The Heritage Foundation

2021 China Transparency Report

Edited by Walter Lohman and Justin Rhee

The Heritage Foundation

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Acknowledgements

Preface

The COVID-19 pandemic has been one of the most of devastating global crises of our time. With millions of lives lost and unprecedented economic devastation, there are many questions that must be answered to ensure that such a tragedy never happens again. But we cannot get those answers without greater transparency from China, where the virus originated.

The Chinese government, under the governance of the Chinese Communist Party (CCP), neglected its duty to the safety of its own people, and to the world, in its handling of the pandemic. The CCP must be held accountable, and for the sake of those millions of lost lives, the world needs greater insight into what happened.

But the need for transparency does not stop with COVID-19. The pandemic was a monumental and much-needed turning point in U.S.–China relations. It set off a chain reaction of calls for greater accountability and transparency from the CCP, not just in public health issues, but in politics and law, human rights, its military, foreign policy, economics, and more.

To this end, The Heritage Foundation launched the China Transparency Project in 2020 to push for greater official transparency and to shine a light on dozens of existing private efforts to gather data on the CCP. The project provides a window to the best available open-source information on the domestic and foreign activities of the CCP.

As China continues its rise, the actions of the CCP have greater implications for everyone across the globe. In the American context, U.S.–China relations will continue to be one of the most important issues for decades to come. The U.S. now faces a different China from a decade ago. The emboldened leadership in Beijing has become increasingly aggressive, and in many ways, it is a threat to America, its interests, and its role in the world.

It is not the Chinese people that are at fault; blames goes to the communist dictatorship that oppresses them and jeopardizes the well-being and liberty of nations around the world. Just as the U.S. made a distinction in the Cold War between the Soviet government and the Russian people, it must take great care to make the distinction between the Chinese communist government and the Chinese people.

This inaugural release of the *2021 China Transparency Report* comes at a symbolic point in China's history. The year 2021 marks the 100th anniversary of the CCP's founding. As the leadership in Beijing celebrates the party's centenary, the free world will solemnly remember the millions of innocent lives lost at its hands.

America's political leaders, policymakers, diplomats, and those who advise them need data at their fingertips to craft the policies critical to dealing with China. More and better data and more attention on data collection is what Heritage's China Transparency Project intends to offer.

With greater transparency on Chinese issues, the U.S. can create policies to keep the CCP in check, to neutralize its various threats, and to build a better future for America, for the world, and perhaps even for the Chinese people.

Kay C. James, President
The Heritage Foundation
June 2021

Introduction

The Heritage Foundation's *China Transparency Report* assesses the current state of China's transparency on eight issues. It does so by analyzing the data, or lack thereof, provided by the Chinese government, and highlights measures by private, global organizations and researchers to fill in the (very wide) gaps using open-source data.

Why is transparency important? The report addresses this question for each of eight categories: (1) the economy, (2) energy and the environment, (3) human rights, (4) influence operations, (5) the military, (6) outbound investments, (7) politics and law, and (8) technology.

Broadly speaking, transparency is important because the Chinese government has a history of withholding, manipulating, and falsifying data for its own purposes. As U.S. policymakers look to address the China challenge, access to reliable data becomes increasingly important. Data help to provide accurate assessments of China's capabilities, expose areas where China poses the greatest threat to U.S. interests, and examine where threats are overstated.

While the editors of the report acknowledge that virtually all governments have some degree of transparency issues, the Chinese government's lack of transparency is alarming on two fronts. First, the nature of the Chinese communist system exacerbates the lack of transparency. As continued Chinese Communist Party (CCP) control is its utmost priority, the CCP benefits from repressing data that do not fall in line with its narratives. Second, the U.S.–China competition and the policies made today will have consequences for generations to come. As such, it is critical that U.S. policymakers have access to accurate data to create sound policy.

The report is not a comprehensive review of every available tracker or project. The editors seek to raise awareness about ongoing private efforts and their methodologies, while pointing to where more research can be done. The editors hope that this report will encourage not only more data-driven analysis within the policy community, but also encourage cross-fertilization between categories. Methodologies and best practices are not exclusive to a single category.

This report does not limit data to quantitative figures or statistics. Data do not always come in the form of numbers. This is especially the case for categories such as human rights, where there simply is not enough numerical data.

Also, while the focus of the report is primarily on private, non-governmental research, governmental agencies are instrumental in data collection as well. Unless stated otherwise, The

Heritage Foundation does not claim ownership of the data projects mentioned in this report.

In addition to an assessment of the eight categories, this report also features six topical essays written by Heritage analysts and external authors:

- "Creating Some Clarity on the PLA Budget," by Heritage senior policy analyst Frederico Bartels. This essay examines the current available primary data on the PRC's military expenditures, its gaps, and how independent institutions have made up for the information gap. In a scenario of great power competition, it is important to understand how adversaries are building their militaries and its capabilities. Thus, it is paramount to have a clearer vision of what the Chinese allocate to the People's Liberation Army.

- "China Considers Big Data a Fundamental Strategic Resource, and Africa May Offer an Especially Valuable Trove," by Heritage senior policy analyst Joshua Meservey. The CCP believes that technological superiority is critical to achieving its most cherished national priorities, including the upending of the U.S.-led international order. Africa is likely a key part of Beijing's ambitious project. Chinese companies, and through them the Chinese government, have gained extraordinary access to valuable African data that can help China refine critical technologies such as artificial intelligence and biomedical technology. Given Beijing's prioritization of data as a strategic asset, its companies' history of sharing data with the government, and the ease with which it can mine African data, this essay argues that it is implausible that Beijing declines to exploit this valuable opportunity.

