

# How Will Technology Shape, and Be Shaped By, Policy Choices in the Coming Decades?

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A Research Agenda from the Technology Futures  
Policy Summit

TERRENCE K. KELLY, QUENTIN E. HODGSON, SARAH LOVELL



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# About These Conference Proceedings

The RAND Corporation convened a Technology Futures Summit with public policy, technology, and national security experts to discuss how emerging technologies in the coming decade could change the balance of policymaking and decisionmaking between national governments and other actors, such as large technology companies. The purpose was to think broadly about these issues and to propose a research agenda to help the United States and its partners and allies understand how the future national security environment might evolve and how to posture for success. The conference proceedings will likely be of interest to policymakers, researchers, and academics.

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# Summit Proceedings

The RAND Corporation Technology Futures Policy Summit convened a group of 15 top thinkers from industry, academia, and government to think broadly about how emerging technologies in the coming decade could change the balance of policy and decisionmaking between national governments and other actors, such as large technology companies.

The summit was originally motivated by Ian Bremmer’s article “The Technopolar Moment.”<sup>1</sup> Bremmer argues that technology companies and their most influential leaders (“techno-utopians”) are gaining power and influence at the expense of governments and could take a leading role in defining policy in some areas in the future. The article implies several key questions:

- How will the relative influence and power of states, private companies, and highly influential technology leaders change in the coming years?
- How will the relative power of these actors affect future policy and norms on emerging technology and the security of cyberspace?
- How could these futures come to be?
- What would be the implications for national and homeland security (e.g., protection of critical infrastructures)?
- What could governments do to affect how the future plays out?

Because the Bremmer article that motivated this summit focuses primarily on information and related technologies and leaders of those companies, RAND invited participants primarily from those and related fields. This does not imply that advances in other major fields of technology, such as in biological sciences, will not also have a major effect on the future—they surely will. That said, this focus and the constraints on what can be adequately covered in a one-day conference limited the scope of this effort.

The purpose of the summit (see the appendix for a list of participants) was to consider these questions and help frame a public policy research agenda for the United States, with an emphasis on the national and homeland security implications of these trends.

## Summit Overview

Former Secretary of the Navy and RAND Trustee Richard Danzig kicked off the summit with a keynote address that expanded on and added context to the argument in Bremmer’s article. The keynote set the stage for three subsequent sessions that addressed our national security futures:

- Who are the actors and how do they interact?
- What are the implications of these futures for society?
- How could policy affect these futures?

The facilitators for each session used these three themes to guide a dynamic and free-flowing interaction among the participants attending in person and virtually via Zoom.

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<sup>1</sup> Ian Bremmer, “The Technopolar Moment: How Digital Powers Will Reshape the Global Order,” *Foreign Affairs*, November/December 2021.

## Five Key Points

In his keynote, Secretary Danzig highlighted five points to extend and add context to Bremmer's argument:

