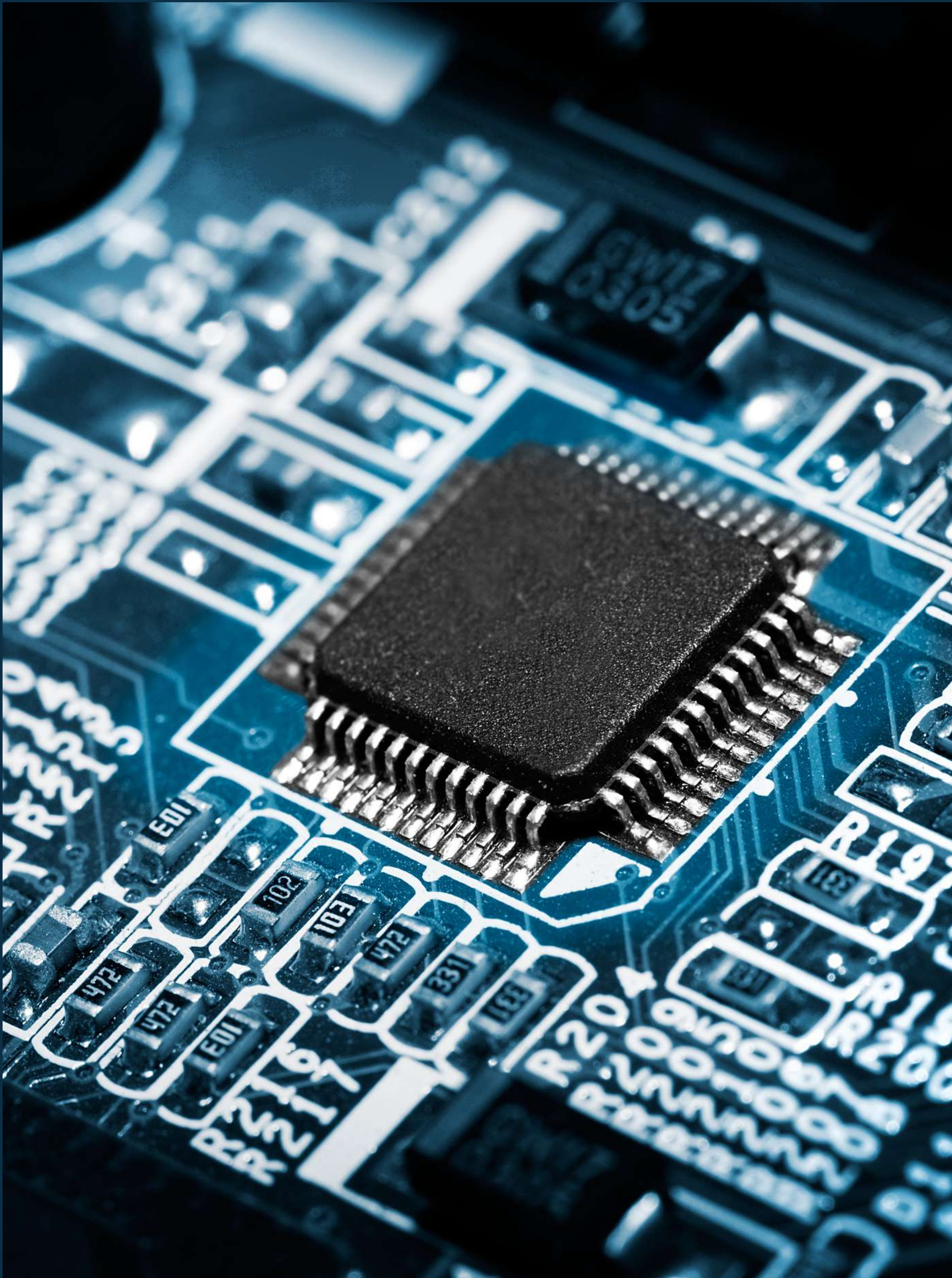


THE NEW CENTER

Policy Paper

September 2020



How Does the U.S. Beat China in the 21st Century Tech Race?

