

Common Code

An Alliance Framework for Democratic Technology Policy

A TECHNOLOGY ALLIANCE PROJECT REPORT

Martijn Rasser
Rebecca Arcesati
Shin Oya
Ainikki Riikonen
Monika Bochert



Center for a
New American
Security

Center for a New American Security
1152 15th Street NW, Suite 950, Washington, DC 20005
T: 202.457.9400 | F: 202.457.9401 | CNAS.org | [@CNASdc](https://twitter.com/CNASdc)

About the Authors



Martijn Rasser is a Senior Fellow in the Technology and National Security Program at the Center for a New American Security (CNAS). Mr. Rasser served as a senior intelligence officer and analyst at the Central Intelligence Agency. Upon leaving government service, he was Chief of Staff at Muddy Waters Capital, an investment research firm. More recently, he was Director of Analysis at Kyndi, a venture-backed artificial intelligence (AI) startup. Mr. Rasser received his BA in anthropology from Bates College and his MA in security studies from Georgetown University.



Rebecca Arcesati is an Analyst at the Mercator Institute for China Studies (MERICS). Her research focuses on how China's digital and technology policies impact Europe. Prior to joining MERICS, Ms. Arcesati helped Italian tech startups scale up in China and worked on gender equality with the United Nations in Beijing. Ms. Arcesati received her LLM in China studies with a focus on politics and international relations from Peking University, where she was a Yenching Scholar, and her MA in international studies from the University of Turin. She holds a BA in language mediation and cross-cultural communication.



Shin Oya is a Senior Consulting Fellow at the Asia-Pacific Initiative. He received his BA in law from Tohoku University and his LLM from the Law School at Boston University, and passed the New York Bar exam. He joined Japan Bank for International Cooperation (JBIC) and experienced various positions including Director, Asian Operation; Director, Oil and Gas Operation; Chief Representative for New Delhi office. Now he serves as Chief Representative for Strategic Research of JBIC.



Ainikki Riikonen is a research assistant for the Technology and National Security Program at CNAS. Before joining CNAS, Ms. Riikonen worked at the Department of Defense's Near East South Asia Center for Strategic Studies, where she supported security cooperation programs on regional security issues for participants from North Africa, the Middle East, Central Asia, and South Asia. Ms. Riikonen holds a degree in international relations from the University of St Andrews and is currently studying for an MA in security studies at Georgetown University.



Monika Bochert is a former contractor with the Technology and National Security Program at CNAS. Prior to joining CNAS, Ms. Bochert was a Peace Corps volunteer at a rural school in Mongolia, where she worked as a foreign language methodologist and community organizer. She graduated cum laude from the Colorado State University Honors Program with a dual degree in social studies education and German.

About This Report

The Technology Alliance project and this report were made possible by a grant from Schmidt Futures. The statements made and views expressed are solely the responsibility of the authors and do not necessarily reflect the views of all authors and their respective institutions.

Acknowledgments

Thank you very much, Yoichi Funabashi, Mikko Huotari, Andrea Kendall-Taylor, Kristine Lee, Jason Matheny, Ely Ratner, and Paul Scharre, for your valuable feedback and suggestions on the draft.

Special Thanks

We especially thank the many contributors to this phase of the project. Nearly 700 government officials, industry executives, scholars, and other experts from 16 countries were invited to take part to share their insight, commentary, and ideas. Some are acknowledged here, others wished to remain anonymous.

Daniel Bagge, Cyber Attaché to the United States, Czech Republic

Tom Callahan, Vice President, CRDF Global

Eline Chivot, Senior Policy Analyst, Center for Data Innovation

Lt. Col. Matt Churchward RM, British Defence Staff

Rebecca Crootof, Assistant Professor of Law, University of Richmond School of Law

Sadanori Ito, Director, JETRO NY / Special Advisor to METI, Japan

Maike Okano-Heijmans, Senior Research Fellow at the Clingendael Institute, the Netherlands

Zoe Stanley-Lockman, Associate Research Fellow, S Rajaratnam School of International Studies

Dr. Joanna Świątkowska, AGH Cybersecurity Center

Fabio Vanorio, Minister Counselor, Ministry of Foreign Affairs and International Cooperation of Italy

Table of Contents

EXECUTIVE SUMMARY	6
SUMMARY OF RECOMMENDATIONS	8
Creating a Technology Alliance	8
Top Priorities: The Common Code for Activating the Technology Alliance.....	9
Longer-Term Agenda for Alliance Activity.....	10
METHODOLOGY.....	11
THE CASE FOR A TECHNOLOGY ALLIANCE	12
A New Grouping is Needed.....	12
Seizing the Moment	13
Averting Protectionism in Tech-Leading Democracies	13
Protecting and Promoting Norms and Values	14
Addressing the China Challenge to Democratic Technology Policy	14
PURPOSE AND GOALS	15
CREATING A TECHNOLOGY ALLIANCE	16
Core Membership: Which Countries and Why	16
Collaborating with Other Countries	17
Expanding the Technology Alliance	17
Structuring and Organizing the Alliance.....	17
Adopting a Voting System.....	18
Engaging with Other Stakeholders.....	18
Establishing Meeting Structure and Frequency	19
THE COMMON CODE FOR ACTIVATING THE TECHNOLOGY ALLIANCE	19
Restructure Supply Chains	19
Safeguard Competitive Technological Advantages	20
Fund and Build Secure Digital Infrastructure	23
Craft Standards and Norms for a Beneficial Technology Future.....	24
PROMISING AREAS FOR LONGER-TERM ALLIANCE ACTIVITY	25
Pursuing Joint R&D.....	25
Engaging in Technology Forecasting.....	26
Focusing on Data Flows.....	26
Promoting Technology Interoperability.....	26
Countering Disinformation.....	27
Maximizing Human Capital	27
NEXT STEPS.....	28

APPENDIX A: OVERVIEW OF SELECTED INTERNATIONAL ORGANIZATIONS AND NEW INITIATIVES.....30
APPENDIX B: SURVEY RESULTS35



Executive Summary

The 21st century will be defined by competition—a contest of economic power rooted in technological advances. How countries decide to compete will shape the lives of billions of people. Technology-leading countries will determine how to harness new technologies to combat disease, feed humanity, counter climate change, gain wealth, explore the universe, gain influence over others, secure their interests, and protect their independence and freedom. The leaders in adopting emerging technologies such as AI, quantum computing, biotechnology, and next-generation telecommunications, and those who shape their use, will garner economic, military, and political strength for decades.

The world's liberal democracies stand at a crossroads. Political power and economic might is diffusing. The integrity and efficacy of postwar institutions are increasingly challenged. Fresh thinking and new approaches are needed to tackle the challenges ahead to ensure that the future of technology is a beneficial one.

No one country can achieve this on its own. The requisite knowledge and capabilities are too dispersed. Broad-based, proactive, and long-term multilateral cooperation among like-minded countries is needed to maximize effectiveness across a range of areas, including research and development (R&D), supply chain diversity and security, standards-setting, multilateral export controls, and countering the illiberal use of advanced technology. To achieve the necessary level of coordination and collaboration, the world's tech-leading democracies should spearhead the creation of a new multilateral architecture for technology policy—a technology alliance.

Technological leadership by the world's major liberal-democratic nations will be essential to safeguarding democratic institutions, norms, and values, and will contribute to global peace and prosperity. A unified approach by like-minded nations also is needed to counteract growing investments in and deployments of emerging technologies by authoritarian, revisionist powers.

Many have made the case for such a grouping, most notably the United Kingdom's recent call for a "Democracy 10" to tackle 5G and other technology issues.¹ Similarly, former U.S. government officials have advocated for the creation of a "Tech 10."² Despite this interest in a new coordination mechanism for multilateral technology policy, the work needed to create it has been elusive.

This document lays out what that alliance framework should look like, the opening chapter of a new, multilateral techno-democratic statecraft strategy for the 21st century. It answers the key questions needed to move from concept to an actionable blueprint necessary to tackle the 21st century technology competition:

- What countries should be members of the technology alliance, and why?
- Should the alliance be able to collaborate with non-members, and why?
- Should the alliance grow, and how?
- How should the alliance be organized and structured?
- What is the ideal voting system?
- How should the alliance engage with stakeholders from industry and civil society?
- What is the best meeting structure and frequency?

After detailing recommendations for creating the technology alliance itself, the blueprint addresses the new organization's top priorities, areas where the project leads identified both a common code between the proposed member countries and an urgent need for improved coordination:

- Restructure supply chains with a focus on security and diversity
- Safeguard competitive technological advantages with tailored multilateral export controls and by curbing unwanted technology transfers
- Fund and build secure digital infrastructure by creating new investment mechanisms
- Craft standards and norms for a beneficial technology future.

The technology alliance's longer-term agenda should include efforts to:

- Pursue joint R&D
- Engage in technology forecasting
- Focus on data flows
- Promote technology interoperability
- Counter disinformation and other illiberal uses of technology
- Maximize human capital.

A summary of recommendations that answers these questions and expands on the tech policy priorities follows. The body of the report consists of seven sections. They detail the case for why collective action by the world's tech-leading democracies is needed, present the purpose and goals of the proposed grouping, make recommendations on the bureaucratic considerations to create it, discuss the common code for technology policy with specific courses of action, and close with a preview of what steps follow. A survey of existing international organizations and new initiatives, and survey results are included in two appendices.

Summary of Recommendations

CREATING A TECHNOLOGY ALLIANCE

Recommendation 1: Establish a technology alliance of the following core members: Australia, Canada, European Union (EU), France, Germany, Italy, Japan, Netherlands, South Korea, United Kingdom, United States.

- Membership criteria are countries with large economies and broad capabilities in technology areas critical to the 21st century economy. They must be committed to liberal democratic values, the rule of law, and respect for and promotion of human rights.
- The EU would be a core member with no voting power on alliance activity. The EU can engage in agreed-to actions in line with its competencies.

Recommendation 2: Create a mechanism to collaborate with other countries and organizations.

- Countries and organizations beyond alliance founding members still bring to bear significant expertise that is key for broader technology policy objectives.

Recommendation 3: Plan for a modest expansion of core membership.

- Growing the group should be considered once the alliance framework is proven. India is a logical candidate for member expansion.

Recommendation 4: Create an informal organization and adopt a network structure for organizational architecture.

- The organization would not be subject to a formal treaty.
- A network approach promotes nimble decisionmaking and preserves equal standing among member countries.

Recommendation 5: Use a consensus-based “one-member, one-vote” system to start.

- Consensus among the members is necessary to avoid a relapse to fractious, ad hoc decisionmaking.
- Additional alternative voting structures could be added once the alliance concept is proven and mature.

Recommendation 6: Ensure multi-stakeholder participation to inform alliance decisions and actions.

- The views and technical expertise of actors from industry, NGOs, scientific and technical organizations, and academia are essential for effective policy action.

Recommendation 7: Hold regular meetings, especially between working-level officials and stakeholders.

- The technology alliance would be most effective if regular meetings occur.
- Heads of state and ministers to provide strategic direction (annually), senior government representatives to set goals (quarterly), mid-level officials to guide implementation (as needed), and working groups and committees of subject matter experts to inform actions and implementation (as needed).

TOP PRIORITIES: THE COMMON CODE FOR ACTIVATING THE TECHNOLOGY ALLIANCE**Recommendation 8: Secure and diversify supply chains.**

- Member countries would benefit from coordinating and cooperating on the scope, process, and policy instruments to diversify important supply chains, which is a complex and expensive effort.

Proposed Area of Focus: Establish a semiconductor fab consortium.

- Complex supply chains foundational to economic and national security—such as semiconductors—are particularly well suited for an international cooperative approach. Semiconductor manufacturing facilities, referred to as “fabs,” are expensive, costing between \$10 and \$20 billion.

Recommendation 9: Protect critical technologies.

- Protecting technologies and know-how from theft, usurpation, and misuse is foundational to safeguarding economic and national security.

Proposed Area of Focus: Align export controls for semiconductor manufacturing equipment.

- Restrictions on semiconductor manufacturing equipment (SME) exports to China would be an effective way of maintaining a technological competitive advantage in semiconductor fabrication.

Proposed Area of Focus: Strengthen information sharing on Chinese technology transfer activities.

- Share knowledge and experience and assist other members with investigating unwanted tech transfer would make this acquisition pathway much more challenging.

Proposed Area of Focus: Harmonize definitions of “critical technologies.”

- Agreement here would improve actions on a range of technology policy issues from investigating export control violations to joint studies on the trajectory of technological change.

Proposed Area of Focus: Share counterintelligence best practices and provide capacity building for industry.

- Better cooperation on commercial espionage, which costs alliance members hundreds of billions of dollars each year, would help to protect valuable technology and know-how.

Proposed Area of Focus: Develop guidelines for research integrity.

- Such guidelines should emphasize addressing the balance between protecting sensitive technical information and openness for scientific inquiry, and addressing human rights and other ethical risks of international cooperation in science and technology.

Recommendation 10: Create new investment mechanisms.

- Democracies have shared interests in promoting secure digital infrastructure built by fair and sustainable investment mechanisms. Digital infrastructure provides a backbone for economic and societal connectivity, but low-quality vendors pose risks for the confidentiality, integrity, and accessibility of infrastructure.

Proposed Area of Focus: Pool resources to create a multinational investment mechanism for digital infrastructure.

- Build on existing capacity to prioritize secure digital infrastructure development in middle powers and developing countries.

Proposed Area of Focus: Establish common criteria to certify fair investments.

- Use the Blue Dot Network certification model as the foundation for broader sound and sustainable development projects.

Proposed Area of Focus: Pursue new approaches to digital infrastructure.

- Promoting novel ways of building out digital infrastructure could position firms in member countries to compete effectively on level playing fields. For example, promoting open radio access networks for 5G wireless networks would reintroduce competition, widespread innovation, and vendor diversity to the telecommunications sector.

Recommendation 11: Reclaim the integrity of international standards-setting.

- China is pursuing a comprehensive strategy to have Chinese-origin technologies be the foundation for global technology platforms and reduce its dependence on foreign intellectual property (IP) and standards. The way the Chinese government links standardization with mercantilist industrial policies is at odds with the purpose and spirit of international standards-setting.

Proposed Area of Focus: Counter unfair practices in international standards-setting bodies.

- Member countries can preserve the integrity of global standards-setting by making resources available for companies to send full delegations and submit the broadest possible portfolio of technologies to standards-setting bodies for consideration, and to call for reforms of the bodies to prevent bloc-voting.

Recommendation 12: Codify norms and values for technology use.

- Core alliance members, in cooperation and coordination with partner countries and relevant companies and civil organizations, should define and diffuse the norms and principles for how technology should and should not be used.

Proposed Area of Focus: Establish unified norms for the use of surveillance technology.

- The alliance framework is a useful forum to come to agreement on how surveillance capabilities should fit into existing legal structures, what types of due process should be available, and what uses are acceptable.

LONGER-TERM AGENDA FOR ALLIANCE ACTIVITY

Recommendation 13: Evaluate the broad array of other technology policy areas ripe for multilateral cooperation by tech-leading democracies. They include efforts to:

- Pursue joint R&D, and related IP rights improvements and intra-alliance export control reforms
- Engage in technology forecasting
- Focus on data flows, such as unified policies for data governance and data privacy
- Promote technology interoperability
- Counter disinformation and other illiberal uses of technology
- Maximize human capital

Methodology

The Technology Alliance project considers how technology will be at the center of the new era of great power competition. CNAS initiated the project with the understanding that whoever leads in the development and adoption of emerging technologies such as AI, quantum computing, biotechnology, and next-generation telecommunications will garner economic, military, and political strength for decades.

The project and this report are a collaboration of researchers from CNAS, the Asia Pacific Initiative (API) and the Mercator Institute for China Studies (MERICS). Together, they ensured diverse input from global stakeholders in the public sector, academia, and industry.

The goal for this phase of the project, which ran from March through June 2020, was to craft a blueprint for how and in what areas tech-leading democracies should coordinate multinational technology policy. This blueprint is the document you are reading now.

To launch the project and to frame the debate, the project leads—Martijn Rasser (CNAS), Rebecca Arcesati (MERICS), and Shin Oya (API)—made available a discussion draft prepared by CNAS outlining the need for and purpose of a new international organization for technology policy. The document laid out the specific considerations for a technology alliance: membership, organizational structure, governance, functioning, institutionalization and member representation, and proposed areas of activity. This draft was posted on GoogleDocs and generated rich and fruitful online discussions.