- "Chinese Influence on and Exploitation of U.S. Colleges and Universities," by Heritage Visiting Fellow and former Acting Secretary of Homeland Security Chad F. Wolf, and Heritage Davis Institute vice president James J. Carafano, PhD. This essay analyzes China's rising influence and exploitation of U.S. colleges and universities. Given the importance of U.S. research institutions to the security and prosperity of all Americans, it is crucial to have transparency on Chinese government and government-directed activities in order to best evaluate the risks and assess the effectiveness of mitigation measures.

- "The Future of China's Maritime Militia in the 'New Situation': A Primer," by Collin Koh, PhD. Koh is a research fellow at the Institute of Defence and Strategic Studies, a constituent unit of the S. Rajaratnam School of International Studies at Nanyang Technological University in Singapore. This essay argues that, notwithstanding China's expansion into distant-waters fishing, near-seas fishing especially in the South China Sea remains important for Beijing to assert its maritime sovereignty and rights in the area. The combination of wild-catch fishery and mariculture activities amplifies the continued relevance of the Chinese maritime militia. The recent Whitsun Reef incident with the Philippines presents a good case in point.

- "Commanding Depths: China's Bid to Dominate the Cloud—Under the Sea," by David Feith and Lara D. Crouch. David Feith formerly served as U.S. Deputy Assistant Secretary of State for East Asian and Pacific Affairs and is currently an adjunct fellow at the Center for New American Security. Lara D. Crouch is a congressional staffer who focuses on Indo–Pacific issues. The views expressed in this essay are her own and do not necessarily reflect those of the United States government. Feith and Crouch highlight that protecting economic and national security requires understanding who builds and finances undersea cables, which carry more than 95 percent of global data flows and are a clear focus of Beijing's ambitions. Through Huawei Marine Networks and other Beijing-backed firms, China can steal information, divert or manipulate data, cut off communications in a crisis, and install subsea surveillance equipment. This essay advocates sharpening U.S. policy at home, keeping U.S. technology from Chinese firms, improving coordination across the U.S. government and with the private sector, and prioritizing diplomacy with NATO allies, Quad partners, and other important players.

- "The South China Sea is the 21st Century Fulda Gap for Major War in Asia," by Heritage senior fellow Brent D. Sadler. Since the end of the Cold War, the U.S. Navy has struggled to identify a compelling naval challenge to inform investments in building its future fleet. Today, as tensions rise with tragic consequences in Asia, most notably over Taiwan and in the South China Sea, the Navy has its new Fulda Gap. As was the case for the Fulda Gap in Germany during the Cold War, this essay argues that the naval forces operating and engaged in combat in the South China Sea will determine the outcome of any armed conflict with China.

Executive Summary

The Chinese government has a history of withholding, manipulating, and falsifying data for its own purposes. The Heritage Foundation's *China Transparency Report* assesses the current state of China's transparency in eight issue areas. It does so by analyzing the data, or lack thereof, provided by the Chinese government and highlights measures by private global organizations and researchers to fill in the gaps.

As U.S. policymakers look to address the China challenge, access to reliable data becomes increasingly important. Data help to provide accurate assessments of China's capabilities, expose areas where China poses the greatest threat to U.S. interests, and examine where threats may be overstated. This report addresses this issue for each of eight categories: (1) the economy, (2) energy and the environment, (3) human rights, (4) influence operations, (5) the military, (6) outbound investment, (7) politics and law, and (8) technology.

The report is not a comprehensive review of every available tracker or project. It is a survey. The editors seek to raise awareness about ongoing private efforts and their methodologies while pointing to where it appears more research can be done. The editors hope that this report will encourage not only more data-driven analysis within the policy community but also cross-fertilization between categories. Methodologies and best practices are not exclusive to a single issue category.

Also, while the focus of the report is primarily on private, nongovernmental research, governmental agencies are instrumental in data collection as well. Unless stated otherwise, The Heritage Foundation does not claim ownership of the projects mentioned in this report.

Economy

To study the economy of 1.4 billion individuals in China is a colossal task. It requires default to broad, macro-level data and trends. One common method is to look at the components of China's gross domestic product (GDP). This includes the total of consumption, investment, government spending, and net exports within China.

There are two problems with measuring China's GDP, however. The first problem is one that every country has: GDP is an imperfect model that fails to fully reflect the welfare of a country. China may have one of the world's largest GDPs, but its GDP per capita (or GDP per person) is one-fifth the size of those in the world's most advanced economies. A better assessment of the welfare of China's economy requires more inputs than GDP. Even GDP per capita is an insufficient measure of the wealth of the Chinese people.

The second problem is that GDP accounting is corruptible. Chinese government officials, both at the provincial level and at the national level, can falsify numbers to make it seem as if China's economic growth is stable, if not increasing. Government actions such as increasing investment and government spending can make it seem as though GDP is increasing when components such as consumption are decreasing (which might reflect a poorer economy). The CCP is known to have officially undercounted growth as well.

An accurate assessment of the health of China's economy is important because most public policy analysts are not economists. Many simply reflect on the size of the Chinese economy and related trends. This ignores many of the problems China faces as an increasingly assertive socialist economy.

