Technology, Economics, and Governance Working Group
Hoover Institution

March 29, 2021

New technologies—from Internet advances to artificial intelligence to synthetic biology and many more—are transforming the global economy and connecting us in ways unimaginable only a few years ago. Emerging technologies are offering unmatched opportunities to alleviate poverty, raise economic growth, treat disease, and improve lives all over the world. But these technologies are also fueling new geopolitical competition between the United States and China and they are posing unprecedented governance challenges to domestic political institutions. Policymakers today are grappling with a host of difficult questions. Among them: How can American technology innovation thrive in an increasingly competitive world with a rising China? Who protects American citizens and companies in cyberspace? What does privacy mean in an age of ubiquitous information and data analytics that can assess far more about our preferences and activities than we ever thought possible? How can American freedom of speech be maintained and how can American democracy thrive when disinformation can spread at network speed and scale? What is the role of government and what are the responsibilities of corporations? What technologies and what enabling policies are essential for ensuring American prosperity, security, and freedom over the next decades?

The purpose of the Technology, Economics, and Governance Working Group at the Hoover Institution is to address these and other questions that lie at the nexus of technology, economics, and governance. We seek to understand the drivers and dynamics of technological innovation in the 21st century, assess the opportunities and risks that breakthrough technologies are creating, and develop governance approaches that maximize the benefits and mitigate the risks for the nation and the world. Facts and objective analysis are the keys to our approach. The Working Group will conduct original research to better understand the current state of innovation as well as its causes and likely effects. This policy-relevant research will inform workshops with both private sector and public sector leaders and the development of policy recommendations for decision-makers at all levels of government.

This Working Group addresses an important need. In the current moment, for example, congressional proposals are increasingly calling for ways to reduce the power of large tech firms, from breaking them up to regulating them or taxing them. Yet it is not evident that any of these solutions will solve the problems the nation confronts with emerging technologies, and many of these approaches could hurt the nation by hobbling American innovation. Deep questions must be answered. Is the problem monopoly power, which leads to higher prices, or is it the power to exclude certain individuals or firms from using the platforms? How would break-ups take place, and would they depend on the market and the product? Are there better ways to proceed that limit global "bads" generated by big tech companies that do not throw out the global "goods" that they create, like scale advantages and greater global interconnectedness?

When we think of the implications of these issues—for the global economy, for international security, for the well-being of democratic governments and free peoples – there is one obvious conclusion: **the United States cannot afford to lose today's global technology competition**.

Who leads the global innovation ecosystem matters. An authoritarian regime will by its very nature use (and abuse) these technologies without the limits of a free press, free markets, counterbalancing democratic institutions and citizens who can assert their rights.

A world in which China, for example, wins the global race for technological innovation, production, and distribution once seemed like an exaggerated hypothetical—something of science fiction. Fortunately, that is not the world of today but it could be the world of tomorrow; as recent bipartisan commissions have noted, we can no longer take American technological dominance in perpetuity for granted.[1]

It is not necessary to guess about China's intentions. The Chinese Communist Party has clearly and repeatedly stated its aims to become the dominant technological power in the world over the next decade. In 2015, Premier Li Keqiang announced Made in China 2025.[2] In 2020, China released the 'China Standards 2035 Blueprint,' detailing a fifteen-year plan to set global standards for the next generations of technologies.[3] And in March of 2021, Chinese leader Xi Jinping unveiled a five-year policy plan centered on increasing China's technology independence – and emphasizing technology development as a matter of national security.[4]

To be sure, plans and reality are not the same. The Chinese government faces many hurdles to achieving these aims, and a world of Chinese dominance has not yet come to pass. But if the United States does not move more aggressively to invest in its own capacity for innovation and leverage the strength of its private sector, America's role in the world will be diminished — and with it, American economic prosperity, security, and values.

We must bear in mind that the United States should seek to maintain its edge in innovation not just to compete with China and others. Technology also offers benefits to our economy and society that the country can ill-afford to miss. For instance, there is great opportunity to harness the promise of technology to address some of our most pressing problems of inequality in education and health care. And needless to say, the connectivity that we have all experienced during the COVID pandemic reminds us that new ways of working, new ways of learning, and more productive ways of doing both can be significantly enhanced by technology.