To delve into these issues further, the project leaders hosted three virtual workshops, one each in March, April, and May 2020. These events were tailored for the Washington, Tokyo, and Berlin time zones respectively to ensure maximum participation from stakeholders around the world.

A survey with 22 questions with multiple choice and freeform answers was sent to more than 600 people to solicit further feedback on these same topics. This provided an opportunity for others to share thoughts anonymously and in confidence. Parallel to this effort, selected multilateral organizations were reviewed to identify capabilities and gaps in existing structures through which technology policy coordination takes place. Finally, each project lead held one-on-one discussions with stakeholders from around the world. In all, nearly 200 people directly engaged on this project to inform the conclusions and recommendations presented in this report.

The Case for a Technology Alliance

Multinational cooperation on technology policy is necessary to ensure that the world's liberal democracies are competitive economically and their citizens empowered in the 21st century. With economic power comes geopolitical might. Increasingly, technological leadership means safeguarding one's sovereignty, values, and ideals. It also means providing a bulwark against increasingly destabilizing actions by autocratic governments.

Today, technology policy coordination is largely ad hoc, stovepiped, and disjointed. The resulting decisions and actions often fail to take into account the broader strategic context, blunting the effectiveness of the policies designed to achieve a desired outcome and impairing the ability to effectively respond to second- and third-order consequences, be they anticipated or unforeseen.

These inefficiencies are rooted in an underappreciation of how intricately linked the technology futures of the world's liberal democracies are. No one country can achieve the desired capabilities across the spectrum of technology areas—quantum computing, biotechnology, AI, robotics, and wireless telecommunications foremost—on its own. Nor can any single state muster the resources to nurture all the necessary talent and control vital supply chains needed to achieve and maintain such technological leadership. Broad-based, proactive, and long-term multilateral cooperation among like-minded countries is needed to maximize effectiveness across a range of areas, including R&D, supply chain diversity and security, standards-setting, multilateral export controls, and countering the illiberal use of advanced technology.

Better cooperation among democratic technology leaders also is needed to set the norms and standards for how technology is used. Emerging capabilities in fields like AI-enabled surveillance enable autocratic regimes in China, Russia, North Korea, Venezuela, and elsewhere to more effectively control and suppress their populations. The proliferation of such technologies erodes fragile democratic institutions in middle powers and developing countries around the world. These tech-leading democracies also should set the example at home by working together to build the legal and ethical frameworks for how such technologies are used in their respective countries.

A NEW GROUPING IS NEEDED

No existing multilateral grouping is equipped to navigate the complex waters of the development, use, and diffusion of the technologies that will be central to the 21st century great power competition. The status quo of uncoordinated and reactive technology policymaking for the major democratic technology powers in Asia, Europe, and North America means growing risk of ceding their technological leadership. China is investing ever more to achieve breakthroughs in areas such as AI, genomics, quantum computing, and telecommunications—the technologies on which the 21st century economy will be centered. China will be poised to reap the economic benefits and the accompanying geopolitical clout that prowess confers. Having China's government dictate the terms of the global economy is in no one's interest but Beijing's. It would erode the economic and national security of most countries.

Creating a beneficial technology future will require coordination and collaboration. Technology-leading countries—those with broad-based technological capabilities and committed to liberal norms like democracy, openness, transparency, inclusiveness and a rules-based order—should work together on a range of important but difficult technology matters.

While existing alliances and agreements such as NATO, the Organisation for Economic Co-operation and Development (OECD), and Wassenaar Arrangement signatories deal with aspects of technology policy, none are equipped to handle the range of largely interrelated issues that underpin the critical technologies

of the 21st century. They are also much too large for effective decisionmaking on such matters. The OECD, while a useful forum for tackling broad issues such as the responsible development of AI—and thus a potentially valuable partner for a technology alliance—is too big and diffuse. The G-7 is closest to being the right entity size-wise. Adapting the economic club to address technological issues, however, would require extensive restructuring and taking on new members, muddling the group’s original purpose in the process.

Instead, the world’s technology-leading liberal democracies—ten countries and the European Union—should join forces to create a collective foundation where each country can collaborate and compete. A key goal for this group should be to ensure a level playing field where the most innovative and dynamic companies succeed, not those swaddled by mercantilist industrial policies.

While China’s rise as a technology power is certainly a factor for the need of a technology alliance, the overarching purpose of this proposed grouping should not be taking reactive measures to put China down. Rather, the main focus should be proactive: sensible measures to boost competitiveness, productivity, and innovation to build a beneficial technology future that is rooted in free and open markets and comports with liberal-democratic values.

SEIZING THE MOMENT

The pandemic crisis presents opportunity and urgency to act. The global order is at an inflection point where decisions made by world leaders in coming months will shape the world for decades. The stakes are high: long-term economic and technological competitiveness, critical infrastructure integrity and security, cohesion among the world’s liberal democracies, and setting the norms for how emerging technologies should be used.

Broad-based collaboration and cooperation between like-minded countries will help to ensure that the upheavals of the post-pandemic world can be dealt with more effectively. It also will improve the chances that the coming decades are ones where their societies and economies can prosper, all while blunting the coercive power of authoritarian countries.

AVERTING PROTECTIONISM IN TECH-LEADING DEMOCRACIES

Technology policy coordination will be essential to help overcome the fissures developing between leading democracies on protectionism. A common reaction to the fallout of the COVID-19 pandemic has been to call for a retreat from globalization by “onshoring” or “reshoring” supply chains to various countries. There was some discussion along these lines before the pandemic, particularly in the United States, but the realization of how widespread the fragility of global supply chains is during the pandemic crisis prompted legislators and pundits in North America, Europe, and Asia to call for large-scale repatriation of manufacturing capabilities.

Furthermore, Beijing often threatens to weaponize economic interdependence,³ such as an 80.5 percent anti-dumping tariff on Australian barley in response to Canberra’s call for an investigation into the coronavirus outbreak and putting Germany’s car industry in the crosshairs if Berlin excludes Chinese telecommunications equipment manufacturer Huawei from German 5G networks.⁴

However, total decoupling or complete reshoring are counterproductive, impractical, and ultimately unfeasible. Autarky and isolationism are not elements of a strategy for crafting a beneficial technology future. Geographic concentration of supply creates vulnerabilities no matter where in the world they are.

Even selective decoupling from China and a shift to managed interdependence present considerable hurdles. Supply chain restructuring and viable diversification impose major costs and political risk. What is

needed instead is a carefully thought-out and managed interdependence that strikes the balance between security, resilience, and efficiency.

While individual states can achieve some on their own, democratic allies and partners have a common interest in doing the same. Multilateral cooperation and coordination on such broad policy issues would lessen the economic impact and help to ease the burden on the inevitable but necessary upheaval these actions will create.

PROTECTING AND PROMOTING NORMS AND VALUES

Technological leadership by the world's major liberal-democratic nations also will be essential to safeguarding democratic institutions, norms, and values, and contribute to global peace and prosperity. Technology, sovereignty, and freedom are increasingly intertwined.

Democracies have not agreed among themselves on a positive agenda for how technologies ought to be used. Lack of agreement damages interoperability among otherwise like-minded states and also impairs democratic states' performance at standards-setting bodies. Despite the strength of their innovation ecosystems, democratic states have not consolidated common norms for emerging dual-use technologies like facial recognition and 5G. At standards-setting bodies, authoritarian states work with their innovation bases to pose standards contrary to democratic values.

Democracies can better shape global norms if they can build a critical mass on common values-based propositions for technology. They also can shape norms more powerfully if they coordinate their policy tools such as export controls on dual-use technologies or sanctions on harmful actors. Without a united vision for emerging technologies, democracies will continue to leave room for authoritarian regimes to abuse technology to entrench themselves and create pathways for democratic backsliding. Democracies can proliferate a positive vision for the future and blunt the expansion of high-tech illiberalism, but only if they work together.

ADDRESSING THE CHINA CHALLENGE TO DEMOCRATIC TECHNOLOGY POLICY

The Chinese Communist Party has a comprehensive vision for global high-tech dominance, which it hopes will bolster its economic competitiveness, military strength, and geostrategic interests. Technology areas such as 5G and AI are central to these ambitions. Beijing mobilizes national champions, influences international standards, develops information and communication technology (ICT) infrastructure worldwide through the Digital Silk Road, and exports surveillance technology.

For democratic technological powers, this poses three challenges. First, unfair competition and predatory technology transfers are central to China's technological advancements. Without a coordinated approach to technology protection, tech-leading democracies could see their technological and industrial bases diminished. China's rapid advances in a number of technologies—5G, quantum computing, AI, and genomics most prominently—have exposed the worrying lack of investment in innovation by many liberal democratic powers. Like-minded democracies seem more focused on competing among themselves, rather than on making the most of their collective R&D strength to fund joint initiatives and spur civilian and military technology innovation.

The second challenge is one of security. Beijing's strategy of military-civil fusion makes it increasingly difficult to assess when collaborations in advanced dual-use technologies with any Chinese entities are contributing to strengthening the People's Liberation Army (PLA)'s capabilities. In the case of Chinese dominance of global 5G networks, Beijing could collect enormous amounts of data, including sensitive personal, commercial, government, and military information and hold critical infrastructure at risk. Despite this, commercial and political considerations have led many democratic countries to rationalize the risks.

Finally, inaction may result in China gaining first-mover advantage in setting the standards and norms governing the development and deployment of emerging technologies such as facial recognition. This is a problem that democracies must address, as Chinese tech firms are enabling surveillance and persecution of ethnic minorities and optimizing mass social control in China.

These firms also are exporting hardware, software, and training packages for urban policing and surveillance to developing nations around the world, including to authoritarian countries with fragile institutions and dismal human rights records.⁵ In addition to spreading digital repression, those partnerships allow Chinese firms to collect vast amounts of biometric data and improve their algorithms. China's surveillance state is expansive, and it threatens civil freedoms on a global scale.

Democracies' piecemeal approach to emerging technology standardization and regulation, coupled with their failure at addressing the global digital divide, facilitates the diffusion of China's preferred rules and norms, in turn threatening democracies' own competitiveness, security, and values. Deliberate, collaborative action will be necessary to effectively counteract China's strategy of exploiting the fissures between them.

Purpose and Goals

The purpose of the proposed technology alliance is threefold: regain the initiative in the global technology competition through strengthened cooperation between like-minded countries; protect and preserve key areas of competitive technological advantage; and promote collective norms and values around the use of emerging technologies.

In doing so, this group can best capitalize on the opportunities and mitigate the risks that go hand-in-hand in the technology competition and the broader great-power competition. Through collaboration, each technology alliance member and their partners can position themselves for strong economic growth and enhanced national security. At the same time, alliance members can ensure that the illiberal use of technology is limited and contained. Collectively, the countries can safeguard liberal-democratic institutions and act as a bulwark against authoritarian powers.

Creating a Technology Alliance

How well this new international technology policy grouping can achieve specific goals, fulfill its overall mission, and ultimately execute on its vision hinges on a set of bureaucratic considerations. First and foremost is deciding what countries should comprise the charter members. Representatives of these countries then must determine how to organize themselves for effective decisionmaking, setting policies and processes, and carrying out agreed-to actions.

CORE MEMBERSHIP: WHICH COUNTRIES AND WHY

Recommendation 1: The technology alliance should comprise the following core members:

- **Australia**
- **Canada**
- **European Union (EU)***
- **France**
- **Germany**
- **Italy**
- **Japan**
- **South Korea**
- **The Netherlands**
- **United Kingdom**
- **United States**

***Core member with no voting power on alliance activity. The EU can engage in agreed-to actions in line with its competencies.**

The recommended criterion for charter membership is that countries have large economies and broad capabilities in technology areas critical to the 21st century economy. They must be committed to liberal democratic values, the rule of law, and respect for and promotion of human rights. These countries must also have longstanding interest in international cooperation and coordination and share important defense and intelligence ties.

This project envisaged the creation of a multinational alliance that is mission-driven at its core. This means that founding members should broadly identify with the values and objectives defined in the problem statement. To ensure effective decisionmaking and overall functionality of the technology alliance concept, the core group must be small.

European participants from countries not part of the proposed group of countries made a strong case for the European Union (EU)'s participation in the Technology Alliance. The European Commission has played a leading role in advancing Europe's technology policy, from digital rights protection and 5G cyber security to key investment and norm-building initiatives pertaining to a range of emerging technologies, such as AI and quantum technologies. Meanwhile, the EU has many important competencies in areas such as research and technological funding, competition, and internal market policies.

The participation of the EU—and leading research and innovation hubs across its member states—therefore would maximize the alliance’s effectiveness and impact, especially if members embark on even more ambitious activities such as joint R&D and cross-border innovation challenges. However, the organization will need to act as an observer in case of alliance decisions for which consensus among EU member states would be required.

The project leaders considered, but do not recommend, inviting India to be a part of the founding cohort. India’s tradition of nonalignment in foreign policy and informal conversations with Indian government officials in March 2020 suggest that the country would not be interested in joining a technology alliance as a founding member. We believe, however, that the technology alliance and India would benefit from its eventual membership as noted below.

COLLABORATING WITH OTHER COUNTRIES

Recommendation 2: Create a mechanism to collaborate on technology policy beyond core member countries.

A nimble and inclusive technology alliance framework would include the capacity to work with other countries. Core alliance members may wish to involve other partners to achieve specific goals. There are numerous countries that, while lacking broad-based technology capabilities and economic heft, or not being fully aligned on all technology alliance goals, have significant expertise that is well suited to broader technology policy objectives. For example, core alliance members could work with Estonia and New Zealand on cyber security, Finland and Sweden on telecommunications, Austria and Switzerland on quantum computing, India on software development, and Israel on robotics and autonomous systems. A collective approach to assist with digital infrastructure development and technology deployments in developing countries around the world would help to blunt the illiberal use of technologies.

Technology alliance members also should consider working with other organizations on issues of mutual interest—NATO on cyber security, the OECD on the economic implications of certain technologies, and the Global Partnership on AI for relevant norms, for example.⁶

EXPANDING THE TECHNOLOGY ALLIANCE

Recommendation 3: Plan for a modest expansion of core membership.

Technology alliance founding members should plan for potentially growing the group once the concept and framework have proven effective. The bar to joining should be set high and require unanimous agreement by the founding members. Beyond considerations of economic heft and broad technological capabilities and normative liberal-democratic principles, care must be taken not to expand the group such that its effective functioning becomes imperiled. One logical candidate for member expansion would be India. The participation of India—the fifth largest global economy by nominal GDP and a vibrant technological ecosystem—would considerably broaden the group’s reach and diversity and add developing country representation.

STRUCTURING AND ORGANIZING THE ALLIANCE

Recommendation 4: Create an informal organization and adopt a network structure to promote nimble decisionmaking and to preserve equal standing among member countries.

The single most important decision founding members will make during the creation of a technology alliance is choosing the proper organizational architecture. Structure dictates how an organization

pursues its objectives, how successful an organization is in achieving its mission, and how it benefits its members.⁷

An informal, network-based organizational architecture would allow alliance founding members to form flexible issue-based partnerships around specific projects and initiatives as diverse as the global technology landscape in the 21st century. Network organization entails having a flat management structure that leverages flexibility and the capacity to outsource tasks based on participants' knowledge and experience. It has been utilized most frequently in industry production, but many of its lessons can be transferred to the management of multilateral institutions.⁸

Project participants emphasized the need to minimize formal bureaucratic structures, at least at the outset. The alliance should be informal—not subject to a treaty. Other than a small permanent secretariat to organize meetings and manage the execution of agreed-to actions, substantive expertise and related recommendations should come from specialized, temporary working groups and task forces, which would well suit the purpose of an alliance of countries working on a range of technology-specific initiatives. Stakeholders and experts from government, industry, and civil society from each member country would make up these groups.⁹

ADOPTING A VOTING SYSTEM

Recommendation 5: Adopt a consensus-based “one-member, one-vote” system at the outset of alliance creation.

The proposed technology alliance will require consensus among its core members for any specific course of action to avoid a relapse to fractious, ad hoc decisionmaking on technology policy matters. This approach will be essential to ensuring the technology alliance concept is viable, as reflected in comments by workshop and survey participants. Decisions that entail regulatory alignment most likely would require unanimity.

