

Adam Segal

China Leadership Monitor, Winter 2021 Issue 70
Wednesday, December 1, 2021

Reshaping the Chinese economy around the principle of self-reliance will be an extremely complex, highly uncertain, and multi-year process. The barriers to self-reliance, especially in the semi-conductor sector, are high. Still, the conflict with the United States is starting China off on a longer-term restructuring of the economy and innovation system. Success will not be measured by complete self-reliance, which is not a realistic goal. Rather, the goal will be one of degree—to restructure China's domestic economic and technological systems and supply chains on Beijing's own terms.

Writing in *Foreign Affairs* several months after the death of Mao Zedong, sinologist Ross Terrill questioned whether China in the immediate future would “keep itself under the banner of ‘self-reliance’” or pursue a more interdependent path with the rest of the world.¹ Terrill identified historical, cultural, ideological, and economic sources of self-reliance, and argued that the first three were not immutable and could be politically modified. The memory of imperialism was fading, the Chinese Communist Party was increasingly seeing itself as part of world history and claims of independence were more decorative than specific policy guidance. The size and agricultural nature of the Chinese economy meant that self-reliance probably could not be completely cast aside, but Terrill (correctly) believed that the steady trend was toward greater integration. “Most of the sources of the principle of self-reliance have dried up,” Terrill wrote.

As Terrill carefully noted, the ideas of self-reliance must be understood within their specific political and ideological contexts. A change in the situation will lead to a modification in the principles. Looking at China today, there is no doubt that the Chinese leadership believes the environment has changed. As the United States has cut China off from advanced semiconductor technology, tightened controls on Chinese investments in U.S. firms, and scrutinized the flow of Chinese students and scholars to American universities, Beijing has stressed the need for indigenous innovation and to seize control of core technologies.² Xi Jinping also has political and ideological reasons to reorganize the domestic economy, and the technology sector, in

¹ Ross Terrill, “China and the World: Self-Reliance or Interdependence?” *Foreign Affairs*, 55.2 (January 1977): 295–305.

² Adam Segal, “Seizing Core Technologies: China Responds to U.S. Technology Competition,” *China Leadership Monitor*, June 1, 2019, <https://www.prcleader.org/segal-clm-60>

particular, around the idea of greater independence from outside pressure. The banner of self-reliance has returned as a guiding policy principle.

CCP Party Secretary Xi Jinping and other top leaders have repeatedly emphasized self-reliance in numerous speeches during the last several years. In a November 2018 speech in Heilongjiang to workers at China First Heavy Industries, a state-owned enterprise set up with the assistance of the Soviet Union, Xi warned: “Internationally, advanced technology and key technology are more and more difficult to obtain. Unilateralism and trade protectionism have risen, forcing us to travel the road of self-reliance.”³ Two years later, during an inspection tour in southern Guangdong, Xi again stressed the hostile international environment, stating: “We are witnessing major changes never seen in a century, and we need to take the path of indigenous innovation through self-reliance.”⁴ During that same year, Vice Premier Liu He visited Mianyang, a critical defense industrial base, and urged the city to redouble research in core technologies and to strengthen independent innovation.⁵ In a May 2021 speech to the Chinese Academy of Sciences, the Chinese Academy of Engineering, and the National Congress of the China Association for Science and Technology at the Great Hall of the People in Beijing, Xi called for accelerating efforts to build “China into a leader in science and technology and achieving sci-tech self-reliance and self-strengthening.”⁶

China’s Outline for the 14th Five-Year Plan (2021–25) signals the importance of the drive for independence, for the first time calling “science and technology self-reliance, and self-improvement” a “strategic support for national development.”⁷ The plan commits Beijing to massive subsidies for commercial technology applications, investments in new technology infrastructure, and increased funding in semiconductors, telecommunications, artificial intelligence, quantum information, and new materials. Spending on research and development will increase by more than 7 percent annually, and the overall share of basic research in R&D spending will rise from 6 percent to more than 8 percent.⁸

³ Gabriel Wildau, “China’s Xi Jinping Revives Maoist Call for ‘Self-reliance,’” *Financial Times*, November 11, 2018, <https://www.ft.com/content/63430718-e3cb-11e8-a6e5-792428919cee>

⁴ “President Xi Jinping Calls for Self-reliance in Guangdong Inspection,” CGTN, October 13, 2020, <https://news.cgtn.com/news/2020-10-13/President-Xi-Jinping-calls-for-self-reliance-in-Guangdong-inspection-Uy43r9wWyI/index.html>