Understanding the strengths and weaknesses in China's economy will give analysts a better picture of the world's second-largest economy. But because of China's lack of transparency—and its careful management of the official data it does release—there has been far too much focus on its strengths and far too little on its weaknesses.

All sorts of economic data can be found through the National Bureau of Statistics: information on China's GDP, population size, and wage and income rates; its travel, retail, and education industries; and more. Provincial government data feeds into the information collected by the NBS. Government agencies also publish more in-depth information on industries they cover, such as trade or the digital economy, but much of that topline information ends up being published by the NBS, too. While some of the data that NBS publishes may be more reliable—trade statistics, for example, because they can be compared to other countries' statistics—others are more questionable.

There are some prominent for-pay resources that one can use to analyze China's economy—resources that are often used by companies and individuals that are invested in or planning to invest in China—but there is far less open-source information that is as comprehensive and available. The following are a few examples of the open-source resources.

- MacroPolo: "China's Debt Hangover"[1]

- Milken Institute: "Best-Performing Cities China"[2]

- Center for Strategic and International Studies: China Power Project[3]

- Mercator Institute for China Studies: "Trade and Investment"[4]

Transparency from the Chinese Government: 4 out of 10

The data provided by the Chinese government on its economy has significant gaps. While the Chinese government is fairly transparent with data on consumption, wages, and employment, there is a lack of information on the nature of the government control over Chinese state-owned enterprises (SOEs) and businesses. Official data on SOEs lacks basic firm-level statistics. When it comes to debt and government spending, the central government seems more transparent than local governments. Local debt is more complicated, and much is off budget. There is also a severe lack of reliable data from the Chinese government on subsidies and aggregate GDP figures.

Overall Transparency: 5 out of 10

Private efforts have helped filled some of the gaps in data, especially on the nature of the government control over Chinese SOEs and businesses. Private efforts have also significantly improved transparency on Chinese government's subsidies and China's GDP. With that said, these efforts have not been able to provide sufficient data on Chinese government spending and debt, as this area of transparency must be provided by the Chinese government.

One research area that could have the most significant impact is how efficient China's economy actually is. Generally speaking, the efficiency of an economy is based on what is being produced given a country's labor, capital, and technology. Measuring what is actually produced based on these inputs is sometimes referred to as total factor productivity. China has plentiful labor and capital compared to many other economies, but whether they are being used efficiently is questionable, especially

in view of the fact that manufactured goods have a tendency to be overproduced in China.

Energy and Environment

While energy and environmental issues are independent, there is interplay between them. Energy production and use can have both positive and negative impacts on environmental quality, and environmental policy impacts access to energy resources, and therefore, development. Together, they provide an important benchmark for evaluating human well-being.

Categories of energy data include energy production and use by source of energy, end use by sector, and imports and exports. They also encompass energy infrastructure investment, energy poverty, and energy consumption per dollar of GDP. Reliable trend data in these areas can help evaluate how China's energy mix is changing or not changing.

China's commitment to transparent and reliable data is important chiefly for the Chinese people, who must live with the consequences of energy and environmental policy. Energy use and a healthy environment strike close to home because they are the core building blocks of well-being and livelihoods. Affordable, reliable energy is a necessity for families, but so too is a clean, sound environment. China's pollution is directly responsible for a number of serious public health problems, declines in worker productivity, migration patterns, and harm to people's well-being.[5] Clear, objective data can identify where problems exist and incentivize data-driven solutions.

Free economies are generally cleaner economies,[6] not only because these societies possess greater wealth to improve their environments but also because the tools of stewardship—property rights, rule of law, transparency and accountability, incentive to innovate and become more efficient—contribute to environmentally sustainable economic outcomes. Unfree economies, such as China's,[7] put those tools and accountability for them largely in the hands of government and party authorities—where conflicts of interest negate its effectiveness.

After decades of fraudulent, inconsistent, nonexistent, or undisclosed national data and anecdotal evidence of poor environmental stewardship, the Chinese government does not have a reputation for reporting energy and environmental data consistently or accurately. It has been caught withholding or misrepresenting data on multiple occasions by its own citizens,[8] nongovernmental organizations,[9] and U.S. government resources.[10] In recent years, however, outside pressure, whether from the Chinese people or from other countries, has helped to create accountability and drive change by the government—for example, with respect to monitoring and publishing data on air quality.

In the past, the Chinese government has treated some energy and environmental data as state secrets, but in other cases, the absence of consistent data is due to the sheer complexity and magnitude of data collection across all of China's provinces. For example, a joint project between China and the United States to build a Chinese Environmental Public Health Tracking system has been complicated by the difficulty of "collecting, integrating, analyzing, and interpreting environmental and health data at various administrative levels ranging from provinces and cities to counties and villages."[11] This is important because environmental policies in one city or province affect economic decisions and environmental outcomes in others. For instance, efforts to reduce pollution in urban areas simply pushed industrial activity outside the city to more rural areas.[12] The ability to aggregate all these data is essential if one is to understand the magnitude of China's environmental problems.