The benefits of innovation are important to remember, particularly as discussions in the U.S. are frequently turning to the problems, not the promise, of technology. The political left and right are unified in this regard—by dislike and distrust of big tech. Currently, these reactions to the

---

[1] Cyberspace Solarium Commission, Final Report March 2020, https://www.solarium.gov/; National Security Commission on Artificial Intelligence, Final Report, March 1, 2021, https://www.nscai.gov/. See also hearing of the Senate Armed Services Committee, "Emerging Technologies and their Impact on National Security," February 23, 2021.

[2] Emily Crawford, "Made in China 2025: The Industrial Plan That China Doesn't Want Anyone Talking About," Public Broadcasting Service, May 7, 2019, www.pbs.org/wgbh/frontline/article/made-in-china-2025-the-industrial-plan-that-china-doesnt-want-anyone-talking-about/.

[3] Arjun Kharpal, "Power is 'Up for Grabs': Behind China's Plan to Shape the Future of Next-Generation Tech," CNBC, April 26, 2020, https://www.cnbc.com/2020/04/27/china-standards-2035-explained.html.

[4] Paul Mozur and Steven Lee Myers, "Xi's Gambit: China Plans for a World Without American Technology," *New York Times*, March 10, 2021, www.nytimes.com/2021/03/10/business/china-us-tech-rivalry.html.

challenges of the technological revolution are impulsive rather than analytical – emotional and not always rational. We have to do better.

In order to maintain U.S. global economic competitiveness and leadership, state, local, and federal policies must be oriented to encourage free and open markets and fuel innovation. China's technological progress stems from four key drivers: the dramatic growth of its domestic market; industrial policy favoring indigenous innovation; broader forces of globalization and its cross-border flows of capital, knowledge, people, and technologies over the past twenty years; and the widespread cyber theft of American intellectual property—what FBI Director Christopher Wray has called "one of the largest transfers of wealth in human history."[5]

Domestic markets and cross-border flows—particularly of human capital—also contributed importantly to U.S. technological leadership in the 19th and 20th century. However, the American model has always been quite different. Here, decentralization, democratic openness, and market principles also play pivotal roles in innovation.[3] If the U.S. is to continue leading technological innovation, it is imperative that our leadership and policies—at all levels of government — embrace these conditions for success. Any response to China's challenge should not seek to mimic what Beijing does. There is a reason so much talent—particularly in the engineering and entrepreneurial space—is attracted to the United States. It is not only our open Internet, but our approach to innovation that we must seek to maintain.

The sheer power of large technology companies, including those that amass data and control its distribution, has led some to think that "too big to fail" has become "too big to exist." Yet, one wonders whether the scale itself—with all of its challenges and disadvantages—is essential to the global technological competition. If there are increasingly two technological ecosystems—one free and one not—do we want scale to rest with the authoritarian state? And how do we accelerate and sustain technological innovation while providing adequate governance to limit the harms of technology for democratic societies?

At the same time, we must face the realities that new technologies have brought new challenges to individuals and institutions alike. Social media has presented democratic societies with vexing challenges. In a world of viral messaging, disinformation, and company business models that use algorithms to filter content and create likeminded communities, what are the risks to the marketplace of ideas? What does free speech look like and who decides what speech is accepted, rejected, and amplified? How can national interests, corporate interests, and privacy interests be reconciled? The Framers created American political institutions on the assumption that the answer to bad speech was more speech. Yet, modern psychology research casts doubt on that age-old assumption, finding that humans cling to preconceived ideas even when faced with contrary evidence and tend to believe outright falsehoods if they are repeated frequently from multiple sources—exactly the kind of media environment that the Internet now provides.[6] If more speech no longer fosters healthy discourse essential to democracy, then what can?

---

[5] Amanda Macias, "FBI Chief Slams Chinese Cyberattacks on U.S., calls it 'one of the largest transfers of wealth in human istory," CNBC, July 7, 2020, https://www.cnbc.com/2020/07/07/fbi-chief-slams-chinese-cyberattacks-against-us-hudson-institute.html.