⁵ http://www.gov.cn/guowuyuan/2020-09/19/content_5544822.htm?mc_cid=45ea9a017a&mc_eid=2a1ec643bb

⁶ “Xi Stresses Sci-tech Self-strengthening at Higher Levels,” Xinhua, May 29, 2021, http://www.xinhuanet.com/english/2021-05/29/c_139976311.htm

⁷ Xinhua, “Outline of the People’s Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035,” May 13, 2021. Translation available at <https://cset.georgetown.edu/publication/china-14th-five-year-plan/>

⁸ Smriti Mallapaty, “China’s Five-year Plan Focuses on Scientific Self-reliance,” *Nature*, March 11, 2021, <https://www.nature.com/articles/d41586-021-00638-3>

Much of the analysis on self-reliance has focused on the question of whether China will be able to move up the value chain in semiconductors and reduce its dependence on imported chips.⁹ This makes sense given the stated goals of Chinese policy makers, the resources Beijing is investing in the effort, and the importance of semiconductors in U.S.-China tech competition. Yet Xi Jinping’s ambitions extend beyond one type of technology. They are expressed in what is called the “dual circulation” strategy. Although the specifics of dual circulation are inchoate, the objectives are to promote the development of the domestic market and remake the Chinese economy so it is more innovative, more resilient, and less vulnerable to U.S. pressure in particular.¹⁰ Former Australian prime minister Kevin Rudd argues that Xi Jinping is seeking “to organize a form of decoupling from the United States on China’s terms, before having one imposed on him by the United States.”¹¹ In fact, Chinese leaders see the dependence of other economies on China as a form of self-reliance. Or, as Xi Jinping put it, “The dependence of the international industrial chain on our country has formed a powerful countermeasure and deterrent capability for foreign parties to artificially cut off supply.”¹²

Reshaping the Chinese economy around the principle of self-reliance will be an extremely complex, highly uncertain, multi-year process. Success will depend not only on China’s ability to mobilize industrial and political capabilities but also the reaction of the United States and its friends and allies. It is essential to realize, however, that complete self-reliance is not a realistic goal, something that China’s leadership recognizes. Rather, the goal is one of degree—to restructure China’s domestic economic and technological systems and supply chains on Beijing’s own terms. The technology conflict with the United States has created new incentives for structural change. In the short term, the prospects for Beijing do not look good. For the longer term, there is a greater likelihood that the Chinese economy and innovation system will be more resilient and self-reliant.

Semiconductor Self-reliance

Semiconductors are a central focus of self-reliance. Under the Made in China 2025 industrial plan, China declared that 70 percent of the semiconductors it uses would be produced domestically by 2025. Currently, domestic production is around 20 percent. According to one

⁹ See, for example, Doug Fuller, “China’s Counter-Strategy to American Export Controls in Integrated Circuits,” *China Leadership Monitor*, March 1, 2021, <https://www.prcleader.org/fuller>; Paul Triolo, “The Future of China’s Semiconductor Industry,” *American Affairs*, 5.1 (Spring 2021), <https://americanaffairsjournal.org/2021/02/the-future-of-chinas-semiconductor-industry/>

¹⁰ Alicia García Herrero, “What is Behind China’s Dual Circulation Strategy,” *China Leadership Monitor*, September 1, 2021, <https://www.prcleader.org/herrero>

¹¹ <https://asiasociety.org/policy-institute/xi-jinpings-pivot-state>

¹² Quoted in Ana Swanson and Keith Bradsher, “U.S. Signals No Thaw in Trade Relations with China,” *New York Times*, October 4, 2021, <https://www.nytimes.com/2021/10/04/business/economy/us-china-trade.html>

estimate, there are over 100 science, technology, and sectoral development plans singling out the development of the domestic semiconductor industry.¹³

In 2021, Xi chose close confidant Vice Premier Liu He to head a technology task force, the National Leading Group for Reform of the Science and Technology System and Building an Innovation System, to spearhead the development of so-called third-generation chips.¹⁴ These chips are built from new materials, such as silicon carbide and gallium nitride; this is an area in which the technology is more unsettled, and Beijing is not as far behind the others. The group is formulating additional support for the technology, overseeing projects that could lead to breakthroughs in the development of chip design software and extreme ultraviolet lithography machines. Local governments are also appointing “supply chain chiefs” for critical technologies, especially semiconductors. These new “command systems” are meant to ensure the stability and security of supply chains as well as a breakdown of bureaucratic silos and improvements in government coordination.¹⁵

Chinese investment in the sector is expected to reach over US \$150 billion between 2014 and 2030.¹⁶ The central government spent a record 213.6 billion RMB (US \$33 billion) on industrial subsidies in 2020, of which 10.6 billion RMB went to 113 semiconductor firms.¹⁷ Beijing has also exempted chip manufacturers from corporate income taxes for up to ten years, and chip design firms for two years after turning a profit.