Independent data from external sources has also shed light on Chinese investment and patterns in global energy markets. For example, the Mercator Institute for China Studies, which maintains a database of spending on Belt and Road Initiative (BRI) projects, estimates that "about two-thirds of Chinese spending on completed BRI projects went into the energy sector, and already amounts to more than 50 billion USD."[13]

Given the lack of scope and resources, it is extremely difficult for independent data to capture a full picture of energy and environment realities in China. For example, Yale, Columbia University, the Chinese Academy for Environmental Planning, and the City University of Hong Kong attempted to develop an environmental assessment of each of China's provinces but "concluded that data

gaps, a lack of transparency, and inconsistencies in China's baseline official data were too prevalent to allow for the construction of a consistent and comparable provincial China Environmental Performance Index."[14]

Nevertheless, independent efforts to generate and organize data have proved to be and will continue to be critical to achieving more accurate and transparent access to information in China. The following are a few examples of these open-source resources.

- Yale Center for Environmental Law and Policy: Environmental Performance Index"[15]

- Boston University, Global Development Policy Center: China's Global Energy Finance Database[16]

- Global Energy Monitor[17]

- *Our World in Data*[18]

- Climate Watch[19]

- Climate Action Tracker[20]

- Henry L. Stimson Center: Mekong Dam Monitor[21]

Transparency from the Chinese Government: 4 out of 10
The Chinese government's transparency on energy and environment varies depending on the type of data. Whereas it is transparent when it comes to air quality data, there is nearly zero transparency on water and land management and China's climate data. What little is provided is often not verifiable or is disputed by external efforts. Energy production data tends to be more available, because it is produced by SOEs that are listed and floated on local Chinese, and sometimes global, stock exchanges.

Overall Transparency: 6 out of 10
China has greatly improved its disclosure of environmental data over the past decade both in terms of environmental issues covered and in terms of data published. Outside pressure as well as third-party reporting have increased

data reporting and availability. However, there are plenty of opportunities to fill gaps in data and to pursue further research.

The first is increased third-party participation. A 2020 article in the *Journal of Environmental Management* found that increased third-party monitoring improved the data on air quality in China.[22] The editors concluded that the evidence "supports China's efforts to advance its environmental governance from a mono-centric and non-participatory policy process to one that integrates both authoritarian control and market-based mechanisms."[23] To the extent possible, more third-party monitoring should extend to the other environmental indicators mentioned in this chapter. This is particularly true where the quality of data is poor, such as indoor air quality, drinking water, surface water, and soil toxicity.[24]

Another potential avenue for research would be more investigative in nature. China has hidden industrial projects and environmental data under the guise of "state secrets." Like many other public policy issues, there is no clear understanding of how China formulates environmental policy. Consequently, researchers should investigate how environmental laws, regulations, and strategies are formulated. A better understanding of this would shed light on the progress or lack thereof in environmental data reporting and environmental progress.

Human Rights
The Chinese Communist Party (CCP) has a consistent record of failing to protect and preserve the internationally recognized rights of Chinese citizens.

While successive U.S. Administrations have often viewed issues of human rights in China as peripheral, the CCP sees their suppression as central both to the country's survival and to its own. At best, the U.S. government's decision to sideline or deprioritize human rights concerns in broader strategies toward China has led to inconsistencies in U.S. policy; at worst, it has hamstrung U.S. strategy toward China.

There is, therefore, an abiding need to promote transparency with respect to the CCP's efforts to curtail human rights. Civil society—including nonprofits, nongovernmental organizations, legal aid organizations, academics, and others—have sought to pull back the veil on the CCP's efforts to undermine freedom and human rights in China, but much work has yet to be done. However, while Chinese government data on these issues are often hard to track down, many researchers have found ways to shed light the trends.

The CCP is often very open about new laws or regulations that it puts into place. In 2018, the CCP instituted new regulations on religious affairs.[25] Although it does not acknowledge that they restrict a person's ability to practice his or her faith, the regulations do violate international standards of religious freedom. Regulations such as these provide insight into the CCP's policies and often inadvertently reveal information about human rights conditions inside China.

The government of China publishes other ostensibly unrelated data that, for example, outline security expenditures or job postings in the security sector that speak to an increased level of securitization in the Xinjiang region. Researchers use this information to draw inferences about broader trends in the government's policies and rights abuses. Thus, while the CCP may not be especially transparent about the data it releases or the trends that it observes, creative researchers can use threads of data on other subjects to get a clearer understanding of the bigger picture with respect to the CCP's violations of human rights.

There is much independent critical, data-driven research and reports on violations of human rights in China. In recent years, civil society has devoted significant attention to pulling back the veil on the CCP's human rights abuses. Reports have drawn on Chinese government data, ingeniously reverse-engineered technology used in the violation of rights, and collected firsthand testimony; their work has shed a much-needed light on the severity of the situation.

The following is a representative sample of the cutting-edge, data-driven projects that are contributing to these efforts.

- Xinjiang Victims Database[26]

- Human Rights Watch: "Algorithms of Repression"[27]

- Jamestown Foundation: "Xinjiang's System of Militarized Vocational Training Comes to Tibet"[28]

- Tibetan Centre for Human Rights and Democracy: Tibetan Political Prisoner Database[29]

- Hong Kong Watch: Protest Prosecution Database[30]

- Open Doors USA: World Watch List: China[31]

- Freedom House: "Freedom in the World: China"[32]

- ChinaFile: State of Surveillance[33]

Transparency from the Chinese Government: 1 out of 10

The Chinese government is not transparent when it comes to human rights. To be clear, there are data reported by the Chinese government. The issue is that the data provided have been widely criticized as inaccurate and categorized as propaganda. Data that deviates from the Chinese government's narrative are either quickly removed or not readily available.