1. *Historical context.* Although it is tempting to think of our age as unique, many of the circumstances and challenges we face today have informative historical precedents. Over the past 500 years, corporations have gained power that rivals and arguably exceeds those of nation-states. At the height of its power, the East India Trading Company was an international force with a presence in Southwest Asia, India, and Australia. It employed 260,000 soldiers at its peak, more than twice the size of the British Army at the time, and used economic levers to manipulate policy outcomes, particularly in India. Another example is the Standard Oil Company in the United States, with its immense domestic and foreign influence until broken apart by the U.S. government. Accordingly, corporate power should not be treated as a new phenomenon.
2. *Economic power of corporations extends beyond the information domain.* Recent discussion has focused on the role of large technology corporations, particularly social media companies. But other sectors are also key areas of competition. There are important national dependencies and interdependencies on hardware that underpins the modern economy, such as semiconductors, and communications infrastructure, such as fiber-optic and space communications. In addition, important dependencies are often recognized only in emergencies. For example, the dynamic pharmaceutical research community and industry demonstrated its economic and political leverage during the coronavirus disease 2019 (COVID-19) pandemic.
3. *Importance of other types of actors.* Nation-states and large international corporations are undoubtedly the preeminent actors on the world stage, but other entities also play important roles that do not fit into these categories. For example, international cooperative initiatives like the Global Initiative on Sharing Avian Influenza Data (GISAID), which started with tracking avian influenza, shared crucial genetic sequencing of the severe acute respiratory syndrome coronavirus 2 (SARS Cov-2) virus that causes COVID-19.<sup>2</sup> Other examples are the software repository GitHub (though it was acquired by Microsoft in 2018), and nongovernmental organizations, such as the Internet Engineering Task Force, that establish the standards for how technology will function.<sup>3</sup> More nefariously, international terrorist organizations are still an ongoing concern.
4. *Technology as an amplifier of power.* Advanced technology does not itself confer power or advantage to one actor over another. Rather, the degree to which an actor can assimilate and use a new technology more effectively than others is more indicative. Research and development are important to supporting national or corporate power, but the assimilation of the resulting technology is more important to creating advantage.
5. *Technology is a catalyst that is refracted through culture and politics.* Technologies are developed and deployed in societies in different ways that are heavily influenced by cultural norms and politics. Societies like the United States are driven largely by market forces, while nations like the People's Republic of China (PRC) are driven by a ruling party through bureaucratic forces. The results are varying degrees of government control, different propensities for errors and success, and different capabilities to correct errors.

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<sup>2</sup> GISAID, "Mission," webpage, undated.

<sup>3</sup> Frederic Lardinois and Ingrid Lunden, "Microsoft Has Acquired GitHub for \$7.5B in Stock," *TechCrunch*, June 4, 2018.

A final note of caution is that humans have a poor track record of predicting the pace and direction of technology development. This suggests the need for humility in our approach to crafting policy to govern technology's role in the international system and society.

## Discussion

Summit participants discussed Danzig's five themes and their perspectives on the respective roles of governments and technology companies in influencing, creating, and carrying out policy. The session facilitators used the framing questions to guide the dialogue across a variety of diverse topics. The following distills the discussions and weaves together important points from all three sessions, rather than enumerating them session by session.

### How Government Intervention in the Market Shapes Corporate Behavior

Participants from industry, government, and academia noted that the approach that governments take significantly drives the nature of their relationships with the private sector. Most agreed that because governments can tax, regulate, prosecute, and use force, they will be able to dominate corporations if they choose to do so.<sup>4</sup> They cited the European Union's (EU's) ability to shape the behavior of companies not residing there as one example, particularly technology and social media companies.

The public sector carries out many functions that companies typically do not or cannot—from policing to services like sanitation (though these may be contracted services)—so some participants noted that governments will always be critical. Governments' ability to tax, regulate, and otherwise compel action affects how companies do business, so the political jurisdictions in which companies operate is important. Governments can set incentives for corporate behavior through “carrots” (e.g., subsidies, access to markets) and “sticks” (e.g., taxation, regulation, and in authoritarian regimes exerting control over corporations for political purposes). They can also choose to not intervene in markets at all.

Participants who study markets pointed to the different approaches that the United States, the EU, and China take to government engagement in the marketplace, though these approaches can vary over time and depend on the economic activity in question. The United States and China are home to more—and systemically more-significant—technology companies than the EU. This gives the United States and China greater potential influence over these corporations and, by extension, over how global technology develops and operates. Although some major technology companies are headquartered in the EU (e.g., SAP, Nokia, Ericsson, ASML), the most-significant social media and web-based companies are not. The dearth of key corporations suggests that EU policymakers are less concerned about companies' corporate health than the impact of the private sector's actions on society. Major technology companies will seek to influence how governments shape the marketplace, although their degree of influence can wax and wane.