Additional investment has come from local governments, the tech sector, and private markets. The Semiconductor Manufacturing International Corporation (SMIC) announced in September 2021 that it had signed an agreement with the Lin-Gang Special Area in Shanghai’s free trade zone to establish a US \$8.87 billion foundry to produce 12-inch wafers. In March 2021, SMIC announced a similar deal with the Shenzhen government to invest in a US \$2.35 billion project.¹⁸

Huawei has also increased its investments in local chip companies. According to *Nikkei Asia*, Huawei took a stake in over twenty semiconductor companies over the last year and a half. Investments have been made in sectors dominated by companies, such as chip design tools,

¹³ John VerWey, “Chinese Semiconductor Industrial Policy: Past and Present,” *Journal of International Commerce and Economic* (July 2019).

¹⁴ “Xi Jinping Picks Top Lieutenant to Lead China’s Chip Battle Against U.S.,” *Bloomberg*, June 17, 2021.

¹⁵ Tracy Qu, “US-China Tech War: AI, Semiconductors Get Quasi-military Commanders as ‘Supply Chain Chiefs’ to Boost Self-sufficiency,” *South China Morning Post*, June 26, 2021.

¹⁶ Semiconductor Industry Association, “Taking Stock of China’s Semiconductor Industry,” July 13, 2021, <https://www.semiconductors.org/taking-stock-of-chinas-semiconductor-industry/>

¹⁷ Yusho Cho, “Eyeing US, China Wields \$33bn Subsidies to Bolster Chips, Defense,” *Nikkei Asia*, May 17, 2021.

¹⁸ Chipmaker SMIC Inks Deal with Shanghai for \$8.8 Billion Factory,” *Caixin*, September 6, 2021, <https://www.caixinglobal.com/2021-09-06/chipmaker-smic-inks-deal-with-shanghai-for-88-billion-factory-101769466.html>

semiconductor materials, compound semiconductors, and chip production and testing equipment, from the U.S., Japan, South Korea, and Taiwan.¹⁹ Xiaomi has also invested in twenty semiconductor companies during the last year.

In August, Baidu launched Kunlun 2, its second-generation artificial intelligence chip, and a few months later, in October 2021, Alibaba's semiconductor design unit PingTouGe unveiled a new central processor unit. The firm has also released a neural processing unit, designed to accelerate machine learning and artificial intelligence, and a chip for Internet of Things applications in sectors such as 5G, AI, and autonomous driving. In addition, as ecommerce, fintech, and social media have faced growing government scrutiny and regulation, investors have pivoted to chips and biotech. The value of venture capital investments in Chinese semiconductor companies reached a record US \$8.9bn in the second quarter of 2021.²⁰

There has been an explosion of small firms entering the sector. The number of firms registering as semiconductor companies has grown by more than 700 percent in the last decade, reaching close to 14,000. One Chinese account suggests that 58,000 firms were created in a year.²¹ In July 2021, six Chinese ministries, including the Ministry of Industry and Information Technology, the Ministry of Science and Technology, the Ministry of Finance, and the Ministry of Commerce (MOFCOM), issued guidelines to develop 10,000 "little giant" enterprises that specialize in niche sectors and 1,000 enterprises that are champions in a single industry. Policy makers hope that some of these firms will develop into "hidden champions," small to medium sized firms like the Dutch semiconductor equipment manufacturer ASML, that occupy chokehold positions in global supply chains.²²

In addition to stockpiling equipment, Chinese chip-makers are reducing their dependence on U.S. technology so as to reduce disruptions due to U.S. export control laws. SMIC and Yangtze Memory Technologies, for example, are testing production lines without American technology. Yangtze Memory has launched a review of its supply chains in order to find local producers, with the auditing extending beyond to the company's own production lines to those of its

¹⁹ Cheng Ting Fang and Laily Li, "Huawei Ramps Up Chip Investment in Fight for Survival," *Nikkei Asia*, January 13, 2021.