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AUTHOR

Zane Heflin

Policy Analyst

zane@newcenter.org

ABOUT THE NEW CENTER

American politics is broken, with the far left and far right making it increasingly impossible to govern. This will not change until a vibrant center emerges with an agenda that appeals to the vast majority of the American people. This is the mission of The New Center, which aims to establish the ideas and the community to create a powerful political center in today's America.

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1808 I Street NW, Fl. 5

Washington, D.C. 20006

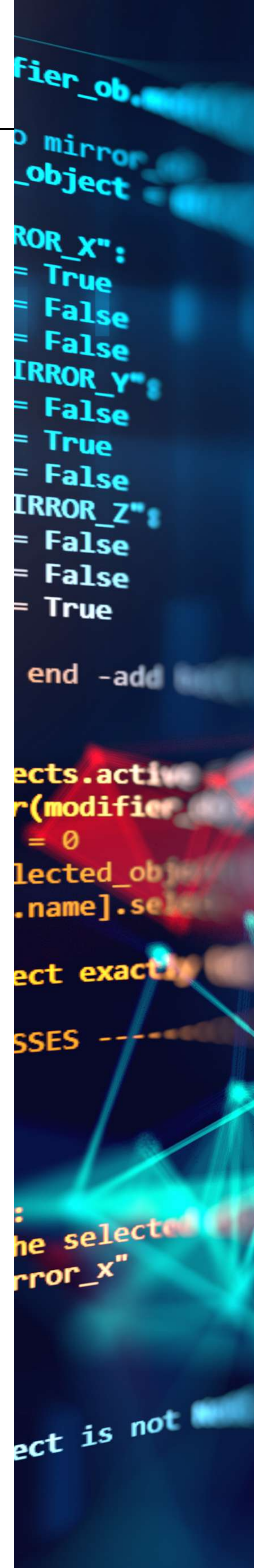
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THE FOURTH INDUSTRIAL REVOLUTION IS HERE

In early August, the Trump administration issued executive orders banning the popular Chinese mobile applications TikTok and WeChat, citing national security concerns about data privacy. While China has blocked some of the largest American services such as Facebook and Google for years, the U.S. has only recently reciprocated. Although the Trump administration justified its move on national security grounds, the move against TikTok and WeChat is part of a broader, long-term competition between China and the U.S. over the most important technologies of the future.

The world is in the early stages of the Fourth Industrial Revolution, which the World Economic Forum characterizes as “a range of new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries, and even challenging ideas about what it means to be human.”