Once the alliance concept is proven and has matured, alternative voting structures should be considered to allow for more flexibility and a broader range of activity. Numerous project participants noted that a variable voting process would be sensible, such as when a subset of core members have no direct stake in a specific matter. For example, two or more members kick-starting a joint initiative such as a joint innovation challenge or an initiative to draft norms and rules for gene editing that can be scaled at a subsequent stage. The Asia-Pacific Economic Cooperation (APEC) Pathfinders Initiative, which provides a mechanism for a subset of APEC economies to start work on a particular issue for eventual APEC-wide consensus, could serve as a model for how to do so.¹⁰

ENGAGING WITH OTHER STAKEHOLDERS

Recommendation 6: Ensure multi-stakeholder participation—particularly private industry, NGOs, scientific and technical organizations, and academia—to inform technology alliance decisionmaking.

Technology policy such as export controls, joint R&D, and curbs on investments directly impact corporations, research institutes and universities, and individual academics. Numerous international organizations have shared interests in setting norms and values for technology use. Incorporating the points of view, concerns, and technical expertise of these actors early on will be essential to technology alliance decisionmaking, planning, and execution. Involvement in the aforementioned working groups and task forces will be central to this effort.

Project participants pointed to the OECD and the Global Internet Forum to Counter Terrorism for other best practices for participatory and multi-stakeholder governance.¹¹ They include:

- Engaging stakeholders early in the planning process, ideally by the time the problem statement has been defined and throughout the deliberation and planning process
- Establishing a consistent framework for multi-stakeholder engagement to ensure a set of minimum standards are met in terms of impact, scope, number of affected groups, information needs, timing of action, and resources available
- Providing stakeholders with relevant and timely information using non-technical language.

ESTABLISHING MEETING STRUCTURE AND FREQUENCY

Recommendation 7: Hold an annual head-of-state and ministerial-level meeting. Focus on regular meetings between working-level officials and stakeholders.

The technology alliance is likely to be most effective if regular meetings occur. For example, senior government representatives meeting quarterly to set overarching goals, mid-level government officials meeting as needed to guide implementation of the top-level guidance, and frequent meetings of working groups and committees to coordinate and execute the agreed-upon actions. An annual high-level meeting of country leaders and ministers would provide the overall strategic direction for the organization.

Government representation could consist of representatives of ministries of Foreign Affairs, Science and Technology, Trade, Commerce, Economics, Defense, or their approximate equivalents, with the advice of intelligence and security agencies. The working groups and committees would largely comprise subject matter experts from government, private industry, and academia.

Most workshop and survey participants agreed that the details of institutionalization would follow naturally from delineating the specific activities the core members agree to tackle.

The Common Code for Activating the Technology Alliance

The viability of a technology alliance rests squarely on a shared desire for multilateral cooperation and strong agreement on what areas of technology policy are most important to tackle. During the course of the project, we determined that not only is the requisite interest there, there is a remarkable alignment on what the initial technology policy priorities should be. To be effective, however, all core members must agree to specific courses of action to achieve clearly defined strategic outcomes.

RESTRUCTURE SUPPLY CHAINS

Recommendation 8: Secure and Diversify Supply Chains

The proposed technology alliance is well positioned to be the driver for much-needed supply chain resilience and diversity. The fallout from the pandemic made clear that efficiencies gained with increasing globalization came with widespread vulnerabilities. Diversifying supply chains geographically is needed to introduce greater resilience and security for key materials and products. Coordinated planning can reduce the cost and complexity of restructuring those supply chains identified as essential to the day-to-day functioning of society, while introducing greater resilience and security.

In the project roundtables and in other discussions, three considerations crystallized. One is that restructuring supply chains will require rethinking the balance between efficiency and resilience. The most cost-effective option is less likely to be the one that is most desirable from a security and reliability standpoint.

Two, resilience is multifaceted. It includes geographic diversification, reshoring, ensuring surge production capabilities, and stockpiling of essential items.

Three, government engagement with industry on the planning and execution of supply chain restructuring is essential. Only by working in concert can policymakers and industry leaders strike the proper balance between national security, economic security, avoiding the pitfalls of protectionism and autarky, and preserving corporate competitiveness.

Proposed Area of Focus: Establish a semiconductor fab consortium.

Complex supply chains foundational to economic and national security—such as semiconductors—are particularly well suited for an international cooperative approach. Semiconductor manufacturing facilities, referred to as “fabs,” are expensive, costing between \$10 and \$20 billion. A fab consortium among technology alliance members could pool resources to establish new semiconductor production lines in various countries. Member countries have a shared interest in introducing greater geographic diversity in global semiconductor supply chains.

Taiwan in particular plays an outsized role in the global semiconductor market, and its relationship with and proximity to China makes it vulnerable to espionage, sabotage, or blockades. The technology alliance could serve as a mechanism to cooperate with Taiwan on safeguarding its semiconductor industry against undue Chinese influence. One way to do this would be building new production capacity elsewhere, such as the agreement the United States concluded with Taiwanese semiconductor firm TSMC aims to do. Alliance members also can help Taiwan with investment screening and building safeguards against Chinese attempts to siphon human capital. Member countries should cooperate on new leading-edge fabs to ensure they are sufficiently geographically diverse to introduce greater resilience into the global semiconductor supply chain.

SAFEGUARD COMPETITIVE TECHNOLOGICAL ADVANTAGES

Recommendation 9: Protect Critical Technologies

Existing mechanisms for like-minded democracies to work together on technology protection suffer from major weaknesses. First, countries take profoundly different approaches as to which advanced technologies are deemed “critical,” the grounds on which those should be protected, and the instruments that should be used.¹² Second, many countries lack the capacity, information, and resources needed to assess the risks posed by China. Third, existing multilateral export-controls regimes have notable loopholes. Fourth, U.S. efforts to persuade allies to align their technology protection measures, most recently through the Multilateral Action on Sensitive Technologies and aggressive lobbying to ban Huawei’s technology, often lack positive incentives.¹³

Protecting technologies and know-how from theft, usurpation, and misuse is foundational to safeguarding economic and national security. A large majority of project participants considered multilateral cooperation in this broad area to hold much promise for significant impact. Areas for cooperation include proactive and reactive measures that can readily be taken in concert.

Enact Multilateral Export Controls

Effective export controls require the cooperation of multiple countries. No single country dominates a technology area such that it can unilaterally achieve its policy goals with this approach. Technology alliance members could take steps to create a community where the same level of protection is granted by all members for a clear and narrowly defined set of technologies for which protecting and maintaining a competitive edge is paramount.

Proposed Area of Focus: Align export control measures for semiconductor manufacturing equipment (SME).

The alliance should start with priority items such as SME where the proposed alliance members have unquestioned advantage. China is making huge investments to indigenously design and manufacture its own chips, but it needs foreign equipment and know-how to accomplish this goal. Because 90 percent of global SME is produced by a handful of countries (Japan, the United States, and the Netherlands—all proposed tech alliance members), restrictions on SME exports to China would be an effective way of maintaining their edge in this sophisticated hardware.

The support and cooperation of other tech alliance member countries, and consultation and cooperation with the affected companies, will be essential to offset the costs of technology protection. The aforementioned semiconductor consortium is one way to do so. Another could be forging a common innovation base with R&D of next-generation semiconductor designs and materials.

Curb Unwanted Technology Transfers

A cost-effective and high-impact way to bolster technological competitiveness and to secure areas of technological advantage is through better information sharing between tech alliance members. The globalization of innovation and supply chains means that weak links in one country can lead to major vulnerabilities elsewhere in the world; therefore, no democracy can effectively play defense if it acts unilaterally. More robust information sharing among alliance members could form the basis for more effective IP theft mitigation, counterespionage, investment screening, and export controls.

The Chinese government is undertaking a systematic and multi-pronged effort to access and acquire cutting-edge foreign technology through legal and illicit channels.¹⁴ The scale of the challenge warrants a coordinated response. The tech alliance concept would be an effective bulwark against unwanted technology transfers that damage each member country's economic and national security, so that beneficial and much-needed scientific and technological exchanges with China can continue to take place in safety. This report is not meant to be an exhaustive review of all ways such transfers happen, but two main avenues stand out as being well suited to being tackled in concert.¹⁵

One such channel is foreign direct investment (FDI). Chinese investors remain keenly interested in high-tech sectors related to the Made in China 2025 industrial policy blueprint. In 2019, the highest number of Chinese transactions in the EU (United Kingdom included) targeted ICT companies, such as semiconductor and data analytics firms.¹⁶ Sharing intelligence and risk assessments of problematic FDI would help to safeguard key companies and critical industries from damaging foreign encroachment.

Another channel is R&D collaboration with companies and universities. These tie-ups often provide Chinese entities with a gateway to foreign technology and know-how, including in dual-use fields and applications that are used for mass surveillance and repression in China. Legitimate research ties often lead to covert technology transfers, and there is ample evidence that most leading economies across the Asia-Pacific, Europe and North America are affected—yet awareness levels and policy responses differ greatly.¹⁷ Meanwhile, research partnerships are only one part of a sophisticated and understudied infrastructure through which the Chinese government seeks to access sensitive technology by exploiting talent exchanges and other lawful channels.¹⁸

Proposed Area of Focus: Strengthen information-sharing on China's technology transfer activities.

Having each tech alliance member share knowledge and experience and assist other members with investigating unwanted tech transfer would create formidable obstacles to this acquisition strategy. A first step could be the creation of a joint database of legal, extralegal, and illicit Chinese activities aimed at acquiring foreign technology across North America, Europe, and the Asia-Pacific region. The database should include a list of companies, research institutes, and individuals affiliated with or collaborating with the PLA and China's state security apparatus. Ideally, the list would be accompanied by a set of risk indicators to help public and private actors from alliance member states identify entities of concern.¹⁹

Information on China's technology transfer organizations, talent programs, and state-backed investors and their activities also should be shared among alliance members. At the same time, existing cooperation agreements and projects with Chinese entities in key emerging technology areas should be reviewed to identify potential vulnerabilities. The database would draw on the unique insights of all members, which also could consider jointly sponsoring research in areas where more data is needed.

Proposed Areas of Focus: Create a platform for alliance members to harmonize their definitions of "critical" technologies.

Crucially, this effort should not be limited to mapping high-risk actors and their entanglements with the innovation ecosystems of liberal democracies. The alliance also would provide a platform for technical and national security experts of the participating countries to exchange information on enforcement and violations of export control regulations, and conduct joint studies on the trajectory of technological change, development and adoption in different parts of the world in order to: a) achieve consensus on definitions of "critical" technologies and "dual-use items" through an open, evidence-based, and inclusive process that also takes into account how technology is used; and b) help businesses and research institutions assess and mitigate risks stemming from unwanted transfers of technology and know-how.

Proposed Area of Focus: Share counterintelligence best practices and sponsor capacity-building for firms in need.

In addition to academic espionage, commercial espionage, including through cyber espionage and cyber theft, is an important line-of-effort of Beijing's state-directed technology acquisition strategy. Democracies around the world, including members of the Five Eyes intelligence alliance, Japan, and several European countries have openly criticized such behavior.²⁰ In the United States alone, an independent commission estimated the annual losses from economic espionage to be more than \$300 billion, 50 to 80 percent of which could be attributed to China.²¹ The technology alliance could provide a forum for member countries to share best practices and coordinate their responses. For instance, alliance members could improve coordination among their law enforcement agencies, and jointly support counterintelligence outreach to and capacity building for startups and small companies working in the technology sectors most affected by China's technology transfer strategy.²²

Proposed Area of Focus: Develop guidelines for research integrity.

Finally, alliance members could launch a multinational dialogue on research integrity, aimed at developing common guidelines for universities, grant-making institutions, businesses, and government agencies engaged in foreign research collaboration with nondemocratic nations. The exchange should be multi-stakeholder in nature and focus on addressing the balance between protecting sensitive technical information, IP, and national security and safeguarding the openness of scientific inquiry. Measures to address ethical and human rights risks of science and technology cooperation with untrustworthy entities should be another priority, particularly with regard to frontier applications of AI and biotechnology.

FUND AND BUILD SECURE DIGITAL INFRASTRUCTURE

Recommendation 10: Create New Investment Mechanisms

Democracies have shared interests in promoting secure digital infrastructure built by fair and sustainable investment mechanisms. Digital infrastructure provides a backbone for economic and societal connectivity, but low-quality vendors pose risks for the confidentiality, integrity, and accessibility of infrastructure. Simultaneously, opaque or predatory lending practices can erode states' sovereignty by opening them to financial coercion. Like-minded nations already have begun to coordinate fair investment criteria and should deepen and expand their efforts within the context of tech policy. A standing multilateral mechanism would act as a force multiplier by allowing democracies to cohesively direct resources to common priority areas.

Proposed Area of Focus: Pool resources to create a multinational investment mechanism for digital infrastructure.

Proposed technology alliance member states generally have agencies that can direct financing to projects important for their foreign policy objectives. For example, the Japan Bank for International Cooperation, the EU External Investment Plan, Australia's Department of Foreign Affairs and Trade and Export Finance and Insurance Corporation, and, to an extent, the new U.S. International Development Finance Corporation. Member states should empower their development and investment agencies to make digital infrastructure—for example, 5G, financial technologies, biotechnology software, or maritime domain awareness tools—a priority because of its importance for the capacity of middle powers and for growth in underdeveloped states. They also should boost digital inclusion in emerging economies more broadly by promoting their innovation ecosystems and through skills training. These can include technical skills, business and innovation skills, and training on legal and technology frameworks to support the democratic use of technology.

The EU already has melded digital tech into its development priorities through the Digital4Development strategic framework.²³ The EU has funded cross-border connectivity projects and international partnerships to jump-start local innovation ecosystems, encourage interstate digital trade integration, and equip youth with digital skills.²⁴ A shared strategic vision among technology alliance member states would maximize the effects of resource allocation and allow for interoperability between connectivity projects. In the spirit of an informal multilateral group, however, coordination of state resources would face fewer political barriers to entry compared to the establishment of a joint investment agency. Developing joint priority areas to direct state resources would work more efficiently.

Proposed Area of Focus: Establish common criteria to certify fair investments.

For fair investment criteria, members of the mechanism can build off the Blue Dot Network (BDN) certification model. The BDN's participants—Japan, the United States, and Australia—certify development projects as “market-driven, transparent, and financially sustainable” with the objective of attracting private sector investment.²⁵ Criteria for certification originated from the G20 Principles for Quality Infrastructure Investment, the G7 Charlevoix Commitment on Innovative Financing for Development, and the Equator Principles. Drawing from internationally agreed-upon principles lends transparency and credibility to BDN. Drawing from consensus principles likely would translate smoothly to the wider pool of proposed mechanism member states. It also would provide a solid framework for member states to collaborate on providing technical assistance for states to increase their own capacity to prepare investment projects.

Proposed Area of Focus: Pursue new approaches to digital infrastructure.

Information-sharing on successful models would empower member states to adopt and proliferate best practices. For example, Japan leads in 5G infrastructure development based on open interfaces and virtualized radio access networks.²⁶ Open interfaces, which are public technology standards, prevent vendor lock-in by creating modularity and interoperability between network components. Network virtualization, where software mimics specialized hardware functions but runs on generic hardware, further expands competition by eliminating proprietary hardware systems.²⁷ An enduring dialogue on innovative and best practices may have prevented perceptions of a lack of options for 5G deployment. Sharing alternative methods would introduce more competition for ideas among member states and expose new ways of building infrastructure. Democracies can coordinate on policy priority areas to direct financing, attract fair investments into middle powers and developing states, and pool experience to proliferate competitive models for digital development.

CRAFT STANDARDS AND NORMS FOR A BENEFICIAL TECHNOLOGY FUTURE

Recommendation 11: Reclaim the Integrity of International Standards-Setting

China is gaining influence in international standards-setting organizations like the International Standards Organization and the International Electrotechnical Commission, part of a comprehensive strategy to have Chinese-origin technologies be the foundation for global technology platforms and reduce its dependence on foreign IP and standards.²⁸ While Chinese firms' participation in international technical standardization should be a welcome development, the way the Chinese government links it with mercantilist industrial policies is at odds with the purpose and spirit of international standards-setting.