²⁰ Mercedes Ruehl and Hudson Lockett, "Investors Pivot From Ecommerce to Chips to Avoid China Crackdown," *Financial Times*, August 15, 2021.

²¹ Katherine Hille and Sun Yu, "Chinese Groups Go From Fish to Chips in New 'Great Leap Forward,'" *Financial Times*, October 12, 2020, quoted in "The Failure of China's Microchip Giant Tests Beijing's Tech Ambitions," *Business Times* (Singapore), July 19, 2021, <https://www.businesstimes.com.sg/technology/the-failure-of-chinas-microchip-giant-tests-beijings-tech-ambitions>.

²² "China to Develop 10,000 'Little Giants' in Push for Advanced Manufacturing," *Global Times*, July 5, 2021, <https://www.globaltimes.cn/page/202107/1227877.shtml>

suppliers. SMIC planned to begin trial production for a 40 nanometer chip line independent of U.S. equipment before the end of 2020.²³

Policy makers also want to ensure that the sector has the requisite human capital, skills, and expertise. The China Semiconductor Industry Association estimates the talent gap is 300,000, creating major bottlenecks in the sector.²⁴ In 2021, ten universities, including Beida, Fudan, and Tsinghua, created schools of integrated circuits, and policy makers have provided a range of incentives, so that industry plays a greater role in curriculum development and talent training.

Regulating the Tech Sector

The Chinese government is also realigning political and economic incentives so “big tech” plays a larger role in contributing to self-reliance. The current regulatory crackdown has many sources and targets. Alibaba, Baidu, Meituan, Tencent, and others have been called out for anti-competitive behavior. The State Administration for Market Regulation has fined almost every large tech platform for failing to disclose mergers, misleading marketing tactics, and signing exclusive contracts. In addition, the Ministry of Industry and Information Technology has told firms to stop blocking their rivals’ links and services on their own platforms.²⁵

The ride-sharing app DiDi, the freight logistics company Full Truck Alliance, and the recruiting platform Kanzhun have come under scrutiny because of their data security practices. The Cyberspace Administration of China launched an investigation into DiDi just two days after the company’s US \$4.4 billion initial public offering in New York and it was ordered to stop registering new users. Investigators from the Ministry of Public Security, the Ministry of State Security, the Cyberspace Administration of China, the Ministry of Transport, and the Ministry of Natural Resources have reportedly been stationed in DiDi’s offices. According to Xinhua, the probes into the company were aimed at “effectively preventing potential national security risks relating to procurement, data processing, and overseas listings.”²⁶

The regulation of big tech is also part of Xi Jinping’s efforts to rein in the “excesses” of Chinese capitalism and build “common prosperity.” Policy makers are more willing to intervene in markets to address what they see as unhealthy social practices and rising economic inequality. The market will remain an important force in the economy, but the state will set tighter parameters regarding how much profit investors and entrepreneurs can make. In a March 2021 speech, Xi Jinping admonished regulators to step up oversight of all platform companies, crack

²³ Cheng Ting-Fang and Lauly Li, “China Chipmakers Speed Up Effort to Cut Reliance on US Supplies,” *Nikkei Asia*, September 9, 2020.

²⁴ “Chips Talent Shortage Predicted to Keep Widening in China as IC Industry Booms: Experts,” *National Business Daily*, May 21, 2019, <http://m.nbdpress.com/articles/2019-05-21/6765.html>

²⁵ “In Fresh Regulatory Move, China Tells Tech Giants to Stop Blocking Rivals’ Links,” Reuters, September 13, 2021.

²⁶ Joseph Ye, “China’s Probe into Didi Is Aimed at Addressing National Security Risks Arising From New York Listing, Xinhua Says,” *South China Morning Post*, October 11, 2021.

down on monopolies, promote fair competition, and prevent “the disorderly expansion of capital.”²⁷ The State Press and Publication Administration announced in August 2021 that it would ban players under 18 years of age from online videogames entirely between Monday and Thursday, and limit play on the other three days of the week, and on public holidays to between 8 p.m. and 9 p.m. Wealthy individuals have been urged to contribute more to society, and tech entrepreneurs and companies have made a big show of philanthropy in support of state goals. Alibaba announced it would invest 100 billion RMB in common prosperity initiatives, including technology innovation, economic development, high-quality job creation, and support for vulnerable groups. Tencent said it would donate 100 billion RMB to rural revitalization and wage growth for low-income earners.²⁸