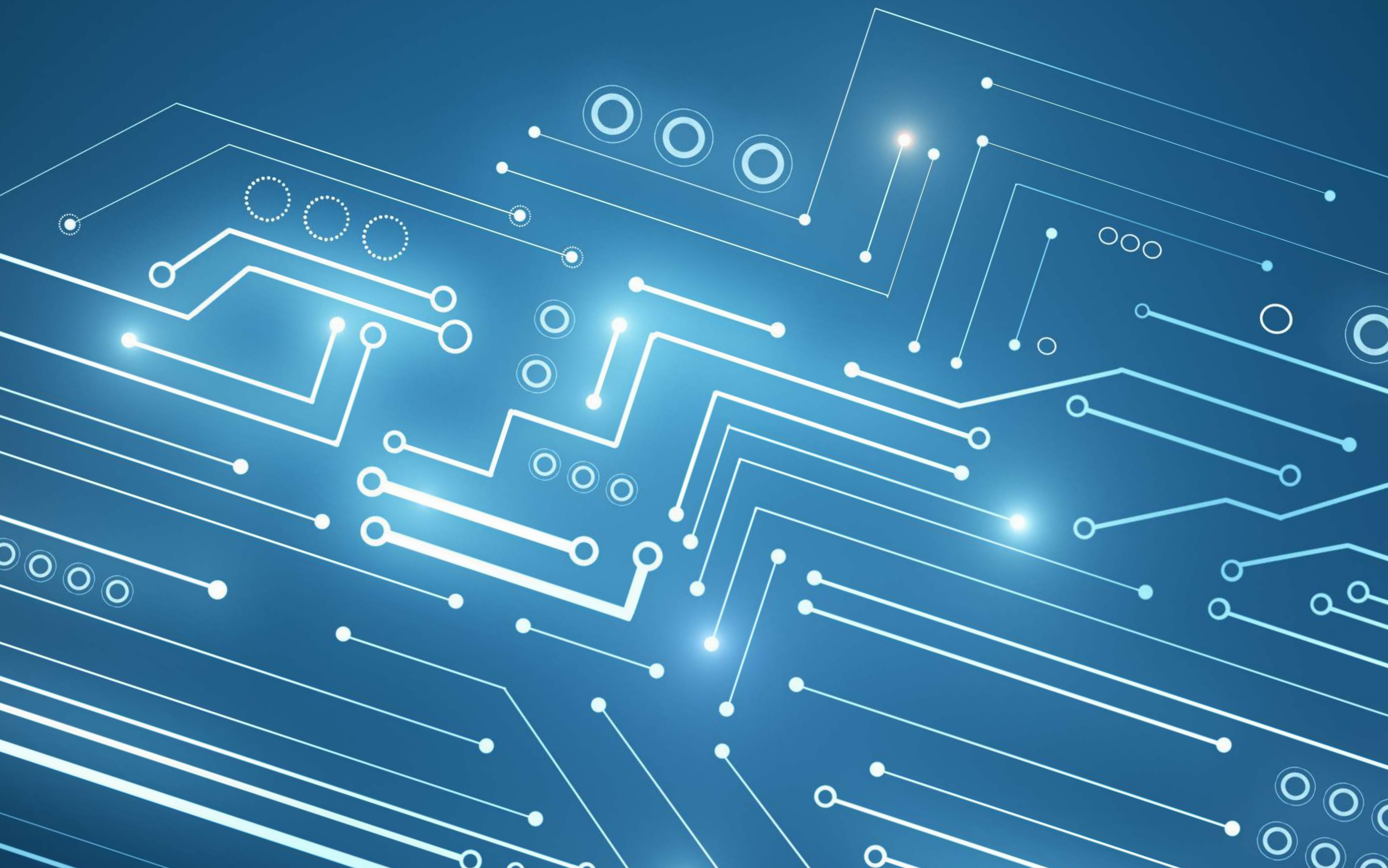
While the U.S. outpaced the world in previous tech innovations—from the creation of the first computers and the Internet—our future leadership in the Fourth Industrial Revolution is an open question. China has put the full weight of its government and state-owned banks behind an effort to build up “national champions” in key sectors, and the U.S. government has only started to fashion a coherent long-term response. In this paper, The New Center will outline the current state of competition between the U.S. and China in emerging technology areas and highlight how the U.S. can ensure its preeminence in them.



WHAT'S AT STAKE?

THE ECONOMIC POTENTIAL

- According to a Global System for Mobile Communications (GSMA) Intelligence Report, 5G is expected to add \$2.2 trillion to the global economy over the next 15 years
- According to the McKinsey Global Institute, artificial intelligence is expected to add \$13 trillion to the global economy by 2030
- According to a World Economic Forum report, AI is expected to create 58 million new jobs by 2022
- According to Boston Consulting Group, quantum computing is expected to create productivity gains surpassing \$450 billion annually in the next decade
- According to the Semiconductor Industry Association, every dollar invested in high tech semiconductor research by the federal government creates \$16 in U.S. GDP growth



THE U.S. STILL LEADS IN TECH, BUT FOR HOW LONG?