A case in point is the recent experience with 5G standards-setting. Whereas traditionally technologies were chosen as setting the standard based on merit, China's industrial policy often requires Chinese representatives to back a pre-selected contender and provides subsidies for companies to participate in international standard-setting bodies, which also encourages them to put forward as many proposals as possible. The resultant bloc-voting and large number of contributions led to Chinese telecommunication equipment company Huawei greatly increasing its share of 5G standard essential patents compared to 4G.²⁹

Beijing looks to expand these efforts. The forthcoming China Standards 2035 strategic plan places a heavy focus on increasing China's influence over global emerging technology standards, which would provide Chinese firms with a competitive edge—and potentially pave the way for increased illiberal use of technologies like AI. In standard-setting organizations such as the United Nations' International Telecommunication Union (ITU), the Chinese government also has been promoting its vision for global internet and cyber governance, which favors a state-led approach to managing information flows. In the same body, Chinese firms are trying to shape global standards for facial recognition technology.

Proposed Area of Focus: Counter unfair practices in international standards-setting bodies.

Working in concert, technology alliance member countries can preserve the integrity of global standards-setting. One way is to ensure that companies based in technology alliance member countries and other liberal democracies have the resources to send full delegations and submit the broadest possible portfolio of technologies to standards-setting bodies for consideration. Another is to push for reforms of the bodies themselves to prevent bloc-voting. Doing so will tilt the balance back to technical merit, not governmental industrial policy, driving standards adoption. Finally, given Beijing's efforts to blend standardization and digital connectivity through the Digital Silk Road, jointly investing in digital infrastructure as proposed above would help prevent China from imposing its preferred standards for the digital economy on emerging economies around the world.

Recommendation 12: Codify Norms and Values for Technology Use

The founding members of the technology alliance, in cooperation and coordination with partner countries and relevant companies and civil organizations, should define and diffuse the norms and principles for how technology should and should not be used. An overriding objective for a technology alliance should be to counter digital authoritarianism, to which even companies from democratic countries too often contribute. This goal has two parts. One is promoting a world that is free, open, and democratic by setting clear guidelines on issues such as data privacy, rights, ethics, and the proper use of AI, surveillance, and monitoring technologies. Two is actively combating the illiberal use of technology. The latter can be a combination of sanctions, export controls, technical countermeasures, and making available cost-effective and compliant technology alternatives to middle powers and developing countries.

Proposed area of focus: Establish unified norms for the use of surveillance technology.

Project participants identified one area as a good near-term starting point to codify and harmonize norms: surveillance technologies, particularly facial recognition technology. These capabilities are widely deployed and used in divergent ways in various countries. Technology alliance members could use the organization to come to agreement on how these capabilities should fit into existing legal structures, what types of due process should be available, what uses are acceptable, and what uses cannot be tolerated. Upon establishing these norms, alliance members then can promote them internationally and set measures to prevent these technologies from being used in ways that violate them.

Promising Areas for Longer-Term Alliance Activity

Project participants identified a wide range of other technology policy issues that are ripe for multilateral cooperation and suitable for longer-term attention by the technology alliance. These activities either require considerable planning and agreement before they could commence or were generally regarded by project participants as being of lower priority. They include:

PURSUING JOINT R&D

There is ample opportunity for collaborative basic and applied research of emerging technologies.³⁰ Because of the breadth of possibilities and the short time line for this phase of the project, the project leads have no specific recommendations at this time on what areas to pursue. One important consideration, however, is resolving IP management and technology transfer stipulations before such work takes place.

There are several IP rights models to consider:

- *Open science model:* This approach comprises making most results of fundamental research publicly available, with some discoveries subject to patent protection. While CERN, the European Organization for Nuclear Research, uses this model to guide its activities, it also maintains a technology transfer office to conduct spin-offs and to monetize aspects of its intellectual property.³¹
- *Short-term contract-law IP rights model:* Such a strategy offers short-term patent protection (e.g., up to five years) upon which the intellectual property enters the public domain. An empirical example is that of Celera Genomics holding IP on sequenced genes up to two years until the publicly funded Human Genome Project effort was able to re-sequence the genes. Critics state that, in this specific case, these short-term IP protections actually stifled innovation.³²

- *Standard IP rights model:* This approach largely would mirror the prevailing IP rights frameworks among Technology Alliance members, with the caveat that the IP owners will be required to license alliance-funded IP to third parties in Technology Alliance member states, with few carve-outs for exceptions.

Treaty-based exemptions for the U.S. International Traffic in Arms Regulations (ITAR), a regulatory regime that controls the export and import of defense articles and defense services, likely would be necessary to ensure alliance partners can collaborate effectively on initiatives pertaining to defense technologies, including the exchange of necessary data and technical information.³³ One concept would be to create an “ITAR super state.” This effort could be part of a broader push to harmonize and improve broader export control laws for alliance member states. Other suggestions are to harmonize license exception programs and multilateral use of temporary export control mechanisms.

ENGAGING IN TECHNOLOGY FORECASTING

The technology alliance should consider implementing technology forecasting into its long-term policy planning processes. The fruits of innovation, whether within or external to the alliance, hold global ramifications for states and societies. Flexible plastic tubing revolutionized the biomedical industry. The internet is evolving economies. Social media have connected communities and opened gateways for new methods of spreading disinformation. In the near future, smart cities proliferated by companies from authoritarian states could supercharge global surveillance and plans to reshape the internet could form controlled splinternets. Democracies will need to prepare for these possible futures—and beyond—and play an active role in shaping a future built on democratic values. To this effect, they should share information on emerging and over-the-horizon trends, study potential outcomes, and coordinate their innovation and regulatory policies accordingly.

FOCUSING ON DATA FLOWS

A key building block of interoperability is consensus on privacy and flows of both personal and non-personal data. Ensuring trust in data exchanges is one of the most pressing and complex challenges for multilateral technology policy. Tech-leading democracies are fragmented in their approaches to data governance, as their regulations restrict cross-border data flows to varying degrees based on different and often divergent public policy, national security, and economic objectives. Japan spearheaded a multinational conversation to achieve interoperability through the Data Free Flow with Trust vision, which focuses on non-personal data.³⁴

By bringing together a smaller group of democratic countries, the technology alliance could provide a venue for intergovernmental and public-private dialogue around some of the stumbling blocks to global data governance, most notably divisions between the EU and the United States. Several participants noted how the alliance could foster difficult but much-needed conversations around privacy rules, as well as around digital platform liability and regulation. The opportunity to share, pool, and store non-sensitive datasets (such as anonymized epidemiological data or militarily relevant information) through common standards also was highlighted in project discussions.

PROMOTING TECHNOLOGY INTEROPERABILITY

The technology alliance should promote technology interoperability among member states in the long term. Doing so will maintain the open flow of information and optimize economies of scale. The grouping also should engage on interoperability matters that involve existing organizations of which most or all alliance members are a part, such as NATO and the Maximator intelligence alliance.³⁵

Important elements of interoperability are common standards and protocols that dictate how information systems interconnect. Some states have proposed alternative frameworks for the internet, such as the

New IP proposal pitched by government entities and companies from China. The New IP proposal doesn't only upgrade the internet's architecture to accommodate contemporary demands such as multifaceted industrial applications. Additionally, measures in the New IP proposal could act as mechanisms for states to increase their control of information flows. The concept is nascent but offers a glimpse of future potential risks for international connectivity. Technology alliance states can and should consider their own alternative to New IP—one that aligns with democratic principles—and should do so together to avoid creating splinternets among themselves.

Interoperability also is essential for private sector innovation and the implementation of technology in member states. Open interfaces can empower vendor diversity not just for 5G networks but for other systems as well. Smart cities, for example, will have a diversity of sensors, networking equipment, and processing components. Open interfaces that are consistent across member states and across tech ecosystems such as smart cities would allow a diversity of vendors to compete in these ecosystems at scale.

COUNTERING DISINFORMATION

The world's liberal democracies are besieged by foreign influence and disinformation campaigns. China, Russia, Iran, and North Korea are the main perpetrators of foreign messaging that erodes election integrity, exacerbates societal schisms, and undermines domestic and foreign policy. While not solely, or even mainly, a matter of technology policy, technology alliance member states can take cooperative steps to counter foreign disinformation operations.

Information sharing on the modus operandi of foreign disinformation and influence campaigns can help inform the development of technologies to help detect and mitigate the spread of propaganda and lies and boost the diffusion of fact-based information as a countermeasure. Case in point are the examples of election interference by Russia in the United States in 2016 and France in 2017. While each effort is part of a comprehensive strategic propaganda playbook by Russia, each affected country treated it as siloed incidents. More recently, the United States, European countries, and others were impacted in a variety of ways by Chinese disinformation and propaganda related to the novel coronavirus pandemic spread via social media, text messages, and other outlets. Messaging included false claims of imminent country-wide lock downs, accusations of U.S. bioengineering and spread of the coronavirus, and deceptive claims of Chinese largess and altruism. Sharing knowledge on the methods and impact of disinformation campaigns can inform mitigation and response strategies. Engaging the G7's Rapid Response Mechanism, established to prevent and respond to threats to G7 democracies, would be one way to bolster such activity.³⁶

Technology alliance members also should broaden their focus on other illiberal uses of technology such as malign foreign influence operations, hacking, surveillance, and repression.

MAXIMIZING HUMAN CAPITAL

The proposed founding members of the technology alliance account for a disproportionate share of the world's scientific and technical talent. This asset is underutilized at present, as growing restrictions on student and work visas, and bureaucratic hurdles to scientific exchanges pose unnecessary barriers to more effective harnessing of valuable human capital. Because technical innovations are more likely to occur with the free flow of ideas, new initiatives to foster cross-border collaboration among democratic states should be considered. These could include a Schengen-like arrangement where qualified scientists, technologists, and engineers can readily travel to and live in core member countries for research in the public and private sectors, and regular talent exchanges to share ideas and build networks among scientists.

Next Steps

The project team is conducting a series of private briefings for government leaders in the Asia-Pacific, Europe, and North America in conjunction with the dissemination of this report. These discussions will form the basis for fine-tuning the recommendations presented here and guide follow-up work as needed. The team will host an event later in 2020 to discuss the recommendations with a broader public. Necessary follow-up work will include further research and engagement with stakeholders on matters such as cost, addressing and providing solutions to barriers to implementation, and considering other externalities.

Ultimately, the goal is to set the stage for intergovernmental dialogue on creating a technology alliance. The results of the Technology Alliance project show there is widespread interest and support for a new, comprehensive approach to managing and harnessing technological change. Similar ideas are percolating in capitals around the world, such as Canberra looking to the Quadrilateral Security Dialogue to address geostrategic competition in cyberspace and London floating the idea of a Democracy 10 to boost alternatives to Huawei for 5G networks.

Now is the time for the world's leading tech democracies to articulate their vision of a technology future where their companies compete in a vibrant, innovative economy all while promoting and protecting democratic norms and principles. Achieving this vision will not be easy. Attaining this outcome requires a comprehensive strategy that will take much time and many resources to execute. No one country can take such action alone and expect to maximize its potential. Instead, sound collaboration with partners is the sensible way forward. A technology alliance provides the framework to ensure that the technology future of tech-leading democracies is beneficial and secure.

Appendices A-B

APPENDIX A

Overview of Selected International Organizations and New Initiatives

The project team surveyed an array of existing international organizations that deal with aspects of technology policy. Although these organizations differ from the proposed technology alliance in membership, purpose, size, and organization, among other factors, they exhibit features or shortcomings to consider when formalizing the proposed technology alliance. Several of these organizations could also be good partners to achieve specific technology alliance goals. Additionally, emerging coordination and collaboration efforts in multinational technology policy are included in this short review due to their proximity with the proposed technology alliance concept. This is not intended to be an exhaustive list, given the limited timeline for this project.

EXISTING ORGANIZATIONS

The Alliance for Multilateralism

The Alliance for Multilateralism is an informal network of countries launched by the French and German foreign ministries in 2019. Hosted by seven countries, an additional 59 countries participate in flexible, issue-based coalitions.³⁷ The network is primarily geared toward boosting international cooperation, reforming international institutions, and tackling various global issues such as disarmament, digitization, and climate change.³⁸ It attempts to combat the consequences of unilateralism and isolationism, which enable nationalist and extremist speech to flourish.³⁹ While it succeeds in promoting global cooperation as the foundation for a rules-based international order and also provides mechanisms for consultation, it has yet to articulate how it intends to accomplish its agenda.

CyberPeace Institute

The CyberPeace Institute is a large coalition of industry, civil, and state actors that grew out of Microsoft's Digital Geneva effort to support digital norms and values. As an industry-led effort, it safeguards the integrity of the online ecosystem by assisting victims of cyberattacks and promoting greater accountability when international law is violated in cyberspace.⁴⁰ The CyberPeace Institute attempts to do this by enhancing the stability of cyberspace, supporting vulnerable communities, analyzing attacks collaboratively, and advancing responsible behavior online. However, while it succeeds in supporting the protection of civilian infrastructures from sophisticated, systematic attacks, it lacks a mechanism for formally building capacity in areas of international law, national legislation, and policy.

Digital Nations (DN)

DN is a collaborative minilateral organization formed by 10 of the world's leading digital governments. It primarily provides a forum to share best practices, identify how to improve digital services, and collaborate on common projects. It does so by sharing knowledge and resources like algorithmic impact assessment tools, organizing an annual ministerial summit, and focusing on themes like digital trust and IT talent.⁴¹ The organization has thematic working groups which allow its members to work on different issues related to the use of digital technology for solving common problems and improving people's lives. The country holding the annual rotating chairmanship is responsible for steering the group and for hosting the annual ministerial meetings, which could be a useful model for the technology alliance to replicate.

The Five Eyes (FYEY)

FYEY is an intelligence alliance comprising Australia, Canada, New Zealand, the United Kingdom and the United States. It is based upon a multilateral United Kingdom–United States of America Agreement, a treaty for joint cooperation in signals intelligence. The Five Eyes recently expanded its cooperation with other nations, including Germany and Japan, to exchange intel on the Chinese government's foreign

interference operations. As such, the FYEY would be an important interlocutor for technology alliance members when it comes to protecting critical technologies.

Freedom Online Coalition (FOC)

FOC is a partnership of 31 governments working to advance internet freedom. Working closely with civil society and the private sector, FOC is committed to the principle that the human rights that people have offline are the same online, namely free expression, association, assembly, and privacy.⁴² It attempts to accomplish this by strengthening coordination and cooperation among members through employing local networks, shaping global norms on human rights online through joint statements, and holding periodic convenings with members and other stakeholders. However, while it succeeds in establishing global norms through multi-stakeholder engagement, its scope and specified task of internet freedom is relatively limited.

Global Internet Forum for Countering Terrorism (GIFCT)

GIFCT is an informal, industry-led organization primarily geared toward preventing terrorists and violent extremists from exploiting digital platforms. Founded by Facebook, Microsoft, Twitter, and YouTube, it attempts to accomplish this by building on the cooperation that already exists within the industry and by fostering collaboration with smaller tech companies, civil society groups, governments, the EU, and the U.N.⁴³ GIFCT manages a program of knowledge sharing, technical collaboration, and shared research to improve capacity of technology companies, prevent abuse on digital platforms, and advance understanding of violent extremist operations online. GIFCT could be a good example of how stakeholders from government, industry, and civil society can work together to effectively tackle a difficult problem.

Group of Seven (G7)

The G7 is a forum of industrialized nations consisting of the seven largest IMF-advanced economies in the world. Initially focused on macroeconomic policy coordination, the G7 has steadily increased its mandate to consider political and security issues, such as conflict prevention in Syria, nuclear armament in North Korea, implications of Brexit, and tackling climate change.⁴⁴ In May 2020, G7 technology ministers agreed to form a Global Partnership on Artificial Intelligence to promote development of AI based on shared values, an initiative proposed by the French and Canadian governments.⁴⁵ Central to today's debates on global governance, other multilateral institutions look to the G7 for direction on international decisionmaking. The G7 exercises influence over global governance by promoting policy agendas that affect all the world's peoples and nations. Of current international organizations, the G7 is closest in terms of the proper size for the proposed technology alliance. Yet, it still lacks key members and transforming this forum to tackle technology matters would move it far afield from its original purpose.