There is also a motivation directly tied to self-reliance. Regulations and policy interventions are designed to shift the types of technology that Chinese firms innovate and develop. Policy makers seem intent on pivoting away from consumer internet companies toward firms that are investing in critical technologies, such as artificial intelligence, quantum computing, and semiconductors. Beijing wants tech companies to carry out foundational research to help it in the long-term tech decoupling with the United States. As the *People’s Daily* put it, Chinese tech giants should not be so concerned with “some cabbages and a few pounds of fruit” when there is more important work to be done. “Internet giants with access to big data and advanced computing should have a greater responsibility, greater pursuits, and a greater role in scientific and technological innovation.”²⁹ Or, as one Chinese commentator framed it, China is abandoning the American, Silicon Valley growth road and is instead going down the “German road,” leaning heavily on manufacturing. In this view, Xi has decided that soft tech like social media and e-commerce is “nice to have,” while semiconductors, new materials, and other hard tech is “need to have.”

Countermeasures

Beijing is also working to remove, or blunt, some of the United States’ most influential levers on the Chinese economy. While Congress and U.S. policy makers are increasing oversight of Chinese firms, China is also exercising greater scrutiny over firms listing on U.S. stock markets. In July 2021, days after the announcement of the investigation into Didi, the State Council and the CCP Central Committee issued a joint guideline that will lead to new rules for the overseas listing system for domestic enterprises and greater restrictions on cross-border data flows and security. As one investor told the *Financial Times*, the guidelines are vague enough that policy makers can decide anything in the name of national security; “Xi has made it quite clear he

²⁷ “China to Strengthen Anti-monopoly Push, Prevent Disorderly Capital Expansion,” NPC&CPPCC Annual Sessions 2021, March 5, 2021, http://www.xinhuanet.com/english/2021-03/05/c_139784906.htm

²⁸ Arjun Kharpal, “China’s Tech Giants Pour Billions into Xi’s Vision of ‘Common Prosperity,’” CNBC, September 3, 2012, <https://www.cnbc.com/2021/09/03/chinas-tech-giants-pour-billions-into-xis-goal-of-common-prosperity.html>

²⁹ <https://finance.sina.com.cn/tech/2020-12-11/doc-iiznctke5996350.shtml>

doesn't want China's top companies to IPO in the U.S.”³⁰ The China Security Regulatory Commission announced in September 2021 that it was expanding a pilot scheme to get Chinese firms that are listed offshore to list onshore. The scheme covers internet, AI, data, information technology, and new energy firms.³¹

Chinese policy makers have tried to build substitutes for U.S. stock markets. Trading on the Shanghai Science and Technology Board, also known as the Star Market, began in July 2019, and since then the number of listings has grown from 25 to 331, including Semiconductor Manufacturing International Corp., which once traded on the New York Stock Exchange. Total market value on the board has grown to US \$761 billion, but the listing process is characterized by heavy government oversight and unpredictable delays.³² Policy makers appear to believe that regulatory scrutiny is required to ensure that the market lists generally innovative companies. In 2021, Xi announced formation of a board in Beijing to funnel investment into small and medium-sized, innovation-oriented firms.³³ Beijing's National Equities Exchange and Quotation market, or NEEQ, is only open to professional investors, but the goal is to boost the next generation of technology companies. Regulators are also trying to divert Chinese companies from the United States to the Hong Kong market. The Cyberspace Administration of China reportedly suggested to DiDi, Full Truck Alliance, and Kunzhun that they explore listing on the Hang Seng so as to address data security concerns.³⁴

Beijing also hopes to limit the impact of U.S. export controls. In January 2021, MOFCOM issued the “New Rules on Counteracting Unjustified Extraterritorial Application of Foreign Legislation.” The rules are designed to block any foreign restriction that “unjustifiably prohibits” Chinese citizens or companies from “engaging in normal economic, trade and related activities with a third state or its citizens.” Similar to blocking statutes in the European Union, these regulations state that Chinese companies facing foreign restrictions must, after thirty days, report them to the State Council, and companies that suffer losses from such restrictions can sue in Chinese courts for compensation. The administrative measures were reinforced with a new Anti-Foreign Sanctions Law promulgated by the National People's Congress on June 10, 2021. These laws also allow Beijing to levy counter-sanctions against persons or entities instigating or implementing sanctions.