The discussion then touched on the use of technology and data and how usage differs under these distinctive political models. The tension in democracies over what to regulate and how much to do so is typically centered on protecting individuals and rights. In authoritarian systems, technology and data are often used to protect the government or party and control people (e.g., what they hear and see, their ability to organize, what they do). These differences in approach create very distinctive roles for individuals, companies, and governments, and have different implications for how futures can and will develop. This in turn has implications for trust in government and access to, or even agreement on, what is true. These and other concerns

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<sup>4</sup> This is particularly true in larger, diversified economies, but there can be exceptions where industry has regulatory influence or where a country depends on a single industry or resource for much of its productivity and income.

often lead authoritarian governments to limit access to information and cause both authoritarian and democratic societies to worry about “misinformation.”

In summary, how technology and tech actors affect the future will differ across countries and regions. This also will have economic and security implications that countries and regional blocks like the EU need to consider and address. Notably, summit participants focused more on the role of governments and companies and less on the role of individuals, such as the “techno-utopians” Bremmer discusses in his article.

### The Evolution of Society’s Interaction with Technology Companies and Governments

Several participants noted that the nature of ordinary people’s interactions with government and technology firms has changed dramatically in recent decades. The discussion that followed engaged most of the participants and highlighted that technology, social media companies, and the creators of the underlying hardware, software, and business practices that enable other economic activity have changed the way that people acquire and understand information. How government controls and permits things like internet access and data-sharing has a large influence on this change in the consumption of information.

This significant change in how people receive and understand information affects trust in government. The participants observed that trust is particularly low in Western democracies.<sup>5</sup> Even in autocracies, populations can express dissatisfaction with government, as made evident by the Chinese people’s reaction to the PRC’s zero–COVID-19 policy. This distrust in public institutions has been building over decades, fueled by perceptions that governments have not been truthful about major issues from war to public health.<sup>6</sup>

One astute observation was that many people approach companies like Twitter and Amazon as a form of public commons or market and they view access to them as a right rather than a commodity.<sup>7</sup> This affects how people perceive these companies’ legitimacy and creates a much closer and direct relationship between these companies and their customers than in the past. This legitimacy gap between how people view government and how people view these key commodity providers affects how governments interact with technology actors, particularly in democracies.

The summit discussion turned to the ability of governments to make decisions quickly that affect people—and to learn and pivot from policies that prove unworkable. Many bemoaned the sclerotic and divisive nature of policymaking in the United States, noting that lawmaking and policymaking lag far behind technology and business innovation. A few experts noted that quick decisionmaking—enabled by information technology and increasingly by big data—is not always an unalloyed good. Several noted that the Chinese government can act quickly and compel compliance, but it does not receive the benefits of public debate and appears very slow to learn and pivot from bad decisions (e.g., the PRC’s zero-COVID-19 policy).<sup>8</sup>

Technologies also have unintended consequences, as one participant noted. These include such disparate challenges as the safe disposal of plastics and electronic vehicle batteries, foreign actors’ use of information

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<sup>5</sup> For example, according to Pew Research, trust in government in the United States has fallen from the mid-seventy percentage points in late 1950s and early 1960s to the mid- to low-twenty percentage points since about 2007; the existing trust level is lower than it was at the end of the Vietnam War. See Pew Research Center, “Public Trust in Government: 1958–2022,” webpage, June 6, 2022.

<sup>6</sup> Whether the information provided by government is true or false also affects this perception.

<sup>7</sup> This is particularly true for social media platforms (e.g., Twitter, Facebook, Instagram, TikTok) because they are free of charge. Though there is no fee to use these platforms, users often agree (usually without having a full understanding of what they have agreed) to allow the platforms to collect data on them that can be used to target advertising or sell to others. Often, data are collected by tracking devices with little or no user awareness or choice.

<sup>8</sup> Participants also noted that policymaking, regulation, and lawmaking concerning technology can suffer when the decisionmakers are ill-informed about the technology, regardless of whether they are a part of a democracy or authoritarian government.

technology to affect societies and even elections, and authoritarian governments creating surveillance states and facilitating genocide. Some participants thought it was important to be able to better anticipate these consequences.