[6] Jennifer Kavanagh and Michael D. Rich, "Truth Decay: An Initial Exploration of the Diminishing Role of Facts and Analysis in American Public Life," RAND, 2018.

The Working Group will tackle these and other key questions by conducting original research, fostering dialogue and engagement with key stakeholders, and developing policy recommendations. Among the areas that we hope to address are:

America and the World

Technological leadership is intrinsically tied to global leadership. Losing market share in the global tech race doesn't just hurt American companies. It hurts American economic competitiveness, American national security, and the spread of Western democratic values. Research on this topic requires further assessment of two factors at play: technological determinism and global protectionism.

Technological determinism is a near law of nature now—and holds that if something can be built, it will be. As global competition for technological innovation continues to race ahead, it is vital that the U.S. be a strong competitor at the front of the field. If something can be built, *it should be built in the U.S.*—or else it will rest in the hands of authoritarian countries such as China. This is not the 1950s and the dawn of the nuclear age, when new technologies were created by governments in classified facilities and could be carefully and tightly controlled by a handful of countries. Today's breakthrough technologies are inherently dual use—they have both commercial and military/intelligence applications. They are "born open" in the private sector, not classified and restricted by governments. And they can be invented anywhere: the Internet has been a great leveler on the global innovation playing field. Countries and their innovators are on a constant global treadmill for better, faster, cheaper technology and products for consumers. The U.S. used to lead in global technology innovation. That gap is narrowing in every area, from microelectronics to artificial intelligence, with new competitive entrants such as China, Japan, Germany, and South Korea. In some areas (like facial recognition and 5G) the U.S. has already lost its lead. In most others, the U.S. is losing global market share every year.

The U.S. needs to move rapidly to strengthen its competitive muscles, including adopting market-based policies that promote innovation and investment and capitalizing on current advantages. For example, the U.S. has an opportunity to leverage the upside of the pandemic, which is the rapid transition to online work in a wide range of industries. In the past year, an estimated 60% of the national workforce moved to work from home.[7] The workforce has become more productive overall—and the U.S. is seeing more new business starts than ever before.[8] America's online work transformation, combined its successful vaccine development and rollout, create a moment of opportunity.

---

[7] Kim Parker, Juliana Menasce Horowitz, and Rachel Minkin,"How Coronavirus Has Changed the Way Americans Work." *Pew Research Center's Social & Demographic Trends Project*, Pew Research Center, December 9, 2020, www.pewresearch.org/social-trends/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/. Jose Maria Barrero, Nicholas Bloom, and Steven Davis, "Why Working from Home Will Stick," Becker Friedman Institute Working paper, Number 2020-174, December 2020, https://bfi.uchicago.edu/working-paper/why-working-from-home-will-stick/.

[8] Greg Rosalsky, "The Unexpected Boom In Startups." *National Public Radio*, November 10, 2020, www.npr.org/sections/money/2020/11/10/933105790/the-unexpected-boom-in-startups.

Where does the U.S. want to—and where should it—lead in the vast technology space? This is both a question of focusing on our national strengths—for example, in enterprise and healthcare—as well as closing gaps in industries that will be of critical importance in the future, such as online education and cryptocurrency.

There is also a new global protectionism emerging, a large shift in how the international system interacts with U.S. technology power and assets. A study from the Organization for Economic Co-Operation and Development (OECD) of member countries as well as eight large non-OECD countries from 2015 to 2019 found that restrictive trade measures have replaced liberalization measures.[9] This trend, which is often rooted in desires to repatriate monopoly profits and gain global technology leadership, is counterproductive.[10] According to the International Monetary Fund, the costs of restrictions such as trade bans are amplified amongst allies. Instead of restricting trade, global leaders should establish cooperative frameworks in key areas, such as international intellectual property rights and cybersecurity.[11]

The biggest global markets today are India and China. If they continue to move from greater openness to less openness, there will be a balkanization of the technology world. In 2018, China introduced a standardization law that ignores international principles and best practices and added to earlier measures favoring indigenous Chinese tech firms and their products. India has also enacted e-commerce regulations specifically targeting and discriminating against international companies.[12]