Overall Transparency: 5 out of 10

Private efforts have significantly improved transparency on human rights given the complete lack of transparency from the Chinese government. Private efforts have been instrumental in uncovering the Chinese government's actions in Xinjiang. Transparency on Tibet has also improved, although more should be done. Private efforts have also been instrumental in improving transparency on rule of law, freedom of speech, and religious freedom.

This report can serve not only as a resource for identifying information and reports that lend insight into the CCP's intentions and actions but also to inspire future research projects that fill in the gaps in current research.

In conducting research for this report, there appeared to be significantly fewer data-driven resources on the situation in Tibet and Hong Kong, especially as compared to Xinjiang. Some of this may have to do with the fact that some of the events and rights abuses are new and emerging (as in Hong Kong). In other places (such as Tibet), it may be more difficult to access information, or there may be less political will to conduct research on these subjects. Nevertheless, they merit further investigation.

In an episode of *China Uncovered*, a Heritage Foundation podcast within the China Transparency Project, researcher Adrian Zenz suggested that additional deep research is needed to gain a better understanding of the forms of forced labor carried out by the CCP.[34] His own work has focused on Xinjiang and Tibet, and while there may be a need for more research in both of these regions, more information on the CCP's historical use of reeducation-through-labor methods is also needed.

Future research should do a better job of unpacking some of the motivations for China's violations of human rights. A more thorough understanding of why the CCP does what it does will deepen the application of research in the policy context, particularly for policymakers focused on safeguarding U.S. national security and advancing U.S. interests.

Influence Operations

Influence operations are government operations aimed at changing foreign popular perceptions in order to enhance a country's global influence. A range of soft power tools are used in influence operations, from benign civilian exchange and cultural programs to military psychological operations (psy ops). Likewise, the content of influence operations can, depending on the government in question, range from "white propaganda" (the origin of which is truthfully disclosed) to "black propaganda" (the origin of which is hidden or disguised).

Influence operations have been used by modern states for centuries in some form and are widespread tools of foreign policy and military strategy. In their broadest application, influence operations represent an all-of-government approach focused on specific targets. However, influence operations can also be seen as a more general strategy to deal with future crises and generally enhance a country's global standing.

Influence operations are key to China's efforts to control and manage its image globally; extend its regional reach; dominate the narrative vis-à-vis Hong Kong democracy, persecution of Uyghurs in Xinjiang, and Taiwan's de facto independence; and ultimately compete for global leadership with the United States.

The Chinese government and CCP are highly secretive about their influence operations, which are therefore not easily quantified through official Chinese data. Evaluation is made even more complicated by the sprawling structure of agencies and offices within the Chinese government and the CCP that contribute to the CCP's massive well-funded propaganda efforts. As Lowy Institute senior fellow and journalist Richard McGregor observes in his book *The Party*, "the big party departments controlling personnel and the media keep a purposely low public profile."[35]

However, there are some relevant publicly accessible data, often available only in Chinese, such as registrations of organizations within government and party agencies. For example, the State Council's Ministry of Civil Affairs maintains a database of officially registered social organizations, including those registered under the United Front Work Department. The CCP and Chinese government system is not devoid of bureaucracy. Formal processes are used to effectively mobilize its agencies for major operations, necessarily generating information on their efforts.

While official data provides a very limited and incomplete picture of the scope and scale of Chinese influence operations, private efforts have helped unveil these operations by exploiting some of the various data sources listed above and utilizing technological tools. Translation applications and social media analytic platforms have made it easier to spot and analyze the data. The following is a sample—list of cutting-edge private efforts helping to fill out the picture of Chinese influence operations.

- Alliance for Securing Democracy: Hamilton 2.0 Dashboard[36]

- Alliance for Securing Democracy: Authoritarian Interference Tracker[37]

- AidData: China's Public Diplomacy[38]

- MapInfluenCE[39]

Transparency from the Chinese Government: 3 out of 10

There are severe gaps in the data provided by the Chinese government with regard to influence operations. On one hand, there is some transparency provided by official data on health and economic diplomacy and united front work (within Chinese language sources). On the other hand, there is no transparency on digital and cyber operations that involve information manipulation or spreading disinformation.

Overall Transparency: 5 out of 10

Private efforts have greatly improved overall transparency on the Chinese government's influence operations, particularly on digital and cyber operations. These efforts have also provided more transparency on health and economic diplomacy and united front work. With that said, there still needs to be more overall transparency on united front work.

The CCP's influence operations have received tremendous attention recently from the general public, media, and national governments. However, the available open-source research has only scratched the surface.

One specific opportunity is in Beijing's use of influence operation mechanisms to support its technology objectives. As pointed out in the book *China's Quest for Foreign Technology*, there is still insufficient understanding of the united front system's role in technology transfer and talent recruitment programs.[40] While there is some publicly available literature on this role thanks to organizations such as Georgetown's Center for Security and Emerging Technology, which have conducted analysis on professional organizations and technology transfer to China, more can be done.[41]

More broadly speaking, there needs to be more evaluation of the actual effectiveness of the CCP's influence operations. It is one thing to become a target of influence; it is another thing to become influenced. Much of the discourse has focused on what the CCP is doing and identifying the targets of those operations, as it rightfully should. This has raised the alarm on the issue, so now closer attention can be paid to the actual effectiveness.

Military

The realm of national security—including military affairs, intelligence activities, and internal security operations—is typically the most opaque, even in open democratic societies. In an authoritarian system like that of the PRC, access to information is bound to be even more restricted.