Finally, the important point was made that societies and governments affect the quality of and access to the human capital that industry and government need to perform well. The participants expressed belief that the United States attracts talented labor. However, those involved with or who study industry noted that the U.S. government performs poorly in hiring and retaining people with the deep knowledge needed to, for example, create and implement regulations and industrial policy. The different pay scales and opportunities in other governments (e.g., some European governments) permit them to do better at the latter task. However, participants noted that strong government industrial policy is not always successful and has risks, such as continuing to invest in failing businesses and industries or intervening in ways that distort competition through political favoritism. These participants cautioned against approaches that try to pick winners and losers among competing companies and advocated an approach that would support innovation while sustaining healthy competition in the marketplace.

### Industrial and Economic Policy Levers Can Give the United States an Edge

Major technology players also create the hardware and business practices that enable not only software and service providers but also the full variety of business endeavors. The global distribution of the semiconductor industry was a major point of discussion, as noted above. The United States is attempting to reinvigorate its semiconductor industry through the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act, which will provide \$52 billion in subsidies.<sup>9</sup> Participants noted, however, that developing the most-sophisticated chips does not automatically confer economic leverage because older-generation semiconductors—many manufactured in China—are used in a broad array of products like computers, cars, and airplanes. As one participant noted, focusing on 7-nanometer (nm) chips—the most sophisticated and hardest to produce—can blind us to the leverage of a country that dominates the manufacturing of 65nm chips.

Still, important products need the most-advanced chips, and developing and manufacturing them is very difficult. China, for example, has been unable to do so despite concerted effort and investment over several years (although reportedly, the Shanghai-based Semiconductor Manufacturing International Corporation recently started successfully manufacturing 7nm chips).<sup>10</sup> Some participants who understand complex manufacturing processes said that China's difficulties are because its closed system lacks the multiple inputs needed to develop and implement the most-complex, sophisticated manufacturing processes. The West holds a significant advantage in that all the companies that build the sophisticated tools and machinery needed for manufacturing semiconductors are based in countries like the United States, the Netherlands, Germany, and Japan. As one participant suggested, smart export control policy that restricts sales of such equipment to

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<sup>9</sup> David Sanger, "China Has Leapfrogged the U.S. in Key Technologies. Can a New Law Help?" *New York Times*, July 28, 2022. By comparison, China is set to invest at least \$140 billion in developing its semiconductor industry between 2015 and 2030. See Semiconductor Industry Association, "Taking Stock of China's Semiconductor Industry," blog post, July 13, 2021. The CHIPS and Science Act was signed into law on August 9, 2022. See White House, "FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China," press release, August 9, 2022.

<sup>10</sup> Debby Wu and Jenny Leonard, "China's Top Chipmaker Achieves Breakthrough Despite US Curbs," *Bloomberg*, July 20, 2022. However, there are questions about whether the production of this one chip indicates a real leap forward—see Rupert Goodwins, "China's 7nm Chip Surprise Reveals More Than Beijing Might Like," *The Register*, August 1, 2022.

China can dramatically slow China's progress toward independence in semiconductor production across all chips' nodes—advanced and legacy.<sup>11</sup>

The participants discussed the importance of new types of software and methods; in particular, how artificial intelligence (AI) and machine learning are developing in ways that can confer an advantage on one or another major international player. Although participants did not have an in-depth discussion of how AI will affect the balance of power, they did recognize that it would.<sup>12</sup> A key observation here is that China may be at a disadvantage despite having amassed enormous datasets on its own population. This is because the population data tend to be more homogeneous than in Western countries because of the homogeneity of China's population. Developing AI using these constrained datasets could lead to inherent biases and faulty algorithms. Participants noted that this holds the potential to give those working on population-related AI applications in the West an advantage over similar actors in China.