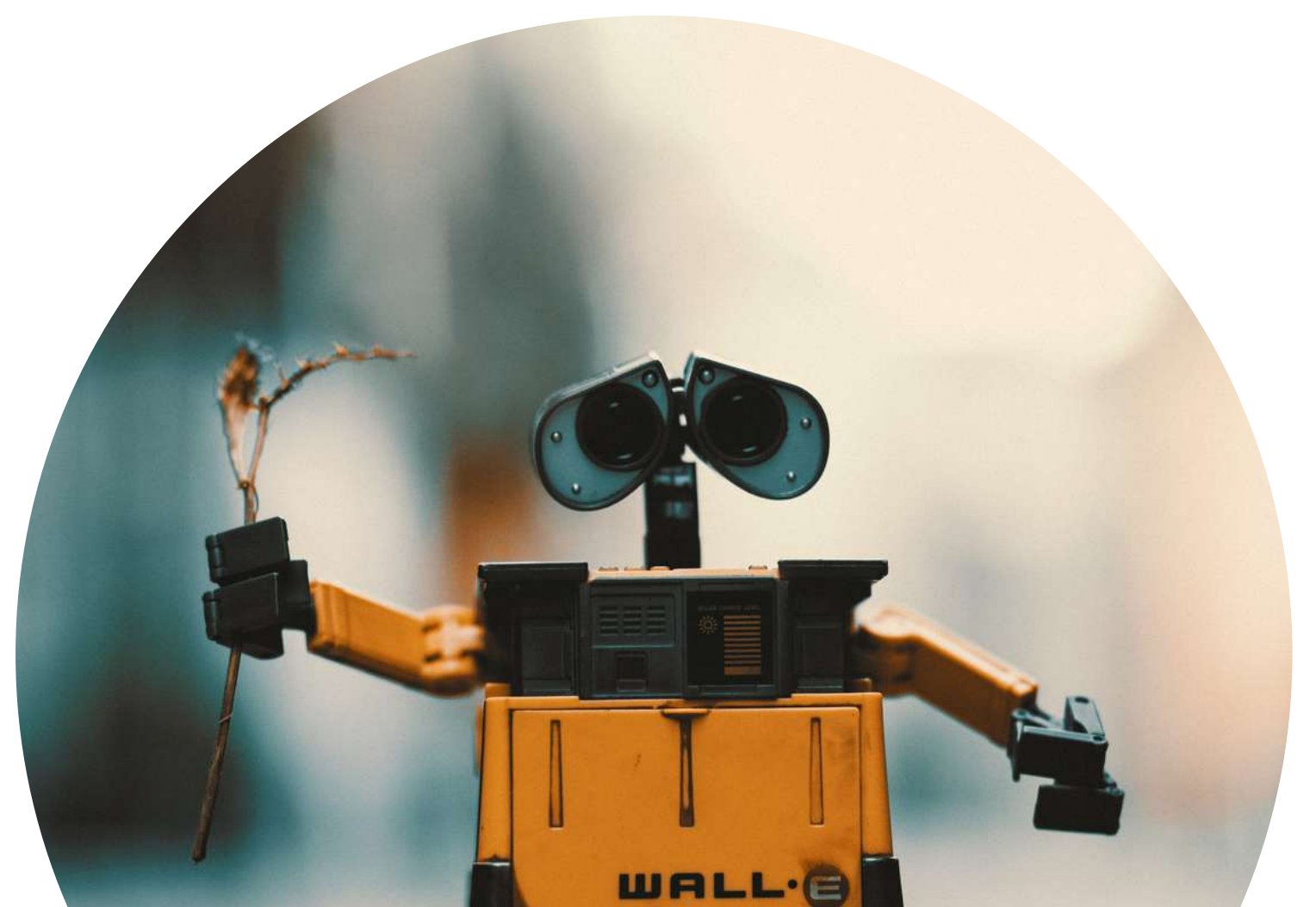
While the media has lately been fixated on the U.S. seeking to ban or minimize market access to Chinese tech companies like TikTok, WeChat, and global 5G leader, Huawei (click here for The New Center's recent paper on 5G), the U.S.-China competition is playing out across an array of cutting edge industries and technologies. Here is a primer on the current state of innovation in artificial intelligence (AI), biotechnology, and advanced computing.