Transparency about China's military is important because it provides researchers with a baseline of data for assessing the current state of and ongoing trends in the Chinese military. Understanding the Chinese military requires consideration of both its tangible and its intangible aspects.

China publishes a wide variety of information, including information about its military and security forces, but it does so in an often incomplete fashion, omitting key details and figures. Thus, the People's Liberation Army (PLA) has published white papers for over two decades that have discussed such issues as the PLA's individual services, "military strategic guidelines" of the "Active Defense," and mobilization.[42] These biannual white papers have been the most authoritative sources of information on PLA doctrine and China's evolving military thinking.

But these same white papers provide little insight into many of the more basic aspects of the world's largest military, including such essentials as the Chinese military budget. At no time was a breakdown of the single aggregate Chinese defense budget figure ($178 billion in 2019) ever provided to indicate how much might be spent on each service. It has never been clear exactly what activities—for example, military research and

development, space infrastructure, or biological research—are included in this figure and, equally important, what activities are not.

Similarly, the work reports issued in conjunction with the National People's Congress (NPC) and CCP Congresses provide important data and signposts on major Chinese security initiatives. They have provided hints, for example, as to the extent of Chinese internal security spending—but only sporadically. The announcement of the 14th Five-Year Plan (governing 2021–2025) noted that China's military was accelerating its efforts to become "fully mechanized and informationized,"[43] but no details were forthcoming on exactly what those terms might mean and what metrics were being employed, much less on how mechanized and informationized the PLA is now.

Open-source information is vital to any in understanding of the Chinese national security establishment, Chinese strategic thinking, and therefore likely Chinese national priorities. This is especially true because the intelligence community is often much more focused on "current intelligence": the who, what, where, when, and how of daily developments. There is much less time for more in-depth examinations of issues such as national strategy, the evolution of military doctrine, and other "why" questions.

As noted, the International Institute for Strategic Studies produces the annual *Military Balance*, which provides basic data (numbers of troops, tanks, planes, warships, nuclear weapons, etc.) for every nation, including the PRC. For more than a decade, the China section has included an overview of the past year's national security developments, including assessments of overall Chinese strategy, changes in force structure and organization, and major additions to the PLA's order of battle.[44] Similarly, the Stockholm International Peace Research Institute publishes an annual yearbook that covers major military developments around the world. It includes assessments of Chinese and other military expenditures, recent arms control agreements, and arms transfers.[45] The following are a few examples of these open-source resources:

- The Australian Strategic Policy Institute: China Defence Universities Tracker[46]

- Center for Strategic and International Studies: Asia Maritime Transparency Initiative[47]

- National Bureau of Asian Research and Sasakawa USA: Maritime Awareness Project[48]

Transparency from the Chinese Government: 5 out of 10

While the Chinese government scores low on transparency with regards to its military, the score is notably higher than some of the scores in other categories within this report. Military size is slightly better documented by the Chinese government but is still incomplete and without much detail. Details on military armaments outside of images are limited from the public. There is a lack of transparency on PLA activities and arms sales by the Chinese government. PLA activity can be seen, but the official info is lacking as it is often not reported.

Overall Transparency: 7 out of 10

Private efforts have been most impactful in providing transparency on arms sales by the Chinese government and tracking PLA activities and movement. Other areas—such as doctrine, private reform efforts, and policies—have also become more transparent because of these efforts.

Given China's translucent if not opaque nature, there is an enormous range of areas that could benefit from sustained open-source research. With the massive reform of the PLA in 2015—which saw a complete overhaul of the Central Military Commission, the transformation of seven military regions into five war zones/theaters, and the creation of several new services—each area includes a wealth of topics. For example:

- What are the functions of each of the 13 offices, commissions, and departments that now comprise the new Central Military Commission? How do these relate to each other in terms of seniority and staffing? How are each of these staffed? For example, are they predominantly from the ground forces (now a separate branch), or are they deliberately made joint?

- What is the structure of the war zones? Do they all follow the same organizational approach, or are they customized to their environments? For example, how does the western war zone, which has no maritime border, compare with the eastern or northern war zone?

- What is the structure of the new services (PLA Ground Forces, PLA Rocket Forces, PLA Strategic Support Force)? How do they recruit and train their forces? How do they relate to the other services (PLA Navy, PLA Air Force) in terms of seniority? How are they represented in the war zone headquarters? For example, are there more senior PLA Air Force officers in one than there are in another?

Similarly, the steady modernization of the PLA, and especially the ongoing emphasis on "informationization" of the force, raises a host of questions. Specifically:

- How does the PLA train its forces to accommodate all of the new technologies? How successful have these efforts been thus far?

- How well has the PLA developed a cadre of noncommissioned officers (the backbone of Western militaries), and how do they relate to the unit's political officers, who are responsible for, among other things, monitoring the welfare of the enlisted personnel?

- What is the process for acquiring more advanced weapons from the SOE system, and what has been the impact of efforts to inculcate "civil–military fusion"? How responsive are elements of China's military–industrial complex to changing requirements as defined by their customers, the PLA?

Outbound Investments

The Organization for Economic Co-operation and Development defines *foreign direct investment* (FDI) as a "category of cross-border investment in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise in another economy."[49] Broadly defined, FDI can assume

multiple forms, including an entity constructing new factories or power plants, expanding existing businesses, providing loans to overseas subsidiaries, acquiring voting stocks, mergers and acquisitions, and joint ventures.