The participants from industry, government, and academia noted that it is important for the United States to develop trade and industrial policies that strengthen its position, particularly with respect to China, for national security as well as economic reasons, such as the theft of intellectual property. The logic behind this stance is that governments shape the environment in which technology companies operate and that the fact that certain countries dominate important technologies has economic and security implications.<sup>13</sup> More-assertive trade approaches included well-crafted export controls, especially judicious use of Foreign Direct Product Rules (FDPR).<sup>14</sup> The participants referenced the successful use of the FDPR with Huawei as an example of what could and in some cases *should* be done. Some participants called for more-aggressive and pointed efforts regarding China's unfair practices to dominate key technologies and markets (e.g., industrial espionage, unreasonable rules for operating in China, opaque subsidies to industries) and the security threat that those practices pose. Several also cited a need for focused industrial policy (e.g., with respect to manufacturing capability and capacity for microprocessors, securing key supply chains, and rare earth mineral production and stockpiling).

Although there was broad agreement on the need for better trade and industrial policy, some participants raised the issue of how to fund industrial policy. A sovereign wealth fund was one possibility raised by participants, but the panel did not explore it or other government investment options in depth. One participant noted that sovereign wealth funds and other similar vehicles for publicly funded investments carry risks, particularly for countries that do not divest themselves from investments based on clear conditions or that persist in unwise investments for political purposes even when the economic viability of the industry is clearly questionable. Nevertheless, the question of how to manage sovereign wealth funds to support effective industrial policy is plainly a topic that merits further investigation.

The participants noted that the United States could use economic leverage in two ways: (1) to attempt to restrain China's growth and (2) to reinvigorate U.S. economic competitiveness in key industries. However,

<sup>11</sup> Although it did not come up in discussion, the challenge of China developing indigenous capabilities in response to export controls is also an issue that should be carefully considered.

<sup>12</sup> For more on the topic of AI and the balance of power, see Matthew Daniels and Ben Chang, *National Power After AI*, Center for Security and Technology, July 2021.

<sup>13</sup> We acknowledge that the participants predominantly came from public policy and academic institutions, though some had current or prior experience in the private sector. A different group of participants might have different views on the desirability of the United States pursuing these policies.

<sup>14</sup> FDPRs regulate the export of controlled U.S. technology or items created using controlled U.S. technology and are part of the U.S. government's Export Administration Regulations (Code of Federal Regulations, Title 15, Commerce and Foreign Trade; Subtitle B, Regulations Relating to Commerce and Foreign Trade; Chapter VII, Bureau of Industry and Security, Department of Commerce; Subchapter C, Export Administration Regulations; Part 734, Scope of the Export Administration Regulations).

the secondary and tertiary impacts of increasing economic leverage, such as increasing the relative power of technology company leaders on the one hand and introducing inefficiencies into U.S. industry on another, could be significant.

## Where Do We Go from Here? Defining a Research Agenda

The potential scope of questions to address is vast, and the breadth and diversity of discussion during the summit reinforced this view. The participants generated many areas for potential exploration, which we organized, extended, and revised into two main topics with supporting research questions listed in the following section. These serve as an initial set of research questions that we hope will engender a robust national and international discussion of what needs to be examined, not to mention investments in getting the answers.