³⁰ Tom Mitchell, “Xi and Washington's China Hawks Unite Against Chinese Tech IPOs in US,” *Financial Times*, July 9, 2021.

³¹ https://twitter.com/Lingling_Wei/status/1438880307328000007?s=20

³² Fraser Howie, “Shanghai's STAR Market Is Losing Its Luster,” *Nikkei Asia*, April 16, 2021, <https://asia.nikkei.com/Opinion/Shanghai-s-STAR-Market-is-losing-its-luster>

³³ James Areddy, “China to Launch Beijing Stock Exchange to Steer Investment Into Innovation” *Wall Street Journal*, September 2, 2021.

³⁴ Keith Zhai and Liza Lin, “Chinese Regulators Nudge Didi Toward Hong Kong Listing,” *Wall Street Journal*, October 21, 2021.

While it remains to be seen how these laws will be implemented, companies complying with the U.S. ban against selling advanced semiconductors to Huawei or military-related companies may be punished under these measures. In fact, the measures raise the stakes for European, Korean, and other third country firms, forcing them to choose between access to the Chinese market and access to the U.S. market, with penalties possible from both the Chinese and the American authorities. Mary Lovely and Jeffrey Schott argue that multinational firms are increasingly “at risk of being caught firmly between U.S. sanctions, including export controls, and Chinese countermeasures.”³⁵ In order to avoid getting caught in this crossfire, third party firms may decide to remove U.S. technology from their production processes and supply chains.

Outcomes

From the narrow perspective of semi-conductors, China’s efforts to develop greater self-reliance have so far had limited success. Huawei, for example, managed to increase the percentage of parts made in China in one of its more advanced smartphones—the Mate 40E had roughly 60 percent Chinese components, more than double that of its predecessor the Mate 30. However, the company remains dependent on critical semiconductors, and, with components scarce and customers uncertain about Huawei’s future, revenues have fallen for the last three quarters. The company, which became the world’s number one seller of smartphones in June 2020, fell to ninth place by October 2021. It relied on China for two-thirds of its revenue last year, compared with half in 2017.³⁶

Moreover, China’s goal of meeting 70 percent of its chip needs through domestic suppliers remains very distant. In 2021, its estimated self-sufficiency rate was only 16 percent.³⁷ The sector is still dependent on equipment from abroad, lacks adequate talent, and has not yet mastered sophisticated manufacturing processes. There are concerns that the push from the central government will lead to redundancy and waste. Tsinghua Unigroup, a high profile semiconductor investor and holding group, announced in July 2021 that one of its creditors had initiated bankruptcy proceedings.³⁸ That same year Wuhan Hongxin Semiconductor Manufacturing (HSMC) was exposed as a Ponzi scheme.³⁹ Scammers took advantage of local officials’ competition with a rival district, which had attracted a flash storage manufacturer. Unrealistically, the trio behind the scheme promised HSMC would immediately start producing

³⁵ Mary E. Lovely and Jeffrey J. Schott, “Can China Blunt the Impact of New US Economic Sanctions?” June 2021, <https://www.piie.com/sites/default/files/documents/pb21-13.pdf>

³⁶ Dan Strumpf, “U.S. Set Out to Hobble China’s Huawei, and So It Has,” *Wall Street Journal*, October 7, 2021.

³⁷ Shunsuke Tabeta, ”‘Made in China’ Chip Drive Falls Far Short of 70% Self-sufficiency,” *Nikkei Asia*, October 13, 2021.

³⁸ Paul Mozur, “The Failure of China’s Microchip Giant Tests Beijing’s Tech Ambitions,” *New York Times*, July 19, 2021.

³⁹ Kevin Xu, “China’s ‘Semiconductor Theranos’: HSMC,” *Interconnected*, March 4, 2021, <https://interconnected.blog/chinas-semiconductor-theranos-hsmc/>

14nm chips and then move to 7nm chips and compete directly with TSMC and Samsung. Total local government investment eventually reached 15.3 billion RMB, but as the Coronavirus struck Wuhan, the criminals began siphoning money out and the project quickly collapsed.