Group of Twenty (G20)

The G20 is the main forum for intergovernmental economic and financial cooperation, bringing together leaders of developed and developing economies from all continents. Comprised of 19 countries plus the European Union, the forum has expanded its initial focus on global financial stability to engage with broader issues related to economic growth and development. As such, the G20 also hosts important discussions on cross-border innovation and digital technologies. Since Japan's leadership of the organization in 2019, the forum has initiated a pioneering multilateral conversation on cross-border data flows and the adoption of advanced technologies. The efficacy of G20 declarations has been questioned, and, overall, the group appears too large and politically divided to steer the kind of democratic technology policy that the proposed technology alliance would aim to accomplish.

Internet Engineering Task Force (IETF)

The Internet Engineering Task Force is a large, open, international community of network designers, operators, vendors, and researchers that fills the function of technical standards development, and produces recommended practices for members of industry to adhere to. IETF's mission is to make the internet work better by producing high quality, relevant, technical documents that influence the way people design, use, and manage the internet.⁴⁶ IETF attempts to accomplish this through working groups, which are organized by topic into several areas. Communication is handled over mailing lists and the IETF has meetings three times a year. While the IETF succeeds in promoting voluntary internet standards, it has no formal membership roster or requirements. This highly decentralized nature presents challenges in enforcing widespread adoption of new standards.

International Telecommunication Union (ITU)

Formally established in 1865, the ITU is currently the U.N.'s foremost agency responsible for information technology and coordinating global use of radio spectrum, satellite orbits, and technical standards. It also assesses more niche categories, including machine learning for a 5G future, development of human-centric communication technologies, and convening to discuss the role of AI in law enforcement.⁴⁷ While it succeeds in identifying emerging developments in information and communication technologies, active participation in conferences are restricted to member states, with civil society and industry only advising and observing.⁴⁸ The ITU would be an important partner to engage on issues and initiatives related to the development and use of information and communication technology (ICT) and digital technologies for sustainable development. However, alliance members would need to consider the longstanding efforts on the part of authoritarian regimes, such as China and Russia, to promote their preferred internet governance norms through the ITU.

Organization for Economic Cooperation and Development (OECD)

The OECD is made up of 37 member countries whose main role is to manage globalization by maximizing widespread benefits and tackling challenges of market instability. It seeks ways to achieve the highest possible sustainable economic growth and employment to contribute to economic expansion and expand world trade.⁴⁹ The OECD is a good model for the technology alliance to look to for best practices on engaging with industry and civil society for decisionmaking. It constitutes a highly successful example of multi-stakeholder dialogue and cooperation informed by rigorous data analysis and robust technical expertise. The organization would also be an important partner on promoting norms and values for the use of technology, especially in AI, as the OECD is home to the newly created Global Partnership on AI's secretariat. Additionally, the organization provides a collaborative platform for countries to jointly advance bio, nano and converging technologies ethically and responsibly.

Pacific Economic Cooperation Council (PECC)

PECC is a policy-oriented organization of 26 member committees geared toward promoting cooperation among the economies of the Pacific region. PECC seeks to recognize the full potential of the Pacific region by focusing on incorporating industry into a region-wide network of experts.⁵⁰ This network is consultative, consensus-seeking, and focuses on promoting sustainable development and stability. These networks are successful in a number of areas, including identifying problem areas that could be addressed by task forces; acting as a pool of expertise to draw solutions from; providing a channel for dissemination of substantive work; and promoting wide stakeholder participation. PECC participants hail from the private sector, government, academia, and civil society.

Wassenaar Arrangement (WA)

The WA is a multilateral export control regime for conventional arms and dual-use goods and technologies. With 42 participating states, it promotes transparency and greater responsibility in transfers of conventional arms and dual-use technologies in order to prevent destabilizing accumulations and

preclude the acquisition of these items by terrorists.⁵¹ While it succeeds in the export control of specified munitions, controls on the export of sensitive technologies are difficult to legislate upon.⁵² These regulations are even harder to enforce at the national and transnational level. A major shortcoming of the WA is that there is little incentive for members to exchange information that is vital for controlling the export of sensitive dual-use technology.⁵³

World Economic Forum (WEF)

The WEF is a membership-based, non-governmental organization comprised of large multinational corporations. Its mission is to serve as a platform for public-private cooperation that “engages the foremost political, business, cultural and other leaders of society to shape global, regional and industry agendas.” The WEF’s most concrete line of effort in the realm of technology policy takes place through platforms designed for various stakeholders to collaborate on thematic initiatives and projects aimed at solving specific social and industry challenges, from building sustainable smart cities to improving business models in the healthcare industry. The forum also hosts dedicated centers for public-private cooperation on cybersecurity and the Fourth Industrial Revolution. While its strong private sector leadership has clear downsides, elements of the WEF’s model could be useful for the technology alliance if member countries decided to embark on cross-border innovation challenges.

World Trade Organization (WTO)

The WTO began as a series of multilateral trade treaties. Over time, this contractual agreement between states evolved into a permanent international institution, geared toward dealing with the rules of trade between nations. Now comprised of 164 nations, it attempts to accomplish this coordination by following a legal-rational form of organization in which participating member states must pay significant up-front costs in order to obtain and maintain membership, but enjoy many benefits upon acceptance.⁵⁴ While the WTO succeeds in minimizing the freeriding problem, its rulemaking power declined due to difficulty in achieving consensus during the latest round. Even the dispute resolution function, once considered a WTO crown jewel, is stalled because its appellate body lacks the requisite number of judges to function.

NEW INITIATIVES

Clean Network

Announced in 2020, Clean Network is a U.S. State Department-led effort that encourages countries to push untrusted vendors out of their 5G networks.⁵⁵ While the initiative’s public messaging features opposition to China’s vendors, the project acknowledges the country-neutral Prague Proposals and developed criteria for security and trust in telecommunications networks and services. In August 2020, the State Department announced an expansion of Clean Network to encompass telecommunications networks, mobile app stores and apps, cloud infrastructure, and undersea cables. Clean Network draws on international efforts to establish risk assessment frameworks to secure technology ecosystems, but it emerged largely as a reactive measure following controversy around Huawei.

‘Democracy 10’ concept (D10)

In May 2020, it was reported that the UK government was considering the establishment of a new group of ten leading democracies for tackling emerging technology policy challenges, specifically with the aim of supporting secure alternatives to Chinese suppliers of 5G equipment and other technologies. The envisaged framework would include G7 countries plus Australia, India, and South Korea. The idea appears to share broad similarities with the proposed technology alliance, including its membership scope and emphasis on secure digital connectivity and critical supply chain restructuring. The concept in itself is not new. The fact that it is being promoted by the government of a leading technological power underlines the growing momentum for greater democratic technology policy coordination.

Economic Prosperity Network

This initiative proposed by the U.S. State Department in the wake of the COVID-19 pandemic aims to restructure selected global supply chains through an alliance of partner countries, including Australia, India, Japan, New Zealand, South Korea, and Vietnam. In essence, the stated mission is to mitigate reliance on China for a set of critical supply chains by building a network of “trusted geo-economic partnerships” comprising countries, companies and civil society groups. While it remains unclear how the initiative intends to achieve its objectives and the EU is notably missing from the equation, the concept highlights how supply chain restructuring has come under the spotlight during the global health crisis.

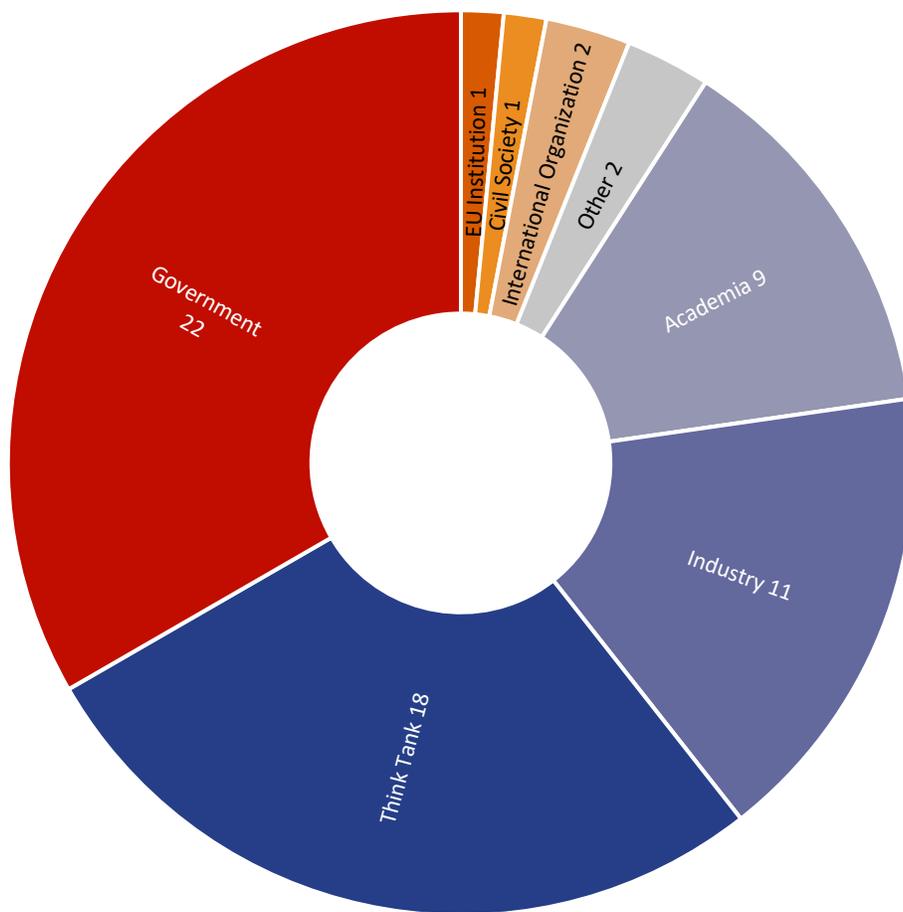
Quadrilateral Security Dialogue

The Quad is an informal security cooperation arrangement composed of Australia, India, Japan, and the United States with the objective to support a “free, open, and inclusive Indo-Pacific.”⁵⁶ The group is best known for its cooperation on disaster response and maritime security but, as threats have evolved, it has expanded attention toward other areas like cybersecurity. The Quad’s emphasis on the democratic nature of its membership, combined with its venture into cyber issues, demonstrates appetite among democracies to work together on technology policy.

APPENDIX B
Survey Results

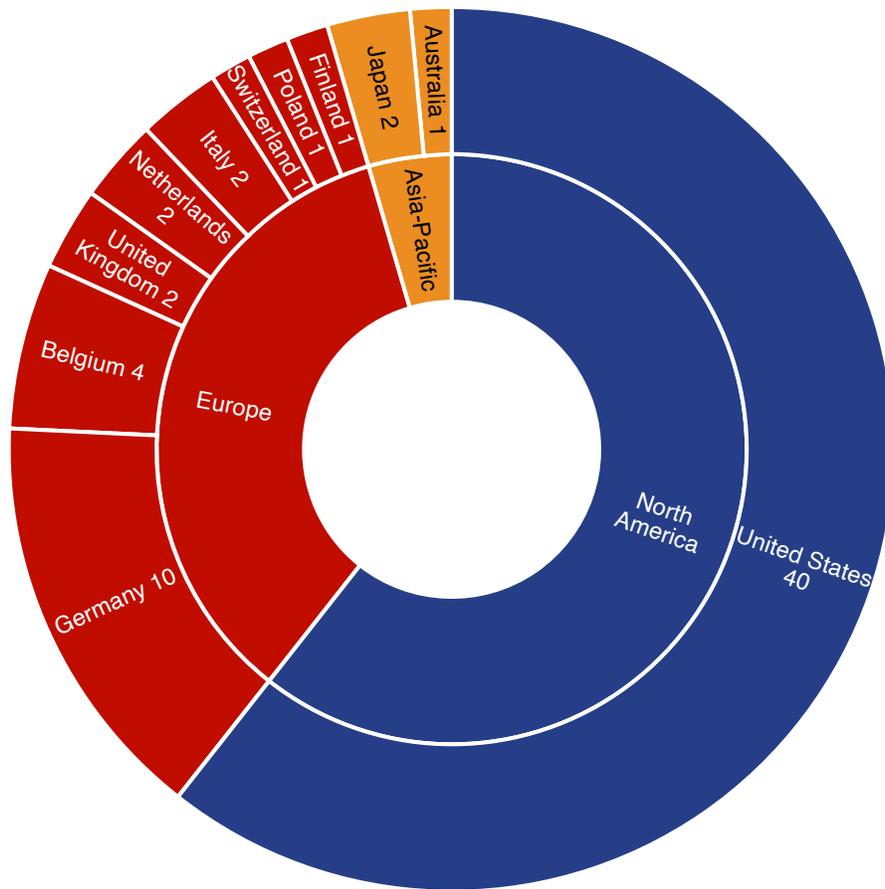
To inform this report, a survey was distributed to international stakeholders and subject matter experts. Its 22 questions solicited input on what a technology alliance might look like including, but not limited to, its policy priority areas, formation, membership, and governance. The survey was distributed to 643 experts from government, industry, think tanks, academia, civil society, EU institutions, or other international organizations. Out of all those who received the survey, 407 were from North America, 51 were from the Asia-Pacific, and 185 were from Europe. A total of 66 participants responded while the survey was available from April 14, 2020 to May 11, 2020. The results, excluding personally identifiable responses, are summarized here.

Question 1: Which of the following best describes your current affiliation?



Other (please specify)
University research center
Academy

Question 2: In which country are you based?



Question 3: Please state your current institutional affiliation (optional).

Identifying results omitted.

Question 4: Please state your full name (optional). This may help us reach you in case we have any follow-up questions on your answers.

Identifying results omitted.

Question 5: From your perspective, and based on current policy debates in your country or region, do you see the need for a new grouping to improve coordination on technology policy issues among like-minded liberal democracies in North America, Europe, and the Asia-Pacific?

Yes, such grouping is urgently needed in principle 37

It would be beneficial for coordination, though it is not a priority 13

No, there are effective channels for that purpose

Other (please specify) 2

Other (please specify)
While coordination among like-minded countries on technological issues is needed, I completely disagree with the strategic purpose of this initiative which is a technological decoupling from China throughout entire value chains. While this may be common sense in U.S. domestic politics it is against European interests. It would be helpful if the U.S. didn't withdraw from existing multilateral organisations where standard and norm setting is taking place (e.g. UNESCO) and where agreement has to be found with China, not against China.
Depends on scope. OECD an effective body on a variety of such matters, but not appropriate for national security aspects of tech for example.

Skipped: 14

Question 6: In order to be effective, the Technology Alliance will probably need to start with a narrow focus. What do you think the work priority should be, and why?

Responses
Regulatory (and certification) alignment/harmonization. Typically, this is done, to some extent, in 3GPP technologies (LTE, 5G), but not necessarily in cybersecurity or with AI.
A key technology area relevant to all countries, such as AI, hypersonics, directed energy or semiconductors.
Standards, ethics, human rights, and what it requires to fulfill them.
The decision on what should be treated as a priority must derive from an in-depth process of identifying and mapping critical processes, functions, dependencies and technologies. 5G can serve as an example.
I see a lot can be gained in the area of AI, which is still incredibly broad but also an area where international cooperation is urgently needed, in particular in the area of (countering) defense

applications. More specific themes could cover topics ranging from information exchange on how to conduct effective V&V and T&E, legal reviews, operationalization of existing principles covering military AI applications. Relevance and hope of the alliance could be to allow information exchange on these topics between like-minded states.
Standard setting and privacy agreements which lead to data sharing cooperation for innovation purposes. Cooperation on next generation telecommunications.
Microelectronics: DoD focus and critical to a secure supply chain.
Start with a horizon scan: let each member prepare a two-pager that identifies: (1) (three) key policy priorities in the field of high-tech and digital (as per the list/bullet points you are preparing in the doc), both at home and abroad; (2) key interests and concerns; and (3) approaches and underlying norms/standards. Then compare notes and build the TA agenda from there, aiming for 'low-hanging fruit' for cooperation/coordination as well as a long-term agenda for the more difficult issues.
Joint research collaboration on vaccine development. Coordination on global public health security and pandemic preparedness.
Coordination of resilient, secure technology supply chains.
I would suggest that the project should start with a positive, collaborative project rather than a joint defensive measure such as export controls. One suggestion would be to pool resources and start a joint civilian R&D project, i.e. in AI.
Focus should be based on countries' existing assessments of necessary sovereign technology capabilities.
Common policies for dealing with China.
Fostering R&D collaboration in emerging tech among allies, making use of comparative advantages to increase joint tech capabilities and develop competitive strengths at a global scale.
Norms and standards, along with protecting technology.
5G. Hardware and protocols are narrower than algorithms like AI.
Supply chain. Digital/data technology used in coronavirus efforts.
Coordination of AI standards, norms, and regulatory frameworks would be a sensible priority to start with given the relevancy and urgency in these countries.
There's strong case for making this track 1.5 in the first instance (especially if Trump gets re-elected)—it's not for me to decide what the alliance should focus on—I'd pick one low-hanging fruit and something that is quite contested and where one needs to come to a joint approach. First danger is to pursue a Christmas tree approach where everyone just puts forward their pet issue; that was a bit the case during the Japan-focused conference call.
Investments in digital infrastructures and app.
Export controls.
Digital infrastructure—will be at the core of the 4th industrial revolution, instrumental to cope with and limit climate change, etc.; Network security essential for national security.
AI Ethics. ITU/Standards coordination.