ARTIFICIAL INTELLIGENCE

A recent report by Citi that studied the AI competitiveness of 48 economies found that the U.S. still leads significantly. The other 47 economies included in the index would face “severe difficulties in catching up to the U.S.’s AI industry in 2020-30,” the report said. The source of America's advantage lies in artificial intelligence is thanks to its patents and academic research. However, China is ranked just behind the U.S. in the index, and is thought to be the most likely to “cultivate an independent strong ecosystem for the AI industry due to both economic and geopolitical reasons.”

Despite the current advantage enjoyed by the U.S., China isn't going to stand by quietly in this scientific field. Already China's tech giants, such as Alibaba and Baidu, have begun to invest heavily in AI research. Some of this investment has even found its way to Silicon Valley, which has been relatively open to set up research labs for Chinese companies. Some subcategories of artificial intelligence are already being dominated by China including social media algorithms and facial recognition. The basis of artificial intelligence heavily relies on large quantities of data, which China has plenty of thanks to its large population, lax privacy rights, and surveillance infrastructure.

While China enjoys these advantages when it comes to AI research, the U.S. can count on its own edge in other areas. One such area is global investment, where U.S. AI companies have received over half of the total global investment in artificial intelligence between 2015 and 2019. This investment has flowed to companies working on a wide range of applications for AI including automatic filtering and recommendation engines. Another significant advantage for the U.S. lies in its leading universities, which help produce some of the best talent currently working on AI research.



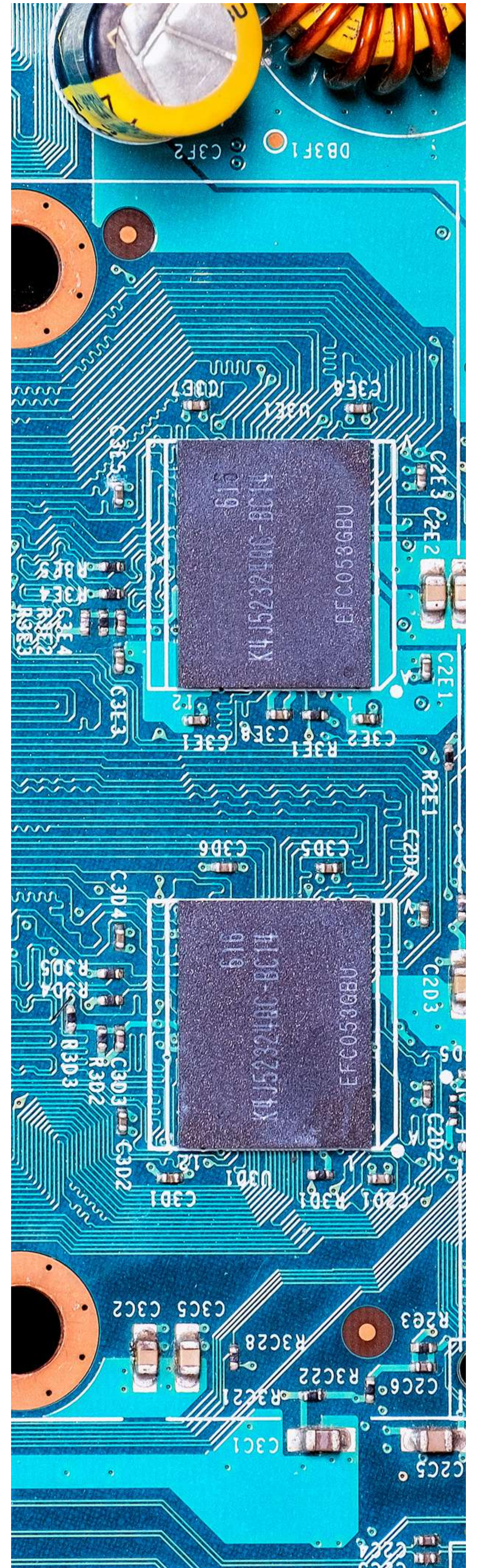
SEMICONDUCTORS

John Bardeen, Walter Brattain, and William Shockley created the first working transistor, an early semiconductor device, at Bell Labs in Murray Hill, New Jersey in 1947. Since then, semiconductors have become the basic component of nearly every modern electronic device such as televisions, computers, and phones.