Horizontal FDI generally refers to funds invested abroad in the same industry: for example, a retail clothing store in China opening a new branch in the United States or purchasing a competing clothing store in the United States. *Vertical FDI* generally refers to investments up and down the supply chain: for example, a retail clothing store purchasing the garment manufacturer that supplies the clothing that it sells.

Finally, different definitions may include or exclude different classes of FDI. Some definitions, for example, limit FDI to investments that net at least 10 percent of voting power in a firm, distinguishing FDI from short-term portfolio investment in stocks.

In several developing economies, Chinese investments in infrastructure, energy, and connectivity projects have improved economic performance, infrastructure, and productivity, enhancing living standards and propelling economic growth. In a number of high-risk developing economies, Chinese lenders and investors have financed projects deemed too economically or physically risky by more traditional Western and international lenders. The developing world has a compelling need for trillions of dollars in infrastructure investments, and in some cases, Chinese sources have been their only options for financing and construction.

However, in more than a few cases, Chinese FDI flows have proven a double-edged economic sword, providing economic benefits that are either limited—in some cases to small groups of business elite, leadership networks, or Chinese firms themselves—or outweighed by economic costs. Chinese investments, particularly large-scale infrastructure projects, have frequently and credibly been criticized for failing to meet international financial and technical standards, for lacking transparency, and for contributing to irresponsible debt practices. The BRI is littered with examples of projects that have been hand-picked by autocratic elites and would not have met international standards widely adopted by more traditional lenders. While

there are bright spots, the dark underbelly of the BRI is a trail of non-performing loans, unfulfilled promises, at-risk economies, and white elephant projects.

In a number of cases, Chinese outbound FDI (OFDI) has brought not just unfavorable economic consequences but adverse strategic ramifications. Chinese investments, particularly in sensitive infrastructure projects and telecommunications networks, have repeatedly drawn espionage concerns. National security concerns have led numerous capitals worldwide to restrict Chinese telecom giant Huawei from assuming a role in developing their 5G networks.

The Chinese government regularly reports on trade and investment statistics, principally through the NBS and Ministry of Commerce. However, while these statistics are sometimes corroborated by more reliable sources, China is often accused of manipulating its economic statistics—whether at the federal, regional, or local level—to serve the CCP's interests.

OFDI statistics can be more difficult for the Chinese government to manipulate, particularly when the counterparty is an advanced economy, as the figures are generally corroborated by the destination of the investment. However, even when Chinese OFDI statistics are accurate, there are numerous cases of planned foreign investments that for a variety of reasons fail to materialize. And while there is often much publicity around "new" investments, the cancellation or scaling down of proposed investments often goes unreported.

In recent years, there has been a dramatic proliferation of new research initiatives, particularly in the United States but also further abroad, that are devoted to tracking Chinese FDI statistics and analyzing their implications. The growth in the number of Chinese FDI "trackers" is partly a result of the exponential growth in Chinese OFDI flows beginning in the mid-2000s and peaking in 2016.

The prominent attention now being accorded to Chinese OFDI is also a result of the geopolitical character that these investment flows have assumed, particularly since the 2013 announcement of the BRI and the growing resources and attention that the BRI began to command in the years that followed. The BRI became a legacy project of Chinese President Xi Jinping and was enshrined in the Chinese constitution in 2017. Since then, however, the BRI has faced a growing international backlash.[50] In recent years, it has also suffered from a dramatic decline in new projects that parallels a larger decline in Chinese OFDI flows.

Today, several prestigious think tanks and research institutes host a variety of Chinese OFDI trackers, each with different emphases and different sets of data and variables that they are tracking. Some are global in scope, tracking Chinese investments wherever they materialize; some look only at certain categories of investments; and some are focused on specific regions. The following are some of the most prominent Chinese OFDI trackers now in use.

- American Enterprise Institute: China Global Investment Tracker[51]

- AidData: "Mapping China's Global Investments and Inequality"[52]

- Boston University Global Development Policy Center: China's Global Power Database[53]

- Stimson Center: Mekong Infrastructure Tracker[54]

- Inter-American Dialogue and Boston University Global Development Policy Center: China–Latin America Finance Database[55]

- Rhodium Group and National Committee on U.S.–China Relations: US–China Investment Project.[56]

Transparency from the Chinese Government: 3 out of 10
There are critical gaps in the data provided by the Chinese government with regard to outbound investments. There is a near-complete absence of official data on Chinese loans—specifically, information on the terms on which these loans have been provided. The Chinese government's defense-linked outbound flows are also not transparent. BRI projects and Chinese aid are slightly more transparent.

Overall Transparency: 6 out of 10

Private efforts have been instrumental in providing more transparency on BRI projects, FDI, loans, and aid. FDI gets tracked more closely on the receiving end. Even with private efforts, defense-linked outbound investments are still very non-transparent.

There continue to be ample opportunities for additional research in this field beyond the expanding number of existing efforts. Many projects are now evaluating Chinese investments on a regionwide basis, but there is room for more data collection and analysis at a subregional level. The Stimson Mekong Infrastructure Tracker offers a great example and model for such an initiative.

To date, ongoing research efforts have focused largely on the "what" and "where" of Chinese investments. Less attention has been paid to how these investments are affecting the host countries and the regions at large. Specifically, there is a need for greater focus on the impact of Chinese investments on local governance, institutions, and populations.