I think artificial intelligence should be the first focus of the Alliance. In the coming decades, three new variables will compose the “equation of power” in international relations, influencing the interactions between countries and, consequently, their foreign policies. They are access to masses of data (“Big Data”), faster speeds of the data treatment (due to the 5G communication technologies), and artificial intelligence tools.

I think how to keep the trusted supply chain of key technology for future society is a good agenda. Such as 5G, semiconductor, smart industrial systems. This is because democratic countries have to keep capabilities to develop and supply these technologies, should not heavily rely on China, Russia and other dictatorship countries. Also, democratic companies should support developing countries. These countries have a tendency to rely on China easily.

Identifying and pursuing the “low-hanging fruit” to achieve quick initial successes and establish credibility and momentum.

I come at it from a threat perspective and would rank tech in terms of what needs cooperative threat reduction approaches. Synthetic biological engineering, lethal autonomous weapon systems, and general IP theft and tech espionage.

Export control and investment control for critical technology, critical infrastructure, dual-use technology which is closely related to national security. Also, cybersecurity, and security clearance, those international standards and norms are very important.

Building consensus on a small number of specific issues; for example, the appropriate role of facial recognition in law enforcement.

Trusted exports, ITAR-friendly zone, technology protection.

The initial focus could be on digitisation. With respect to COVID-19 we realized that digitisation in all areas is needed (e.g. education, artificial intelligence in various fields, energy supply, water supply...).

Microelectronics and 5G technologies. Area of weakness where there is market failure.

Widening the number of vendors able to provide 5G capability.

Mutual authentication of identities, identifications, and certifications on COVID-19 immunity.

Setting baseline standards around interoperability and minimizing errors is usually one of the places where international law has the best track record.

Trustworthy AI: this is the area where values and democratic institutions will most direct the policy choices democracies will make. Data and privacy: at the moment there is too much divergence between democracies on this topic, which reduces collaboration.

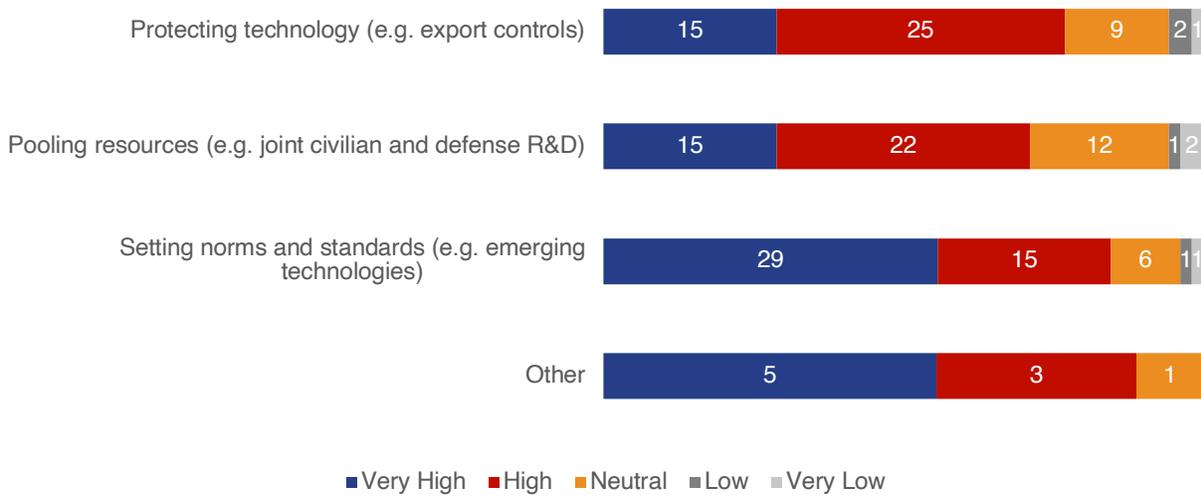
Norms and standard setting.

Use a strategic approach to find the right focus. Focus should centre around what unites us (and not what divides) and cherish what relations exists already. I don't think there would be any other realistic starting point. The question in essence is: What is the (today) right/realistic approach to globalisation. There has been a form of globalisation and there will be also in the future. Forget about the race and focus where Europe or the U.S. wants to be in 10, 20 or 30 years. How should that world look like? You cannot export if you don't have innovative tech to export. Soybeans and odd cars are not what sells well on the world markets. From a tech perspective the focus should be on: digital services for citizens and business, there are huge efficiencies in there to be gained at home and abroad. Use of data, deep learning, better quality SW, highest possible standards to digital product safety, security, trust and usability and a “green” digital deal.

Internet platform liability rules.
Secure supply chain.
Since emerging technologies are fast moving a guidance/principles-based approach would help to bring everybody on the same page. From autonomous weapons systems to research collaboration or facial recognition.
Setting a unique and pragmatic mandate and member incentive structure. Creating another cooperation forum that promises to solve the same or similar issues as existing orgs. (Industry associations, int. orgs., etc.) will likely have a difficult time generating membership and/or member buy-in.

Skipped: 24

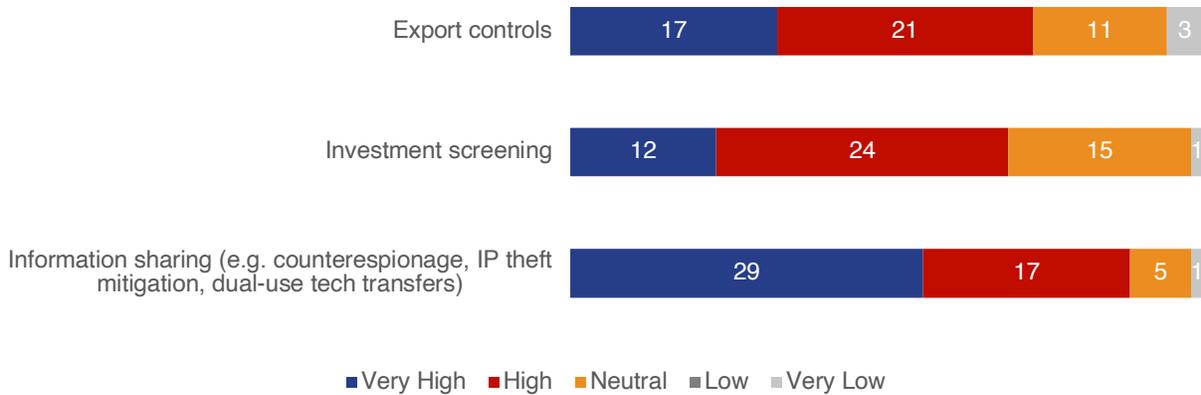
Question 7: How would you assess the need for addressing gaps in existing frameworks and organizations in relation to the following tech policy objectives? Please choose among ‘very high,’ ‘high,’ ‘neutral,’ ‘low,’ and ‘very low’ for each objective.



Skipped: 14

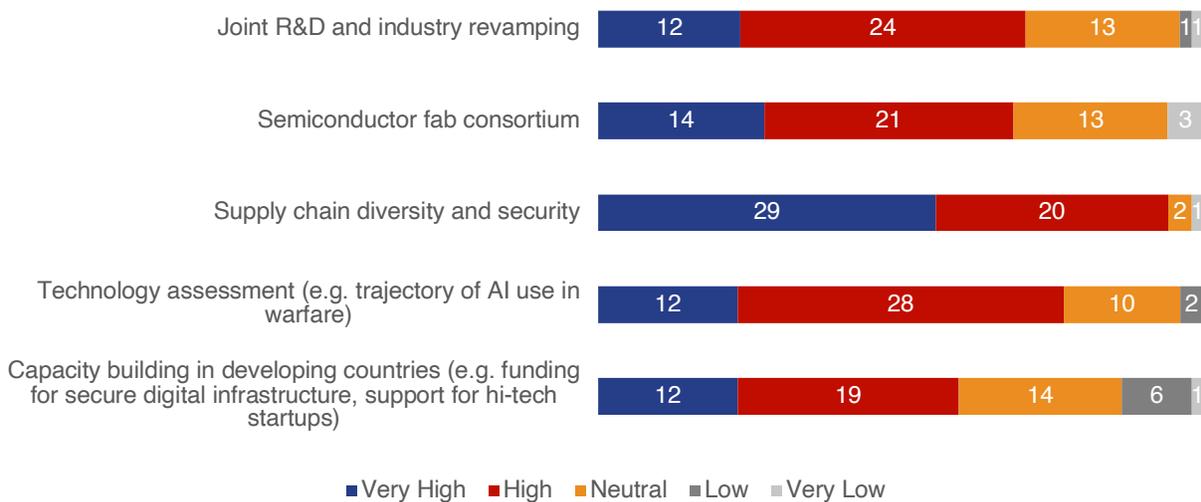
Questions 8-10: Here are 13 suggestions for possible cooperation areas that the Alliance could explore, clustered into three categories. How would you rank the importance of each area? Please choose among ‘very high,’ ‘high,’ ‘neutral,’ ‘low,’ and ‘very low’ for each objective.

Question 8: Technology protection:



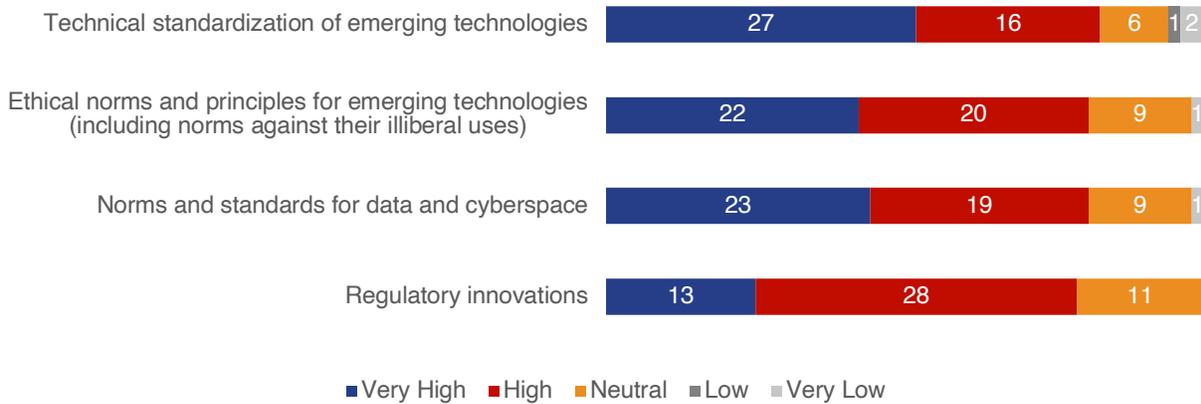
Skipped: 14

Question 9: Pooling resources:



Skipped: 14

Question 10: Norms and standards setting:



Skipped: 14

Question 11: Which structure do you think would be best at managing the trade-off between size and effectiveness?



Other (please specify)
Not large, not small group of states, and other stakeholders. Should not be only for states.
Small group of states, actions taken collectively (but not necessarily with consensus), engagement with selected partners outside Alliance.
Large group but with a strong core group.
Depends on the goals. Design must always follow purpose.
Flexible format depending on the issue.

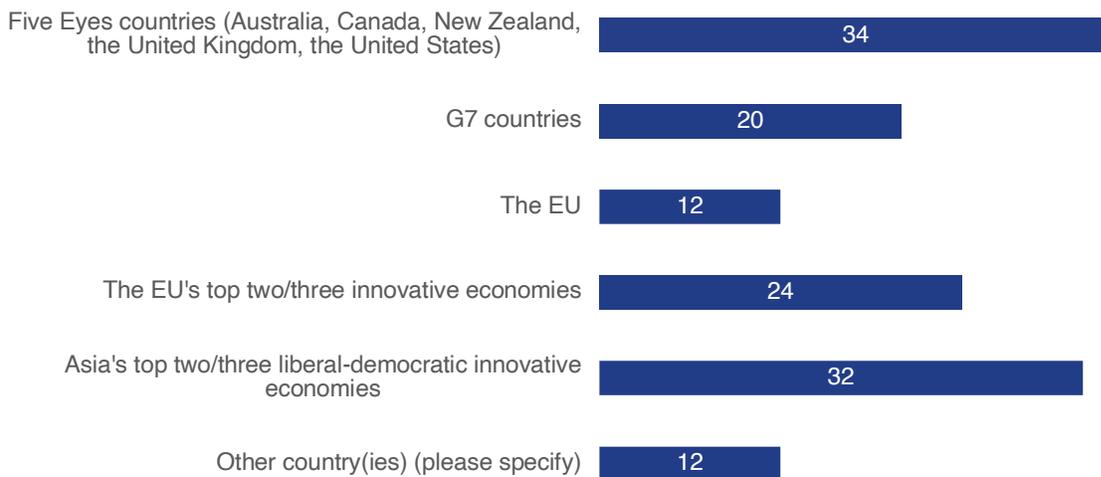
One easily tends to “small group, actions taken collectively”—but right now we are far away from that option. What will bring the U.S. into such a fold?

Option 3, but the outside partners should be a network of verified contributors from industry/academia/gov. who provide crowd sourced technical solutions where needed. E.g. how internet protocols are developed through the ISO, IETF, etc.

Not sure what constitutes large group vs. small group—I think ~8–10 is about the right number—large enough to make a dent, but not too unwieldy.

Skipped: 18

Question 12: Which liberal-democratic countries (organizations) do you think should form the Alliance core membership? You may choose multiple options.

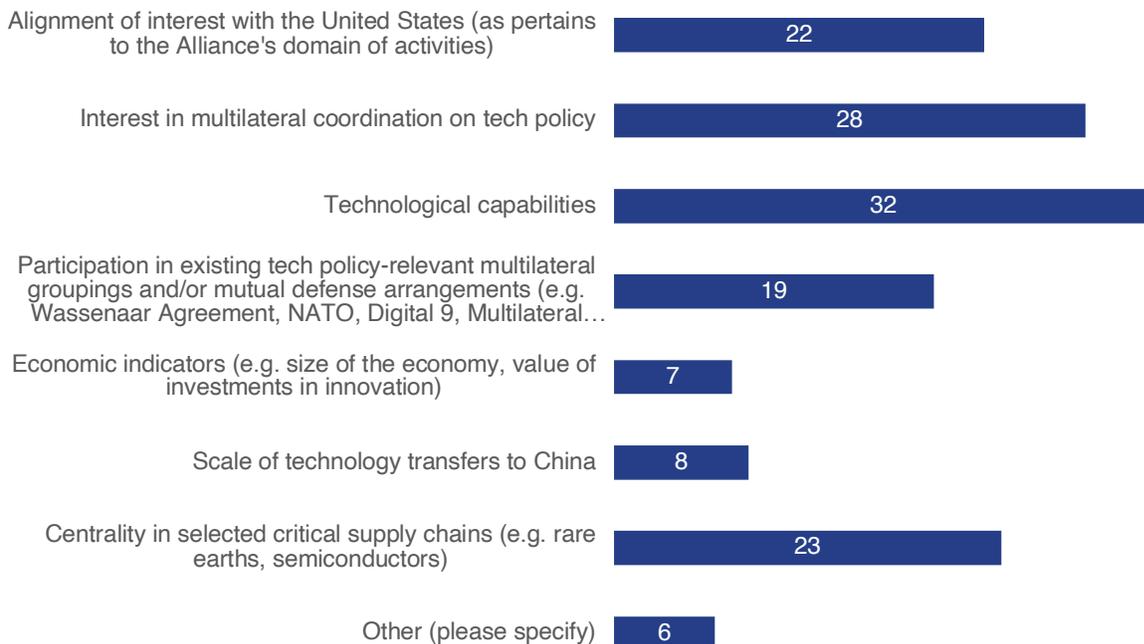


Other country(ies) (please specify)
Balance between the regions should be taken into account. e.g. EU's most innovative countries may be outside the G7.
Suitable transatlantic cooperation + Japan, Australia, New Zealand.
N.B. not necessarily all Five Eyes countries.
Israel; India (if not already in Asian batch above); do consider Mexico, South Africa, Brazil (despite Bolsonaro but certainly after Bolsonaro).
EU, U.S., Japan, Korea, Taiwan, Canada, Australia, UK
G20 countries
Start with core and build out by recruitment/invitation.
Depends on the goals. Design must always follow purpose.