Since the turn of the century, China has spent tens of billions of dollars to develop its semiconductor manufacturing capabilities. China currently accounts for about 60% of global demand for semiconductors but only produces some 13% of global supply. Statistics from the Semiconductor Industry Association (SIA) suggest U.S. exports of chips to China have "stayed around the same level for years, and that Chinese companies haven't gained much market share, even domestically." About 47.5% of chips sold in China were American made as of 2018, according to SIA figures. Worse still for China, other players such as South Korea and Taiwan have firmly entrenched themselves as leading chip manufacturers.

Semiconductor Manufacturing International Corporation (SMIC), China's leading chipmaker, struggles to produce the latest and smallest chips and transistors. The U.S. Department of Defense is currently considering adding SMIC to the Commerce Department's entity list, which would restrict SMIC from receiving specific goods made in the U.S. China will continue to have a hard time closing the gap if it finds itself restricted from accessing materials from the global market. Additionally, the continued innovation taking place in the U.S. will continue to march forward, which will leave China's objective of matching American chip manufacturing that much further out of reach.

China's current strategy is to decouple itself from the U.S. semiconductor supply chain while finding alternative sources for import. But in the long-term, with as much as China has invested in semiconductors, its share of global production will surely grow.



HOW DID CHINA GET HERE?

MADE IN CHINA 2025

In 2015, China released its ten-year economic plan to develop its manufacturing and trade policy to help the country become a global leader in technology. This plan, titled Made in China 2025, outlined a number of new technologies such as advanced robotics and electric cars, which China intended to make a cornerstone of its industrial future. A central objective of the plan is to reduce dependence on foreign technology and promote Chinese high-tech manufacturers in the global marketplace. The plan outlines China's goal to achieve 70% self-sufficiency in some of these high-tech industries, and by 2049—the hundredth anniversary of the People's Republic of China—to be leading in global production.

These goals aren't altogether new for the Chinese government. The Chinese Communist Party has made efforts since at least the 1990s to shift their economy from low-wage manufacturing, such as mining and consumer goods, towards more productive work in the technology sphere. Made in China 2025 simply provides the map for overcoming the so-called middle-income trap, which has led growth to taper off in many developing countries as wages rise.

In many cases, the stated policies included in the Made in China 2025 plan are intended to toe the line of accepted international trade rules enforced by the World Trade Organization. The Council on Foreign Relations details some of these tactics, which include:

- *Setting explicit targets.* Through both public goal-setting and semi-official, backchannel coordination, China's leadership encourages private and public firms to shape their decision-making around the plan's priorities.
- *Providing direct subsidies.* The government provides direct support to industries through state funding, low-interest loans, tax breaks, and other subsidies. The exact amount is unclear, but some outside estimates by the EU Chamber of Commerce put the likely number in the hundreds of billions of dollars.
- *Foreign investment and acquisitions.* Chinese companies, both private and state-backed, have been encouraged by the government to invest in foreign companies, notably semiconductor firms, to gain access to advanced technology. The value of Chinese acquisitions in the United States peaked in 2016 at over \$45 billion.
- *Mobilizing state-backed companies.* China's economic reforms of the 1990s reduced the role of state firms in the economy, but they still account for a third of gross domestic product (GDP) and an estimated two-thirds of China's outbound investment. Many of China's global tech leaders, such as Huawei and ZTE, while privately run, are supported by the government.
- *Forced transfer agreements.* Foreign companies complain that to invest or do business in China, they must enter into joint ventures with Chinese firms under terms that require them to share sensitive intellectual property and advanced technological know-how.