Despite these setbacks, China's prospects for the longer term are brighter. As others have noted, central government waste is not in itself a sign that the strategy will fail. For many strategic technologies, Beijing appears to have adopted a "venture capitalist" mindset that recognizes that not all "bets" will be winners. As long as China's overall technological level is raised and strategic outcomes achieved, waste can be tolerated.⁴⁰

To be sure, Beijing is not likely to break the chokehold the United States holds on advanced semiconductor manufacturing equipment and design tools in the immediate future, but the realistic goal for China (or any other country) in the semiconductor industry is not complete self-reliance. Rather, it is a greater *degree* of self-reliance and resiliency. In pursuit of this objective, there are some positive signals. In part because of the U.S. technology containment strategy, domestic market signals and Chinese firms' incentives are now aligned with the goals of industrial policy. Historically, private technology companies have generally tried to keep the state at a distance, and, in order to ensure they were globally competitive, Chinese firms sourced the best technology, which often meant American technology. They often ignored or pushed back on policy makers' demands for "secure and controllable" technologies developed within China. Today, however, technology firms no longer have that option. As Dan Wang argues, "Enhanced U.S. export-control measures have made that decision for them and united China's government and its leading firms in a shared goal: to pursue technological and industrial self-sufficiency so that no Chinese firm is at the mercy of U.S. trade policies. By imposing restrictions on American products, the U.S. government has inadvertently done more than any party directive to incentivize private investment in China's domestic technology ecosystem."⁴¹

U.S. pressure may also be having positive effects on other parts of China's science and technology system. Government policies are encouraging large firms to participate in "innovation consortiums" with R&D institutes and universities in an effort to commercialize breakthrough technologies.⁴² One of the weaknesses of the Chinese semiconductor ecosystem, especially compared to the United States in the artificial intelligence (AI) chip sector, is there is very little contact between academic research and Chinese industry. In response to U.S. export controls, China is strengthening basic and applied research, and industrial ministries and research

⁴⁰ Barry Naughton, "Grand Steerage," in Thomas Fingar and Jean Oi, eds., *Fateful Decisions: Choices That Will Shape China's Future*. Stanford: Stanford University Press, 2019

⁴¹ Dan Wang, "China's Sputnik Moment: How Washington Boosted China's Quest for Tech Dominance," *Foreign Affairs*, July 29, 2021, <https://www.foreignaffairs.com/articles/united-states/2021-07-29/chinas-sputnik-moment>

⁴² Matt Ho, "China Pivots to State-Corporate Partnerships in Drive for Technology Self-reliance," *South China Morning Post*, December 1, 2020, <https://www.scmp.com/news/china/politics/article/3111990/china-pivots-state-corporate-partnerships-drive-technology-self>

agencies are working to overcome the fragmentation of the innovation system. As Dieter Ernst argues, “Ironically, U.S. technology export restrictions are thus forcing a reform of China’s technological investment and innovation policy, which may help China to correct one of the fundamental weaknesses of its innovation system in AI.”⁴³

The same argument may be made about the impact of regulation of the technology sector on the drive for self-reliance. Many outside analysts are quick to warn that the crackdown on technology firms and tightened political control will be a drag on innovation. Entrepreneurs will be less willing to push risky products and scale quickly for fear of attracting the government’s attention. Yet it may be just as likely that regulation strengthens China’s innovative capabilities. Curbing the reach of Tencent, Alibaba, and other big platforms may create more space for smaller start-ups and greater competition. As Fang Xingdong, a prominent entrepreneur and digital commentator has argued, the big internet companies “can easily squeeze the space for new startups and small and medium-sized enterprises and harm consumers’ interests.”⁴⁴ Certainly, the short-term disruption looks significant; China’s tech firms lost hundreds of billions of dollars in market valuation in the wake of the regulatory crackdown.⁴⁵ In the longer term, the rebalancing of power between the government and the internet giants may result in greater protection of consumer rights, a safeguarding of societal interests (as defined by the CCP), and a fostering of innovative capabilities.

Finally, there is a similar short-term, long-term tension in the international environment. China’s drive for greater self-reliance will be affected by the extent to which Washington can successfully coordinate with friends and allies on technology policy through the EU-U.S. Trade and Technology Council (TTC), the Quad (the grouping of Australia, India, Japan, and the United States), and other multilateral and bilateral relationships. National Security Advisor Jake Sullivan has described one of the TTC’s goals as “aligning our approaches to trade and technology so that democracies and not anyone else, not China or other autocracies, are writing the rules for trade and technology for the 21st century.” At the inaugural meeting of the TTC in Pittsburgh in September 2021, the European Union and the United States established working groups on investment screening, export controls, and semiconductor supply chains as well as international technology standards, cybersecurity, and data governance.⁴⁶

The goals of the Quad are similar, with President Biden, Prime Minister Modi, Prime Minister Morrison, and Prime Minister Suga declaring their intent to cooperate “on the critical

⁴³ Dieter Ernst, “Competing in Artificial Intelligence Chips: China’s Challenge Amid Technology War,” Centre for International Governance Innovation, March 2020.

