of most AI firms is a longshot, especially due to the slow development of the consumer (2C) and the business (2B) market. Not surprisingly, many Chinese AI firms tap the so-called 2G market where the government serves as the main client of ABC products and services. For instance, Megvii's product

Face++, a facial recognition service, has been used by Chinese police forces across the country.

The United States. Observers may have different assessments of the Trump Administration's confrontational approach to China. While the specifics of ongoing trade negotiation between the United States and China remain uncertain, stronger intellectual-property protection, more transparent technology transfer, and greater market access would allow American firms to compete more effectively in the Chinese market. However, it is at least as critical for the federal government to develop a long-term, more comprehensive tech policy framework that enables greater investment in R&D. Indeed, a National Science Foundation analysis suggests that while R&D investment increased by about 4 percent annually during 2010–2015, China accelerated its R&D investment at an annual growth rate of 18 percent over the same time period.²⁴ Erica Fuchs, a professor at Carnegie Mellon University, points out that "the U.S. government's overall approach to supporting electronics innovation is 'easily an order of magnitude below' what's needed to address the challenges we're facing."²⁵

Moving Forward. Washington has to carefully gauge the costs and benefits of countering, containing, or engaging China as a strategic competitor, while Beijing needs to be similarly cautious about mobilizing their political base through nationalism. It is important to leaders in both countries to go beyond conventional wisdom as they prepare for a long-term U.S.-China technology competition that will profoundly impact not just the two nations but the rest of the world as well. How each side acts will have a huge influence on the ABC policies and practices of the other side.

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The author conducted research for this publication during her residency at the East-West Center in Washington as part of the Asia Studies Visiting Fellowship program. Under this program, the EWC accepts applications from scholars and analysts who wish to undertake research and write on topics of relevance to contemporary U.S.-Indo-Pacific policy, with a particular interest in proposals regarding key challenges in U.S.-Indo-Pacific relations and possible responses and approaches to addressing those challenges.

To facilitate this research and allow participants to engage with the resources and experts of the U.S. policy community, the Asia Studies Visiting Fellowship finances residencies for a period of three months at the East-West Center in Washington in Washington, DC.

The fellowship includes a monthly stipend while in residence at the EWC in Washington; office space and accompanying resources; and round-trip economy airfare to Washington, DC.

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