### Understanding the Policy and Technology Landscape

- How do U.S. and Chinese decisionmaking processes and approaches affect economic competitiveness and national security policies with respect to technology (e.g., via democratic or authoritarian processes characterized by different levels of input and deliberation, need for consensus, rapidity)? What are the advantages and disadvantages of each system in competition, and what can the United States do to ensure an adaptable approach to address challenges and opportunities in the coming decades? Will AI and other new technologies improve decisionmaking and decisionmaking processes or lead to undesirable outcomes?
- Technologies are characterized by several aspects that affect the public-private dynamic, and whether and how a country can derive benefit from a technology. How do these characteristics of important technologies, such as the barriers to entry (e.g., infrastructure costs, degree of difficulty to develop and manufacture) and network effects, change the dynamics of a country's ability to establish and maintain a competitive advantage? How can the character of technology change the dynamics of international relations? The policy decisions could include how to shape regulatory regimes and support the development of workforce capacity and talent acquisition.
- Can governments better anticipate the risk of emerging technologies and the unintended negative consequences of their byproducts (e.g., plastics are great until you throw them away, online marketplaces are great but hurt local retailers and media outlets that relied on classified advertisements for revenue)? Can governments weigh the risks of accidents (e.g., the unintended release of a virus being studied and perhaps modified)? While it may not be possible to address the "unknown unknowns," many of these downsides are knowable ahead of time. The extent to which governments, companies, and broader populations wish to acknowledge the knowable downsides is also a key consideration.
- What are the potential long-term impacts of attempts to regulate technology companies to reduce harm to the public or to define and reduce the monopoly power of individual corporations? How can governments apply regulations and other controls on technologies that have multiple applications and uses, both for good and for ill?
- What are the long-term impacts of economic sanctions, trade and export controls, and other aspects of industrial policy?

- What impact will new technologies have on societal trust as these technologies become democratized? For example, what are the impacts of generative AI that is increasingly difficult to distinguish from human output?<sup>15</sup>
- What are the economic impacts and societal changes from dislocations or transformations (e.g., white collar employees are wholesale replaced by AI systems) and what can be done to emphasize the positive aspects and mitigate the negative aspects of them?
- What role do regulatory processes in autocracies vs. democracies play in accelerating or impeding technological progress? Can these asymmetries reveal structural advantages or weaknesses? For example, Chinese regulatory permitting processes clearly accelerate semiconductor factory construction timelines, but Chinese regulatory processes are also increasingly heavy-handed in their oversight of technology giants. Conversely, U.S. regulatory processes impede semiconductor factory construction timelines but have, to this point, avoided heavy-handed oversight of technology giants. What are the merits and demerits of these divergent approaches?
- The U.S. government is asking policy questions that require science and technology subject-matter expertise to answer. However, this expertise is generally not resident in government policymaking branches. Frequently these experts are not connected to the policymaking process at all. What systems and processes could and should the U.S. government create to build short- and long-term capabilities to conduct net assessments of emerging technology (capable of scanning, forecasting, monitoring, and evaluation) to inform United States–China technology competition?
- How can the U.S. government effectively make use of open source and commercially sourced information on emerging technology? Nearly all emerging technology development is happening in the private sector or at universities, and their publicly available publications, patents, and investments provide valuable information about the competitiveness (or lack thereof) of specific emerging technologies and about the people who are developing them and the companies and countries where they are being developed. The U.S. government lacks a strategy for collecting and analyzing this information to inform technology competition and technology forecasting. How could the U.S. government develop such a capability?

## Economic Policy and National Security

Technology futures are as much about the economic dynamics of the 21st century as they are about national security. A large set of questions are centered on how the United States (and its partners and allies) can position itself to compete economically, and what policy decisions and initiatives the United States should consider.

- What levers does the United States have and what levers can it create to succeed in competition with China in areas in which competition is most important? What are the risks of using them and how can they be analyzed? How do short-term and long-term goals interact (e.g., when does achieving some short-term goals result in losses in the long-term)?
- Based on an examination and comparison of industrial policies of different countries and different sectors, what variables might lead to industrial policy being more effective in some areas than others, and how can the United States use these ideas to its advantage? What are the risks over time of industrial policy that may start off well but fail over the long term?

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<sup>15</sup> *Generative AI* refers to unsupervised AI learning that leads to its ability to create new images, video, sound, or text.