The recent rise of protectionist policies raises the question of whether and how to create a democratic advantage when competing against authoritarian regimes. One of the core ways in which the U.S. can maintain its competitiveness is by having companies with scale to compete against the Alibabas of the world. Allies are a second and vitally important approach. American technology interests are not ours alone. Instead, we share far more in common with our allies around the world compared to authoritarian regimes. The U.S. and our allies encompass approximately two-thirds of global R&D—and therein lies great potential for pursuing shared goals by coordinating and collaborating on key research and development priorities.[13]

State and Local Leadership

Global tech competitiveness is not just a Washington issue; state and local policies are crucial to success and often overlooked. As the breadth of global innovation continues to increase, the U.S. must have domestic policies and infrastructure that incentivize domestic investment, facilitate innovation, and enable the production and deployment of products in our large domestic market.

---

[9] Daniel Garcia-Macia and Rishi Goyal. "Multilateral Cooperation and the Digital Economy," International Monetary Fund - Homepage, March 2021, www.imf.org/external/pubs/ft/fandd/2021/03/international-cooperation-and-the-digital-economy-garcia.htm.
[10] Garcia-Macia, "Multilateral Cooperation and the Digital Economy."
[11] Garcia-Macia, "Multilateral Cooperation and the Digital Economy."
[12] Nigel Cory, "The Ten Worst Digital Protectionism and Innovation Mercantilist Policies of 2018," Information Technology and Innovation Foundation, January 28, 2019, itif.org/publications/2019/01/28/ten-worst-digital-protectionism-and-innovation-mercantilist-policies-2018.
[13] Congressional Research Service, "Global Research and Development Expenditures: Fact Sheet," CRS Report R44283, Updated April 29, 2020, https://fas.org/sgp/crs/misc/R44283.pdf

Local public policies—from housing to education to taxes—have the ability to hinder or help the growth of innovation and the technological base.

California provides an exemplar case. In 2020 alone, scores of companies announced plans to relocate outside the state, including Oracle, Palantir and Hewlett-Packard Enterprise.[14] The migration is happening on an individual level as well, with over 135,000 more people leaving the state than moving in during 2020, the twelfth net loss of population of California residents since 1900 and the third largest ever.[15] To be sure, this is another area where getting the facts is essential. What is the magnitude and timing of this shift? Why is it occurring now? What are the key causes? What does history tell us about the rise and fall of technology ecosystems? And what could be the effects of the current trends if they continue? Would a domestic tech diaspora be more likely to help or hurt U.S. tech innovation overall?

California raises broader questions about the general state of U.S. federal, state, and local policies towards technology, innovation, and businesses. What are the policies at all levels of government needed to help foster innovation and global economic competitiveness? If the U.S. does not promote innovation and competitiveness through new policies and infrastructure, what are the likely outcomes? What is the risk of inaction—the price of doing nothing?

Technology and Social Good

Much of the promise of technology lies in its capacity to solve some of our most pressing societal issues. From healthcare to energy, technological advances have been a source of welfare gains, longer lives, higher incomes, and improved quality of life over recent decades.[16] Though vast disparities and challenges remain, technology can help close inequality gaps and improve societal outcomes—in particular by providing more equal access to high quality education.

The importance of technology in education has been on stark display with the impact of COVID-19 and remote learning on today's K-12 students. Research shows that when schools went online in the spring of 2020, learning rates among those in the bottom income quartile fell by 60 percent, compared with just 20 percent for those in the top quartile.[17] At the core of this issue is broadband accessibility—with an estimated 23.3 million Americans lacking access in

[14] Katie Schoolov, "Why Some Tech Companies and Billionaires Are Leaving California," CNBC, January 23, 2021, www.cnbc.com/2021/01/23/why-companies-are-fleeing-california.html. John B Taylor, "A Stampede from Silicon Valley," Project Syndicate, December 28, 2020 https://web.stanford.edu/~johntayl/2020_pdfs/The_Stampede_from_Silicon_Valley_by_JohnBTaylor-Project_Syndicate-12-28-20.pdf.