South Africa
India
Plus Canada and the UK if she ever gets around making such decisions.
If #4 does not include Estonia, then Estonia.

Skipped: 18

Question 13: Beyond broader political and value alignment, which criteria do you recommend using for identifying additional Alliance partner countries? You may choose multiple options.



Other (please specify)
Dedication to liberal-democratic values. Geopolitical significance.
Alignment of interest with states in Alliance core group.
Share the concept of democracy and free and trusted internet.
Leadership interest/acumen/forward looking perspective.
Depends on the goals. Design must always follow purpose.
Capability to run testbeds, or sandboxes.

Skipped: 18

Question 14: In your view, which organizational structure would be best suited for a Technology Alliance of liberal-democratic nations?



Other (please specify)
Others will have more experience, but unless there is already a major backer lined up, I'd push for informal mechanism/umbrella org., and then grow more formal from there as able.
Start informal and let it develop as appropriate.
Start informal and move up. Share relevant security and foreign assistance efforts in strategic trade management, nonproliferation, counterproliferation, IP protections/theft, laws for war, etc. Build momentum before formalizing into regime or IO.
Depends on the goals. Design must always follow purpose.
Internet Engineering Task Force style org. structure with state led governing board built upon an agreed set of general principles. The org. would produce standards and recommended practices for members/industry to adhere to. (e.g. if you merged IETF structure with ICAO's development and use of SARPs).
Unclear. Need to evaluate pros/cons of each.

Skipped: 18

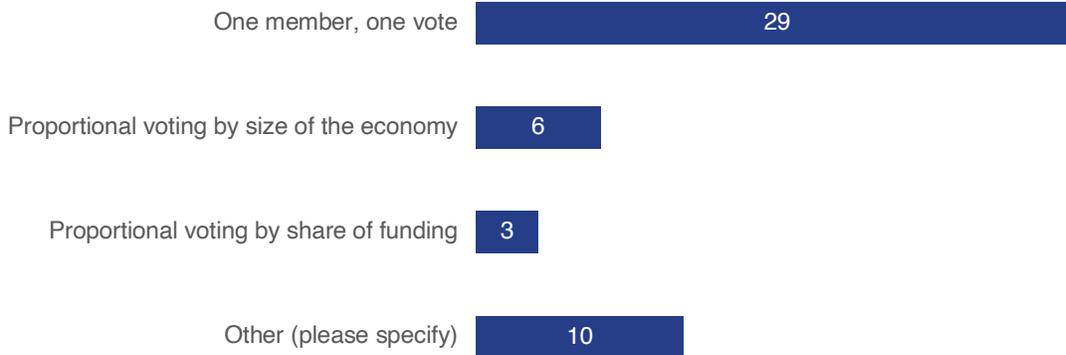
Question 15: Can you think of any international organizations and initiatives (OECD, ASEAN, G7, CERN, etc.) that could serve as a model for the Alliance structure and governance, and why?

Other (please specify)
In some areas, 3GPP is working fine. Structure is quite efficient and decision making / development more or less democratic.
The 4EYES National Technology and Industrial Base is a potential forum albeit that it does not include the extensive list of countries.
Internet Governance Forum; it works well among companies, academia and states (multi-stakeholder forum).
To be considered.
SEMATECH worked well for microelectronics in the late 90s (vs. Japan).
The Transglobal Secure Collaboration Participation, because of its informal character as a multi-stakeholder consultative 'trusted community' connecting government officials, representatives from the private sector and experts.
G7
CERN, because of the council governance.
Financial Stability Board
At this moment, it would be not easy to think of a model, but OECD would be one good organization we can start to work with.
The OECD AI Policy Observatory could serve as a partial model and/or lesson for the Alliance because of its success in bringing together dozens of like-minded countries (with significant multi-stakeholder involvement) on AI norms and policy coordination.
Alliance for Multilateralism.
G20 could give some useful ideas. The group has no secretariat or treaty and relies on consensus agreement of its membership of the world's largest developed and emerging economies. G20 countries 'sign up' to commitments voluntarily with some peer-review processes. When the G20 countries implement policy in coordination, the group can act as 'steering committee'. The G20 has a number of channels to influence domestic policy: issuing collective statements, shaping global norms, setting or adopting collective targets, developing minimum international standards, and improving the functioning of global institutions.
This may seem contradictory to my answer above, but combination of focused informal group combined broad outreach to nonaligned types and civil society about long term threats. Can't think of a specific model but am reminded of Cold War information strategies that stuck to reliable facts in a disinformation environment.
No idea.
FVEY intelligence sharing network: although J2 focused, the model is a proven concept for information exchange between trusted partners.
G7-like plus a soft commitment mechanism.
G7 given the economic might and value alignment with the U.S.

IETF and ICAO. These are agile (as far as int. orgs. go) with broad stakeholder buy-in that avoid many of the debilitating elements of more traditional int. orgs., like UNGA, etc.

Skipped: 47

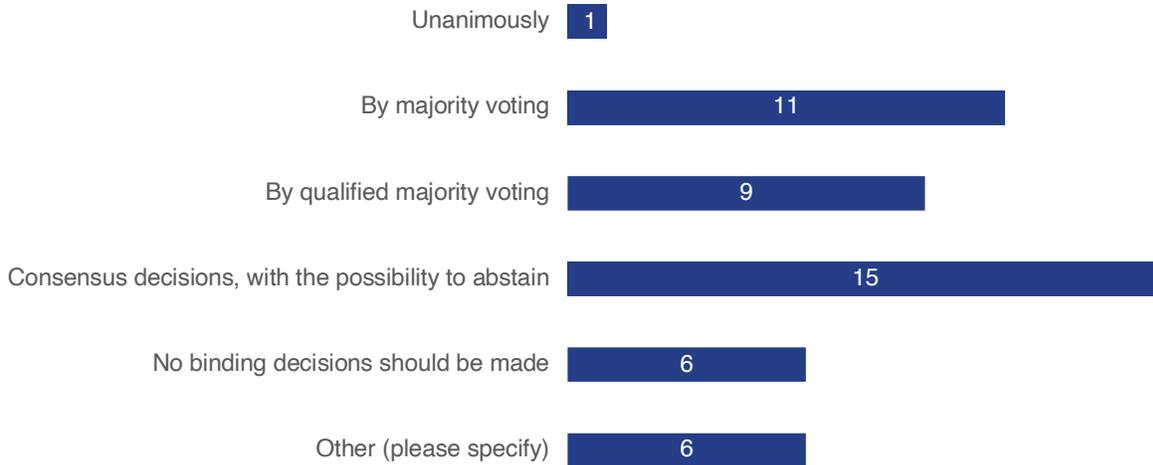
Question 16: What decisionmaking procedure do you recommend for the Alliance?



Other (please specify)
Majority win or consensus-based decisionmaking as in IGF.
To be considered.
Highly dependent on the membership. If it remains a small core group of innovative states that substantially contribute to the alliance, I'd suggest one member one vote, but it depends on how easy it is for states to simply be part without contributing (free ride). States that simply come to remain informed but are only limited affected by the outcomes may disturb a voting process. Also depends on Q17 (unanimously or majority voting etc.).
Not sure.
Start informal and let this part sort itself out.
For as long as it is a five eyes type group; move to proportional by funding as it expands.
Depends on the goals. Design must always follow purpose.
One member, one voice (unanimity), chaired by the smallest partner.
No voting.
Unclear. Believe this should be dictated by the governance structure.

Skipped: 18

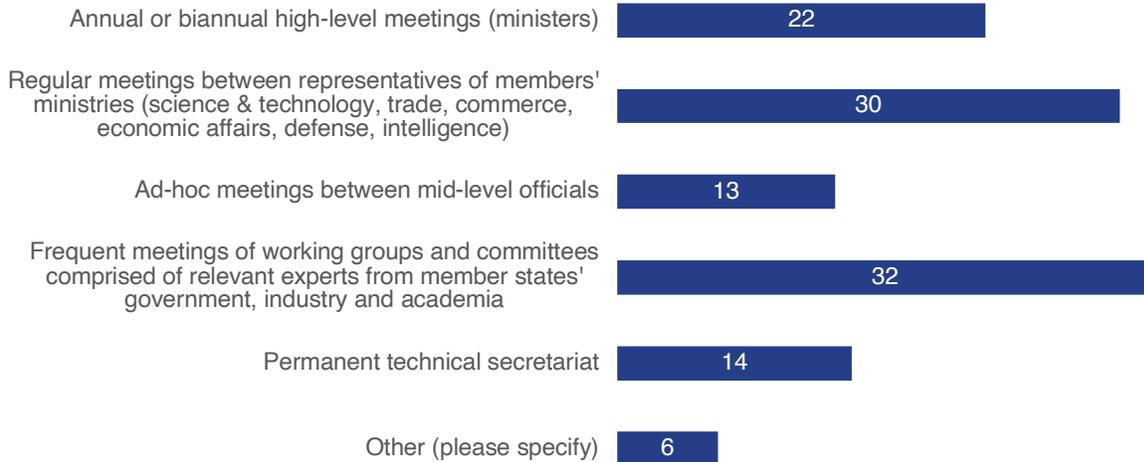
Question 17: In your view, how should decisions be made?



Other (please specify)
Depends on the membership and type of decision. (Qualified) majority voting is probably more effective than consensus or unanimous voting, but in some cases you may want to have all members on board and in other cases it may be enough to have nonbinding decisions. For example, anything binding (a restriction or control on some technology use) is probably never going to be agreed by consensus. In such a case you can either change the way in which the decision is made (only bind those that vote in favor) or change what you are deciding upon (change the binding regulation into something nonbinding like a political declaration). Long story short, I think we shouldn't decide upon 1 mechanism, but keep open several options depending on the type of decision that has to be made.
Too early to even discuss this, start informal and then let this part all sort itself out.
Variable. For statements of principle/values formation matters, unanimous, especially while it remains small. For operational, structural, budget decisions, by majority.
Should focus more on creating opportunities and influencing best practice, rather than an authoritative decisionmaking forum.
Depends on the goals. Design must always follow purpose.

Skipped: 18

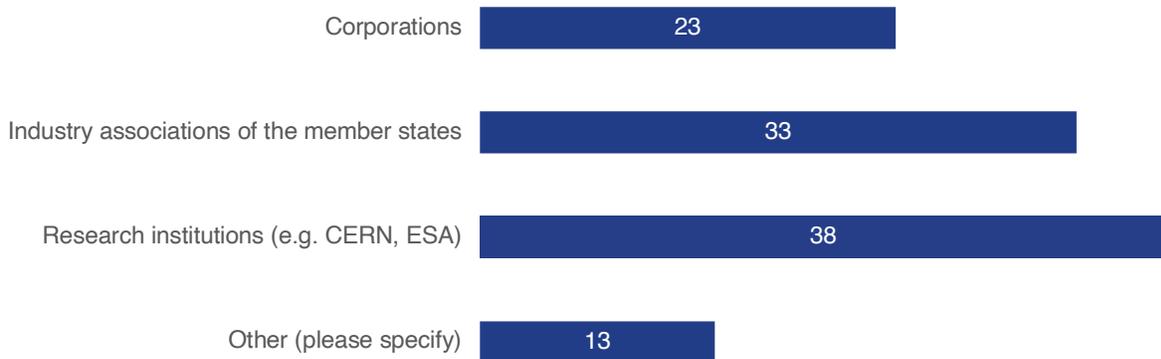
Question 18: In your view, which (combination) of the following constitutes the most effective basis for institutionalizing the Alliance? You may choose multiple options.



Responses
It is better to be flexible at this moment.
First build a working go-cart. Then worry about whether you will build a Tesla or a Ford.
Again, vary by purpose. Need a high-level point official for each government with understanding that engagements on particular topics issues will run far afield of his/her specific ministry and beyond officialdom as well.
Depends on the goals. Design must always follow purpose.
Condensed in spring and autumn meetings, 2–3 intensive days where all the meetings are packaged into. Build an online component.
Believe this should be dictated by the governance structure.

Skipped: 18

Question 19: In your view, which of the following institutions should be allowed to take part in the Technology Alliance through dedicated membership options? You may choose multiple options.



Other (please specify)
If corporations are allowed, then the voting rules should be re-thought. Perhaps could allow e.g. observer role.
Government representatives
NGOs, academia.
Depends on the purpose of the Alliance. I would suggest focusing first and foremost on states and allow corporations, industry, private sector, research institutions to be involved in a less formal (e.g. advisory) role.
That sounds so formal with “dedicated membership,” I’d pursue informal consultation with relevant stakeholders.
Members: just governments; Consultative Status: all others.
Academia
Start with a small coalition of the willing and interested; get that going, then sort this out.
If the statement of purpose and the focused working areas are clear, leaders will be able to pull in appropriate entities based on the value they bring to the topic. In some cases, that may be a single corporation, in others an association or research org. In some places, it may be an existing org. that has little to do with tech but is the primary credible voice in a country for protecting individual liberties or rooting out corrupt practices. It depends and flexibility is desired.
Depends on the goals. Design must always follow purpose.
Civil society.
If you go for a big thing, then hard to say, they are all relevant stakeholders, also civil society needs to be on board.

Permanent state members should be able to develop their delegations however they see fit. A verified network of outside experts shouldn't have membership limitations aside from relevant and credible expertise.

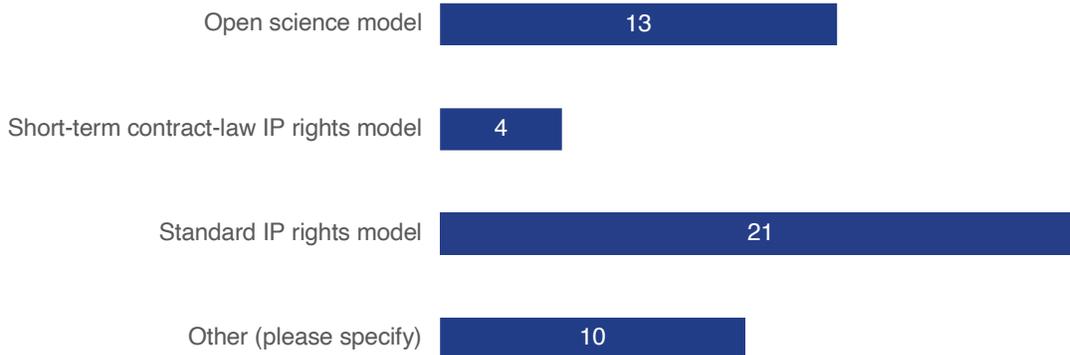
Skipped: 18

Question 20: Do you have any suggestions for allowing and regulating the participation of transnational corporations in the Technology Alliance?

Responses
Would allow as an observer.
Selected by the primary defence trade association of each country as an expert in the relevant technology area.
When it comes to the new tech sectors—role of private companies is central, therefore they should be at least consulted regarding many decisions.
Welcome technical expertise (at invitation, in specific working groups), not the lobbyists.
Potentially, transnational corporations could participate only as observers.
I would suggest that corporations can apply for an observer status and could be invited as technical experts to selected meetings.
Would need to limit ownership based on same considerations used to limit country membership.
Provide for extensive consultation.
Observer status only.
The widest possible participation of non-state actors in the technology sector on the model of the US Defense Innovation Board (DIB) to bring innovation and entrepreneurship in the Alliance would be desirable.
Vary levels of access depending on topic and agenda. Anticipate penetration of larger meetings by agents of state actors antithetical to the agenda.
Could they be given opportunities to provide expert testimony and other similar input, without being formal members?
Has to be regulated. For example, members can invite key companies to participate with certain parameters, also including SMEs. Rotating participation.
Frankly, I don't think MNC are much need in these conversations. First their interests are well known, second their interest is well beyond the level of a country and purely focus on profitability (European MNCs are exempted from my judgement here).
They should be excluded to avoid conflict of interest and bias.
Corporations shouldn't be members. States should be able to include members of corps in their delegations if they wish. Corps could also participate through the external network of verified experts.