⁴⁴ Li Xiaoyong, “China Furthers Anti-Monopoly Regulation for Sound Competition,” *Beijing Review*, March 22, 2021, https://www.bjreview.com/Business/202103/t20210322_800240985.html

⁴⁵ <https://www.reuters.com/world/china/china-crackdown-wipes-hundreds-billions-off-top-companies-values-2021-09-13/>

⁴⁶ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/29/u-s-eu-trade-and-technology-council-inaugural-joint-statement/>

technologies of the future to ensure that innovation is consistent with a free, open, inclusive, and resilient Indo-Pacific.”⁴⁷ The Quad has working groups in standards, cybersecurity, artificial intelligence, and mapping supply chain security.⁴⁸

Beijing will hope to counter this strategy by reaching out to smaller, technologically advanced countries in Europe and Asia. Seoul, for example, resisted pressure from the Trump administration to confront Beijing on technology issues, and memory chip giant SK Hynix is working with the Wuxi city government to develop the China-Korea Integrated Circuit Industrial Park.⁴⁹ In addition, China will also stress the importance of its market to foreign chip-makers and hopes that Broadcom, Intel, Qualcomm, and others will pressure the White House to relax technology controls.⁵⁰

Moreover, the long-term prospects of holding a tech alliance together are uncertain at best. To be sure, international opinion on China has worsened notably over the last several years, and more than half of the respondents to a June 2021 Pew survey say it is more important for their nation to have strong economic ties with the U.S. than with China.⁵¹ Yet China’s economic ties to these countries remain important, and a moderation of Chinese rhetoric could weaken collective opposition to Beijing. In addition, there are important differences in American and European approaches to privacy, anti-trust, artificial intelligence, and other issues in the governance of technology that could make coordination and cooperation difficult. Some policy makers in Brussels, as part of a larger “strategic autonomy” agenda, want to develop their own resilient

⁴⁷ Quad Leaders’ Joint Statement, “The Spirit of the Quad,” March 12, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/12/quad-leaders-joint-statement-the-spirit-of-the-quad/>

⁴⁸ Fact Sheet, “Quad Leaders’ Summit,” September 24, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/24/fact-sheet-quad-leaders-summit/>

⁴⁹ Tracy Qu, “New China-Korea Semiconductor Industrial Complex Starts Construction Amid Beijing’s Push for Tech Self-reliance,” *South China Morning Post*, October 8, 2021, <https://www.scmp.com/tech/tech-war/article/3151684/new-china-korea-semiconductor-industrial-complex-starts-construction>

⁵⁰ 国家创新研究院战略研究中心 [Strategic Research Center of the National Institute of Innovation], “美对华科技政策动向及我国应对策略” [Trends in U.S. Science and Technology Policies towards China and China’s Response Strategies], August 8, 2021, <http://www.ctils.com/articles/2513>.

⁵¹ Laurie Silver, “China’s International Image Remains Broadly Negative as Views of the U.S. Rebound,” Pew Research Center, June 30, 2021, <https://www.pewresearch.org/fact-tank/2021/06/30/chinas-international-image-remains-broadly-negative-as-views-of-the-u-s-rebound/>

semiconductor industry and they have recommended the creation of a public-private partnership and investment of tens of billions of euros in the sector.⁵²

For the near term, then, Beijing is unlikely to make significant progress in its goals of self-reliance, especially in the area of semi-conductors. The prospects for the longer term are uncertain at best, and they are heavily dependent on political factors outside of the technological realm. But deep structural change in the Chinese economy and science and technology system has begun. What is clear now is that the banner of self-reliance once again flies over China.

About the Author: Adam Segal is the Ira A. Lipman chair in emerging technologies and national security and director of the Digital and Cyberspace Policy Program at the Council on Foreign Relations

Photo credit: RG72, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0>>, via Wikimedia Commons

⁵² Sam Fleming, Peggy Hollinger, and Ben Hall, “Semiconductors: Europe’s Expensive Plan to Reach the Top Tier of Chipmakers,” *Financial Times*, July 21, 2021, <https://www.ft.com/content/d365bfe0-98c4-49b5-8e82-dc4386623ace>