[15] "California's Growth Rate at Record Low as More People Leave." CNBC, December 17, 2020, www.cnbc.com/2020/12/16/californias-growth-rate-at-record-low-as-more-people-leave.html.

[16] McKinsey Global Institute, "'Tech for Good': Using Technology to Smooth Disruption and Improve Well-Being." *McKinsey & Company*, May 15, 2019 Discussion Paper, www.mckinsey.com/featured-insights/future-of-work/tech-for-good-using-technology-to-smooth-disruption-and-improve-well-being.

[17] John B. Taylor and Jack Mallery, "In-Person and Online Learning Go Together," Stanford Institute for Economic Policy Research (SIEPR) Policy Brief, August 1, 2020, siepr.stanford.edu/research/publications/person-and-online-learning-go-together#anchor-7.

2019[18]—and device affordability. An estimated 70 percent of teachers assign homework that requires broadband access—despite approximately 15 percent of U.S. households with school-age children lacking access to a high-speed internet connection at home.[19] Technology applications in education clearly have great potential. This includes applications of AI to improve traditional education outcomes and applications of digital education to improve access. India and China lead in digital education. From 2010 to 2020, China spent over $26 billion on EdTech through venture funding, whereas the U.S. spent $13 billion.[20] If the U.S. is to remain a strong competitor, unlocking potential among its population is paramount.

Social Media, the First Amendment, and Healthy Democratic Governance

The rise of technology—and social media in particular—has connected our world in ways previously inconceivable. As of December 2020, Facebook has had 2.8 billion monthly active users worldwide, the equivalent of 35.9% of the global population.[21] These Social media platforms have a unique power to convene global citizens and affect what they see and say. However, as seen from incidents of online "cancel culture" to the protest movements started in Tahrir Square, social media makes it easier to tear down than build up. As we capitalize on the promise for global interconnectedness from these platforms, we must examine better ways to mitigate the risks they create, including threats to democratic discourse.

Although social media platforms operate in different ways, all affect discourse and speech, from older companies like Twitter to newer platforms like Clubhouse and Parler. These platforms increasingly raise questions of how the U.S. should deal with an information ecosystem and world that is radically different than what the Founding Fathers envisioned—and call into question the efficacy of existing governance models in both the public and private sectors. Research increasingly shows that the very assumptions of discourse in democracy—that the answer to bad speech is more speech—is empirically wrong. Online, more speech has exacerbated polarization and undermined shared truth.[22] And yet policy discussions continue to be dominated by legal analyses that do not consider research from cognitive psychology and group decision-making that examines how human cognition and behavior actually work. The result: policies that are mismatched to empirical realities and unlikely to be effective. This is not a question just for technology companies, but instead a core question for our democracy. Under the pressures of immediacy of information and unfiltered information, what is happening to ground truth? The First Amendment? And what can be done?

---

[18] Nicol Turner-Lee,"What the Coronavirus Reveals about the Digital Divide between Schools and Communities," Brookings Institution, March 27, 2020, www.brookings.edu/blog/techtank/2020/03/17/what-the-coronavirus-reveals-about-the-digital-divide-between-schools-and-communities/; John B. Taylor and Jack Mallery, "Broadband for All," *Project Syndicate*, June 29, 2020 https://web.stanford.edu/~johntayl/2020_pdfs/Broadband-for-All-JohnBTaylor-JackMallery_Project_Syndicate_June_29_2020.pdf.

[19] Taylor and Mallery, "In-Person and Online Learning Go Together."

[20] "10 Charts That Explain the Global Education Technology Market." *HolonIQ*, 27 January 2021, www.holoniq.com/edtech/10-charts-that-explain-the-global-education-technology-market/.

[21] "Facebook Reports Fourth Quarter and Full Year 2020 Results." *Facebook*, Facebook, 27 Jan. 2021, investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx.

[22] Christopher Bail et al., "Exposure to Opposing Views on Social Media Can Increase Political Polarization," Proceedings of the National Academy of Sciences, September 11, 2018, www.pnas.org/content/115/37/9216.