Skipped: 50

Question 21: A proper model for IP management and tech transfer will be crucial for managing internal competition and avoid free riding when tangible or intangible outputs are created. In your view, which of the following models would be most suitable?



Other (please specify)
To be considered.
Not sure.
Unsure, will depend on the objectives of the TA.
Don't have final view.
Don't know.
Need to know more on topic before expressing an opinion.
Apologies—minimal experience in this area.
Depends on the goals. Design must always follow purpose.
No opinion.
The issue with IP is enforcement. If you cannot enforce, you may as well not think about a model. Generally, IPRs should be reduced. Less wide-ranging and shorter time periods. IPR tend to stifle innovation.

Skipped: 18

Question 22: Thank you for participating. The survey results will be incredibly useful for our research. Each participant will receive regular updates on the project, including invitations to attend our next workshops and the final, public version of the report. If you have any feedback or comments regarding the survey, or any additional thoughts on the Technology Alliance, please fill in the box below:

Responses
Some of the options were quite close to each other and it was difficult to choose only one. Additional comment section would be needed in future surveys. In general, I do see a need for this kind of alliance.
Stealing of technologies and supply chain vulnerabilities are important issues!
Great initiative, thanks for inviting my feedback. Very interested in staying involved. [Name removed]
Thanks so much for organizing! I'll be excited to see how this initiative progresses.
Thanks for all the great work.
It is a great project and I am highly interested in this work. We need to have a strong but flexible model to share ideas to keep innovative environment for technologies.
Great questions and good effort! Happy to help.
When we talk about technology, there is basically no way around China. Thus, from my point of view China should be involved.
Thank you for the chance to comment—I'll widen to colleagues within [organization removed].
It cannot work without the EU participation.
Excellent initiative!

Skipped: 55

- ¹ Sabahat Jahan, “UK seeks alliance to avoid reliance on Chinese tech: The Times,” Reuters, May 28, 2020, <https://www.reuters.com/article/us-britain-tech-coalition/uk-seeks-alliance-to-avoid-reliance-on-chinese-tech-the-times-idUSKBN2343JW>.
- ² Anja Manuel, “How to Win the Technology Race with China,” Stanford.edu, June 18, 2019, <https://fsi.stanford.edu/news/how-win-technology-race-china>; Anja Manuel and Pavneet Singh with Thompson Paine, “Compete, Contest and Collaborate: How to Win the Technology Race with China,” Stanford Cyber Policy Center, October 17, 2019, https://fsi-live.s3.us-west-1.amazonaws.com/s3fs-public/manuel_et_al_china_tech_race_101619_final_updated_0.pdf.
- ³ The concept draws on network topography and was introduced by Farrell and Newman, though their analysis deals primarily with the use of economic coercion by the United States. Henry Farrell and Abraham L. Newman, “Weaponized Interdependence: How Global Economic Networks Shape State Coercion,” *International Security*, 44 no. 1 (Summer 2019): 42–79, https://www.mitpressjournals.org/doi/abs/10.1162/isec_a_00351?journalCode=isec.
- ⁴ Dominique Patton and Colin Packham, “China hits Australia with barley tariff in latest blow to relations,” Reuters, May 18, 2020, <https://www.reuters.com/article/us-china-australia-barley/china-hits-australia-with-barley-tariff-in-latest-blow-to-relations-idUSKBN22U1J6>; Katrin Bennhold and Jack Ewing, “In Huawei Battle, China Threatens Germany ‘Where It Hurts’: Automakers,” *The New York Times*, January 16, 2020, <https://www.nytimes.com/2020/01/16/world/europe/huawei-germany-china-5g-automakers.html>.
- ⁵ Sheena Chestnut Greitens, “Dealing with demand for China’s global surveillance exports,” Brookings Institution, April 2020, <https://www.brookings.edu/research/dealing-with-demand-for-chinas-global-surveillance-exports>.
- ⁶ For an example of a useful framework for how to think about flexible partnerships with other countries and organizations, see Andrew Imbrie, Ryan Fedasiuk, Catherine Aiken, Tarun Chhabra, and Husanjot Chahal, “Agile Alliances: How the United States and Its Allies Can Deliver a Democratic Way of AI,” Center for Security and Emerging Technology, February 2020, <https://cset.georgetown.edu/research/agile-alliances>.
- ⁷ See Christopher Balding and Daniel Wehrenfennig, “An Organizational Theory of International Institutions,” *Journal of International Organizations Studies* 2 no. 1 (2011): 7–27, <https://pdfs.semanticscholar.org/e59d/5b7eb85ce36978e52d08e3ddfe64ba9e8314.pdf>.
- ⁸ The newly founded Alliance for Multilateralism has adopted a network-based structure: <https://multilateralism.org>.
- ⁹ The Internet Engineering Task Force successfully uses this model: www.ietf.org.
- ¹⁰ Working Group, “Information on Pathfinder Initiatives Guidelines,” Asia-Pacific Economic Cooperation, May 9–12, 2014, http://mddb.apec.org/Documents/2014/OFWG/OFWG/14_ofwg_013.pdf.
- ¹¹ “OECD Best Practice Principles on Stakeholder Engagement in Regulatory Policy: Draft for Public Consultations,” Organisation for Economic Co-operation and Development, 2017, <https://www.oecd.org/gov/regulatory-policy/BPPs-for-Public-Consultation.docx>; “Joint Tech Innovation,” Global Internet Forum to Counter Terrorism, <https://www.gifct.org/joint-tech-innovation>.
- ¹² Noah Barkin, “Export Controls and the US-China Tech War: Policy challenges for Europe,” Mercator Institute for China Studies, March 18, 2020, <https://www.merics.org/en/china-monitor/export-controls-and-the-us-china-tech-war>.
- ¹³ Daniel Kliman, Ben FitzGerald, Kristine Lee, and Joshua Fitt, “Forging an Alliance Innovation Base,” CNAS, March 29, 2020, <https://www.cnas.org/publications/reports/forging-an-alliance-innovation-base>.
- ¹⁴ Michael Brown and Pavneet Singh, “China’s Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor to Access the Crown Jewels of U.S. Innovation,” Defense Innovation Unit Experimental, January 2018, [https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_\(1\).pdf](https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_(1).pdf).

Robbie Gramer and Amy MacKinnon, “U.S. Closes Chinese Consulate in Houston Amid Surge in Chinese Espionage Cases,” *Foreign Policy*, July 22, 2020, <https://foreignpolicy.com/2020/07/22/us-trump-china-escalation-tensions-spying-closes-chinese-consulate-in-houston-chinese-espionage-cases>.

¹⁵ For a comprehensive overview, see Brown and Singh, “China’s Technology Transfer Strategy.”

¹⁶ Agatha Kratz, Mikko Huotari, Thilo Hanemann, and Rebecca Arcesati, “Chinese FDI in Europe: 2019 Update: Special Topic: Research Collaborations,” Rhodium Group and Mercator Institute for China Studies, April 2020, <https://www.merics.org/en/papers-on-china/chinese-fdi-in-europe-2019>.

¹⁷ Alex Joske, “Picking flowers, making honey,” Australian Strategic Policy Institute, October 2018, <https://www.aspi.org.au/report/picking-flowers-making-honey>.

¹⁸ Andrew Imbrie and Ryan Fedasiuk, “Untangling the Web: Why the U.S. Needs Allies to Defend Against Chinese Technology Transfer,” Brookings Institution, April 2020, <https://www.brookings.edu/research/untangling-the-web-why-the-us-needs-allies-to-defend-against-chinese-technology-transfer/>; Marcel Angliviè de la Beaumelle, Benjamin Spevack, and Devin Thorne, “Open Arms: Evaluating Global Exposure to China’s Defense-Industrial Base,” Center for Advanced Defense Studies, 2019, <https://www.c4reports.org/open-arms>.

¹⁹ La Beaumelle, Spevack, and Thorne, “Open Arms.”

²⁰ Ellen Nakashima and David J. Lynch, “U.S. charges Chinese hackers in alleged theft of vast trove of confidential data in 12 countries,” *The Washington Post*, December 21, 2018, https://www.washingtonpost.com/world/national-security/us-and-more-than-a-dozen-allies-to-condemn-china-for-economic-espionage/2018/12/20/cdfd0338-0455-11e9-b5df-5d3874f1ac36_story.html.

²¹ “The Theft of American Intellectual Property: Reassessments of the Challenge and United States Policy,” National Bureau of Asian Research, February 2017, http://ipcommission.org/report/IP_Commission_Report_Update_2017.pdf.

²² Lorand Laskai and Adam Segal, “A New Old Threat: Countering the Return of Chinese Industrial Cyber Espionage,” Council on Foreign Relations, December 6, 2018, <https://www.cfr.org/report/threat-chinese-espionage>.

²³ Roberto Viola, “DIGITAL4DEVELOPMENT: a new approach in the EU’s development tool kit,” Europa.eu, May 19, 2017, <https://ec.europa.eu/digital-single-market/en/blog/digital4development-new-approach-eus-development-tool-kit>.

²⁴ “New Africa-Europe Digital Economy Partnership: Accelerating the Achievement of the Sustainable Development Goals,” African Union-European Union Digital Economy Task Force, 2019, <https://ec.europa.eu/digital-single-market/en/news/new-africa-europe-digital-economy-partnership-report-eu-au-digital-economy-task-force>.

²⁵ “Blue Dot Network,” State.gov, <https://www.state.gov/blue-dot-network>.

²⁶ Matt Kapko, “Rakuten Mobile Dismisses Open RAN Skeptics,” SDXCentral.com, March 3, 2020, <https://www.sdxcentral.com/articles/news/rakuten-mobile-dismisses-open-ran-skeptics/2020/03>.

²⁷ Martijn Rasser and Ainikki Riikonen, “Open Future: The Way Forward on 5G,” CNAS, July 28, 2020, <https://www.cnas.org/publications/reports/open-future>.

²⁸ Björn Fägersten and Tim Rühlig, “China’s standard power and its geopolitical implications for Europe,” UI Brief No. 2, Swedish Institute of International Affairs, 2019, <https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2019/ui-brief-no.-2-2019.pdf>.

²⁹ Anja Manuel and Melanie Hart, “Op-Ed: How the West could win a technological ‘shadow war’ with China,” *Los Angeles Times*, June 11, 2020, <https://www.latimes.com/opinion/story/2020-06-11/china-5g-global-standards-war>.

³⁰ See for example, Kliman et al., “Forging an Alliance Innovation Base.”

-
- ³¹ “Intellectual Property Management - Overview,” KT.cern, <https://kt.cern/ip/overview>; “Managing IP at CERN,” WIPO.int, December 2010, https://www.wipo.int/wipo_magazine/en/2010/06/article_0003.html.
- ³² Heidi L. Williams, “Intellectual property rights and innovation: Evidence from the human genome,” *The Journal of Political Economy* 121 no. 1 (2010): 1–27, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3955392>.
- ³³ “Electronic Code of Federal Regulations,” ECFR.gov, July 30, 2020, https://www.ecfr.gov/cgi-bin/text-idx?SID=70e390c181ea17f847fa696c47e3140a&mc=true&node=pt22.1.120&rgn=div5#se22.1.120_11.
- ³⁴ “Data Free Flow with Trust (DFFT): Paths towards Free and Trusted Data Flows,” World Economic Forum, May 2020, <https://www.weforum.org/whitepapers/data-free-flow-with-trust-dfft-paths-towards-free-and-trusted-data-flows>.
- ³⁵ “A beery European spy club is revealed,” *The Economist*, May 28, 2020, <https://www.economist.com/europe/2020/05/28/a-beery-european-spy-club-is-revealed>.
- ³⁶ Jordan Storozuk, “Introducing the D9 & its Secretariat,” Treasury Board of Canada Secretariat Blog at Canada.ca, December 20, 2018, <https://tbs-blog.canada.ca/en/introducing-d9-its-secretariat>.
- ³⁷ Alliance for Multilateralism, <https://multilateralism.org>.
- ³⁸ “Germany launches Alliance for Multilateralism,” DW.com, September 26, 2020, <https://www.dw.com/en/germany-launches-alliance-for-multilateralism/a-50600084>.
- ³⁹ “Germany, France to launch multilateralism alliance,” April 3, 2019, <https://www.dw.com/en/germany-france-to-launch-multilateralism-alliance/a-48172961>.
- ⁴⁰ CyberPeace Institute, <https://cyberpeaceinstitute.org>.
- ⁴¹ Jordan Storozuk, “Introducing the D9 & its Secretariat,” Treasury Board of Canada Secretariat Blog at Canada.ca, December 20, 2018, <https://tbs-blog.canada.ca/en/introducing-d9-its-secretariat>.
- ⁴² Freedom Online Coalition, <https://freedomonlinecoalition.com>.
- ⁴³ Global Internet Forum to Counter Terrorism, <https://www.gifct.org>.
- ⁴⁴ Tom Barry, “G8/G7 and Global Governance,” IPS-DC.org, October 12, 2005, https://ips-dc.org/g8g7_and_global_governance.
- ⁴⁵ Michael Kratsios, “Artificial Intelligence Can Serve Democracy,” *The Wall Street Journal*, May 27, 2020, <https://www.wsj.com/articles/artificial-intelligence-can-serve-democracy-11590618319?shareToken=st31e9696eb9954d70a66eb5cbe6740a92>.
- ⁴⁶ Internet Engineering Task Force, <https://www.ietf.org>.
- ⁴⁷ “Focus Group on Machine Learning for Future Networks including 5G,” International Telecommunication Union, <https://www.itu.int/en/ITU-T/focusgroups/ml5g/Pages/default.aspx>; “Issue No. 2,” ITU Journal, International Telecommunication Union, <https://www.itu.int/en/journal/002/Pages/default.aspx>; “Artificial Intelligence and Robotics for Law Enforcement,” (INTERPOL and United Nations Interregional Crime and Justice Research Institute, 2019), http://www.unicri.it/news/files/ARTIFICIAL_INTELLIGENCE_ROBOTICS_LAW%20ENFORCEMENT_WEB.pdf.
- ⁴⁸ “About International Telecommunication Union (ITU),” International Telecommunication Union, <https://www.itu.int/en/about/Pages/default.aspx#3>.

⁴⁹ “Technology Policy and the Environment,” (Organisation for Economic Co-operation and Development, 2002), <https://www.oecd.org/science/inno/1830589.pdf>.

⁵⁰ Pacific Economic Cooperation Council, <https://www.pecc.org>.

⁵¹ The Wassenaar Arrangement, <https://www.wassenaar.org>.

⁵² Seema Gahlaut, “Multilateral Export Control Regimes: Operations, Successes, Failures and the Challenges Ahead,” in *Non-Proliferation Export Controls: Origins, Challenges, and Proposals for Strengthening*, ed. Daniel Joyner (London: Routledge, 2017), <https://www.taylorfrancis.com/books/e/9781315247892/chapters/10.4324/9781315247892-9>.

⁵³ Karim K. Shehadeh, “The Wassenaar Arrangement and Encryption Exports: An Ineffective Export Control Regime that Compromises United States’ Economic Interests,” *American University International Law Review* 15 no. 1 (1999): 271-319, <https://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1264&context=auilr>.

⁵⁴ Balding and Wehrenfennig, “An Organizational Theory of International Institutions.”

⁵⁵ “The Clean Network,” U.S. Department of State, <https://www.state.gov/the-clean-network>.

⁵⁶ Lavina Lee, “Assessing the Quad: Prospects and Limitations of Quadrilateral Cooperation for Advancing Australia’s Interests,” (Lowy Institute, May 19, 2020), https://www.lowyinstitute.org/publications/assessing-quad-prospects-and-limitations-quadrilateral-cooperation-advancing-australia#_edn4.