- How do countries fund technology advances, and what works best? How much of the benefit of a new technology accrues to the country that developed it compared with those that adapt and assimilate new technology? Does one approach (e.g., sovereign wealth funds or other state investment funds) confer advantage to countries that have such approaches? What approach or portfolio of approaches would work best in the U.S. context? What other forms of public investment and policy can encourage development of critical technologies to sustain our competitive advantage? What can we learn from our own efforts in unconventional investment approaches (e.g., In-Q-Tel) and other countries' experiences?
- How can new technologies create advantages for the United States in competition with China (and Russia)? The discussants focused on semiconductors, but are there other technology areas that the United States and its partners could support domestically to improve competitive advantage or where they could constrain competitors' access?
- How can the United States support technological innovations in ways that would make foreign advantages obsolete, such as investing in next-generation technologies (e.g., 6G mobile telecommunications)?
- How can the United States, the EU, and such allies as Australia, Japan, and South Korea collaborate on technology policy issues to create lasting advantages that would sustain the prevailing international economic framework? Are there areas such as different views on privacy and national security that need to be addressed to facilitate greater cooperation?
- What industrial policy is required to “reshore” or “ally-shore” critical industries or the manufacture of key technology components? Where can the United States continue to rely on foreign supply chains, given economic and national security needs? How would the United States create and implement such policies?
- How can the U.S. government better use the data it already has (or can access) to spur innovation and growth of critical U.S. industries? Can it accelerate AI or machine learning development by making the data it collects already (e.g., geospatial imagery, trade data, patent data, demographic and health data) more widely available to researchers and entrepreneurs or by making computational assets more available to academic researchers, startups, or others who can advance the field? How can the U.S. government do this while protecting classified or proprietary information, privacy, and sensitive data?
- What impact would an economic or military confrontation with China over a possible invasion of Taiwan have on U.S. technological supply chains? What policies are needed to minimize the damage of an abrupt decoupling similar to what occurred with Russia after its invasion of Ukraine?
- How can the U.S. government recruit and retain science and technology subject-matter experts to build bureaucratic capacity for the existing techno-economic competition with China?
- What is the role of standards-setting bodies in creating and maintaining emerging technology advantage? Standards-setting bodies have traditionally been the purview of private companies engaging in pre-competitive research and collaboration. However, this is changing as the Chinese government articulates and pursues greater influence in these once-private organizations. What strategies can the U.S. government pursue to counter China's focus on influencing international standards-setting bodies in favor of Chinese firms?

Research on such questions as these will be important for the United States and its allies to pursue if they want to remain competitive. Who will sponsor this work and how it is implemented may be challenging questions, given the broad nature of the research suggested here—for the most part, these topics do not fall neatly in the remit of any one government agency and some aspects of this research may be better done outside government, for example. Still, the U.S. government should play an important facilitating role.



## Conference Participants

The RAND team convened a hybrid in-person and virtual policy summit on July 12, 2022, to explore the issues identified in the main conference proceedings. Summit participants and their organizational affiliations are listed in Table A.1. Inclusion of their names here does **not** imply endorsement of any of the concepts, ideas, conclusions, or the research agenda by them individually or by their organization.

**TABLE A.1**  
**Summit Participants and Organizational Affiliation**

Name	Organizational Affiliation
Greg Allen	Center for Strategic and International Studies
Dmitri Alperovitch	Silverado Policy Accelerator
Ylli Bajraktari	Special Competitive Studies Project
Laura Bate*	New America
Richard Danzig	Trustee, RAND Corporation; Senior Advisor, Johns Hopkins University Applied Physics Laboratory
Renee DiResta	Stanford Internet Observatory
Henry Farrell	The Johns Hopkins University School of Advanced International Studies
Jimmy Goodrich	Semiconductor Industry Association
Quentin Hodgson	RAND Corporation
Terrence Kelly	RAND Corporation
Katherine Koleski	Defense Innovation Unit
Mary Lee	RAND Corporation
Herbert Lin	Stanford University
Wade Shen	Actuate Innovation
John VerWey*	Pacific Northwest National Lab

NOTE: An asterisk indicates the participant attended in a personal capacity.



# Abbreviations

AI	artificial intelligence
COVID-19	coronavirus disease 2019
EU	European Union
FDPR	Foreign Direct Product Rules
GISAID	Global Initiative on Sharing Avian Influenza Data
nm	nanometer
PRC	People's Republic of China



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