China's goal of becoming the dominant leader in advanced technology has not gone unnoticed by security officials in the United States and around the world.

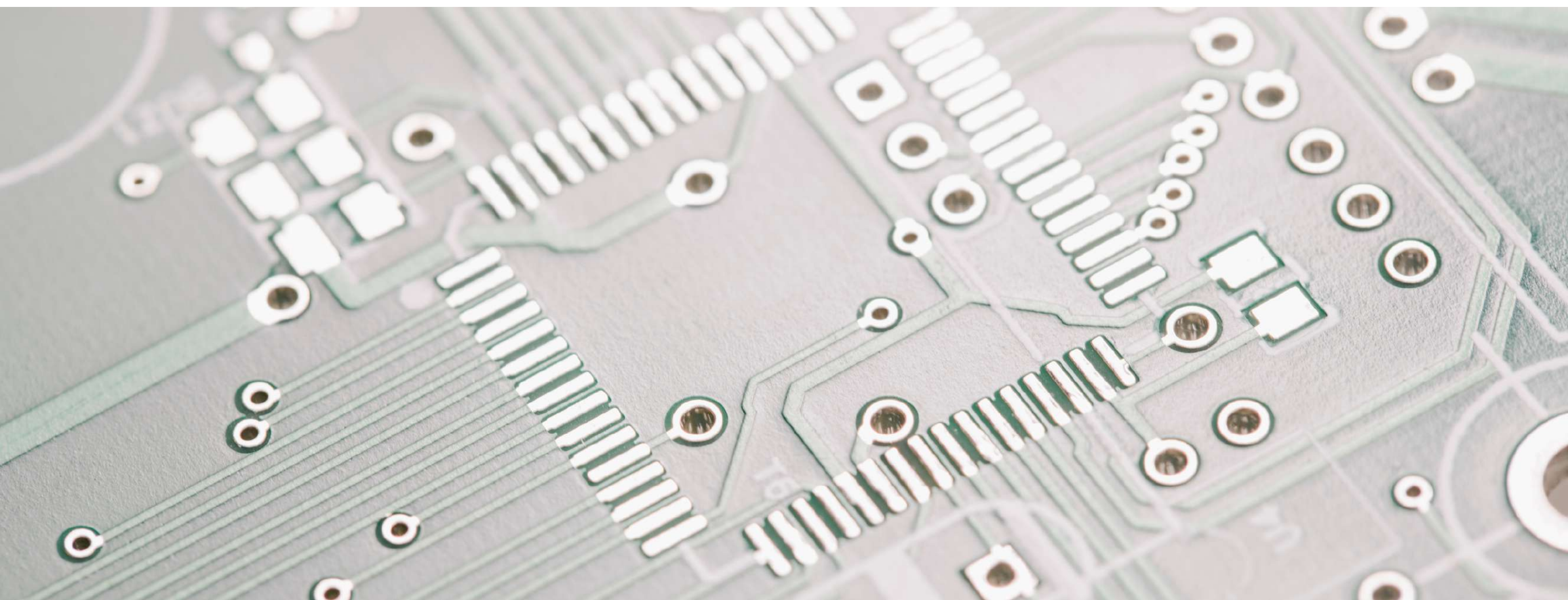
In a report published by the Pentagon in 2017, officials warned that the advanced technology products in fields such as facial recognition and autonomous vehicles had "blurred the lines" between civilian and military technologies. Likewise, in April 2018, the U.S. National Intelligence Council stated that "China's recruitment of foreign scientists, its theft of U.S. intellectual property, and its targeted acquisitions of U.S. firms constituted an unprecedented threat to the U.S. industrial base."

There is a growing worry among U.S. policymakers that China's desire to control global supply chains will lead to entire critical industries being owned by a rival geopolitical power. The Trump administration has repeatedly warned that efforts such as the Made in China 2025 plan threaten the U.S. economy, and those across the aisle have found this issue to be a rare case of agreement.

CHINA STANDARDS 2035

The latest Chinese plan, which is set for release in 2020, builds on the Made in China 2025 plan but focuses on setting the global standards for the products of the next generation of technology. The China Standards 2035 plan is expected to detail how China's government can be the first mover in new technologies like 5G and AI in order to set the global standards that other countries will need to work from as they develop commercial products.

Although the report has not yet been released to the public, the early preliminary report released by the Chinese Academy of Engineering outlines China's ambition to assert itself as a country that designs technology rather than one that simply makes products. Instead of utilizing original product designs or technologies produced in the U.S. and elsewhere at a lower cost, the bigger goal laid out by the preliminary report is to make China the home for global companies that pave the way in emerging technologies that will define the century.



NEW CENTER SOLUTIONS

How then can the U.S. maintain its advantage in key technologies and ensure it sets the standard for new innovations in the future? A comprehensive strategy to accomplish such a goal requires both a domestic and international focus.

WHAT CAN BE DONE AT HOME?

The bipartisan Endless Frontier Act bill, introduced to Congress in late May, provides a necessary blueprint of the strategy necessary to guarantee U.S. leadership in the scientific and technological innovations that are so vital to our economic future. The Endless Frontier Act proposes an expansion of the National Science Foundation (NSF)—to be renamed the National Science and Technology Foundation (NTSF)—and the establishment of a Technology Directorate within NTSF to advance technology in ten critical focus areas. The newly-established Technology Directorate would receive \$100 billion over five years to lead investment and research in several emerging technology areas. An additional \$10 billion would be authorized to designate at least ten regional technology hubs, awarding funds for comprehensive investment initiatives that position regions across the country to be global centers for the research, development, and manufacturing of key technologies.

The new Directorate would invest in key technology focus areas that include:

1. Artificial intelligence and machine learning
2. High performance computing, semiconductors, and advanced computer hardware
3. Quantum computing and information systems
4. Robotics, automation, and advanced manufacturing
5. Natural or anthropogenic disaster prevention
6. Advanced communications technology
7. Biotechnology, genomics, and synthetic biology
8. Advanced energy technology
9. Cybersecurity, data storage, and data management technologies
10. Materials science, engineering, and exploration relevant to the other key technology areas

The new directorate would also carry out activities that include:

- Increases in research spending at universities (which can form consortia that include industry) to advance U.S. progress in key technology areas, including the creation of focused research centers;
- New undergraduate scholarships, industry training programs, graduate fellowships and traineeships, and post-doctoral support in the targeted research areas to develop the U.S. workforce;
- The development of test-bed and fabrication facilities;
- Programs to facilitate and accelerate the transfer of new technologies from the lab to the marketplace, including expanding access to investment capital;
- Planning and coordination with state and local economic development stakeholders and the private sector to build regional innovation ecosystems; and
- Increases in research spending for collaboration with U.S. allies, partners, and international organizations.

WHAT CAN BE DONE ABROAD?

The Center for New American Security (CNAS) has proposed the idea of forging an “Alliance Innovation Base,” which is a community made up of the U.S. and its allies who are determined to deepen cooperation on technology innovation and protection. To create such an alliance, the proposal suggests strengthening America’s toolkit for technology engagement by broadening the mandate of the Defense Innovation Unit, an organization under the Department of Defense founded to help the military make use of emerging technologies, as well as adding technology scouting to the list of responsibilities for Defense Attaches posted to U.S. embassies.

Additionally, the proposal calls for building ally awareness capacity and launching new collaborative programs with allies. This could include expanding information sharing, promoting more awareness of China’s actions, and establishing bilateral innovation funds.

Finally, the proposal advocates for creating more positive incentives for technology protection and specifically focusing on leveraging the U.S.-Japan alliance. Any future presidential administration would be wise to prioritize the creation of such an “Alliance Innovation Base” as a key foreign policy objective to curb China’s ambitions.