Politics and Law

The PRC is governed by the CCP. Chinese politics therefore includes both the politics of the state (at various levels) and intraparty politics. The politics of the Chinese state, even when only discussing domestic politics, spans a wide range of issues.

Another aspect of Chinese politics is Beijing's dealings with other countries, groups, and international organizations. As with Chinese domestic politics, understanding Chinese foreign policymaking is complicated by the very different structures and approaches that characterize the PRC. Because of the CCP's extensive reach, as well as China's "market socialist" system, the PRC has a much wider array of tools at its disposal for the conduct of foreign policy. Chinese SOEs, for example, can make decisions based in part on broader national objectives and are not as constrained by concerns about returns on investment. The Chinese government can invite foreign students to come to Chinese universities because the state runs the educational system. At the same time, the government can support various educational outreach efforts abroad, including Confucius Institutes—which are managed by a body within the Ministry of Education—as well as direct Chinese students abroad. This means that the range of Chinese foreign politics is as extensive as the range of its domestic politics.

Another consideration in assessing China is the country's evolving legal situation. Because China is an authoritarian state ruled by the CCP and considering its millennia-long history of rule *by* law rather than rule *of* law, it might seem paradoxical that China's legal situation should be a focus for Western analysts.

However, China's legal code affects how the Chinese interface with foreign entities, especially corporations and other businesses. China's legal structure is arguably better developed in the realm of commercial law, precisely because various Chinese and foreign companies interact both in the PRC and abroad. Support for China's pursuit of initial public offerings and listings on global stock markets, as well as its participation in international supply chains, requires some degree of legal infrastructure.

In addition, because China is a rule-by-law society, it creates legal scaffolding to justify various other politics. Thus, China has passed a range of laws—including the National Security Law, the National Espionage Law, and the National Cybersecurity Law—to justify accessing a variety of data from both Chinese and foreign corporate entities. The Chinese government does so not by fiat but by referencing these various laws. An understanding of these laws can therefore provide indications of Chinese interests and thinking.

Given the holistic, comprehensive approach that China takes toward accumulating "comprehensive national power," China's political activities overlap with its economic, diplomatic, and military actions. Grasping China's objectives therefore requires understanding the organization of both the CCP and the Chinese state: the relative rankings of individuals in terms of both the state and party hierarchies and their relationships to businesses, the military, and other entities.

To provide insight into Chinese developments, the PRC's State Council Information Office publishes a variety of white papers that provide the

single most authoritative position on Chinese policies on a given subject. The white paper production process requires bureaucratic reconciliation and agreement before publication and therefore provides the consensus view on a subject within the PRC government.

Another source of information is the annual reviews, reports, and statements from various Chinese ministries. The State Oceanic Administration, for example, an administrative agency under the Ministry of Land and Resources, issues an annual report on the state of Chinese maritime activities, including territorial claims, maritime economic activities, and the state of China's maritime environment. The Ministry of Foreign Affairs has long issued annual reviews of China's diplomatic activities.

Coming every five years or so are work reports associated with the CCP Party Congress and the full session of the NPC. These conclaves lay out the expected policy direction for the next five years, set forth at the party congress, and key implementation efforts, set forth at the NPC. Both the national and provincial governments, as well as ministries, also typically provide work reports that review the gains and advances since the previous "two big" meetings. These reports provide important glimpses into both successes and failures—based in part on what is *not* reported or discussed.

Another important source of political insight is the five-year plan. Despite shifts away from the dead hand of centralized economic planning, the PRC continues to produce five-year economic plans for the substantial portion of the economy that remains under state ownership at all levels. As important, the economic five-year plan provides indicators of key priorities and national efforts. The overall five-year plan also sets guidelines and boundaries for subsidiary five-year plans (for example, within each ministry). Both the overall five-year plan and ministry-specific five-year plans also feed into other Chinese planning such as medium-term and long-term plans in aspects of science and technology.

Providing additional information are reports, laws, and drafts. Some of these documents are released in conjunction with the annual meetings of the NPC. These set economic targets (usually in line with the five-year plan) as well as key

legislation and major decisions on a variety of topics. Apart from the plenum-related documents are other Chinese plans and projects, such as "Made in China 2025" and "China Standards 2035," which further detail Chinese objectives.

A wide variety of groups are monitoring various aspects of Chinese political developments, exploiting some of the various data sources noted above. The following are some of them.

- China Digital Times[57]

- China Leadership Monitor[58]

- Center for Advanced China Research[59]

- Paulson Institute MacroPolo: The Committee[60]

- University of California–San Diego China Data Lab: CCP Elite Portal[61]

Transparency from the Chinese Government: 4 out of 10

The Chinese government scores low on transparency of its politics. Overall party membership is published annually, but there is little information of the makeup besides age. This has gotten worse over time. Government structure is generally well-reported except for leaders of the party leading groups, which remain secretive in some cases. The activity of the leadership is reported, except for in sensitive policy areas. In recent years, transparency in the publication of government decrees, even in economic policies, has worsened.

Overall Transparency: 5 out of 10

Private efforts, while beneficial, have not made near enough impact on transparency on China's politics. The issue is that, in most cases, access to the data on political issues is guarded by the CCP. If the Chinese government does not publish data, there is little else private effort can gather in the public domain. This will remain the case unless Beijing implements new regulations to improve ease of access.

As the PRC has become stronger, instead of becoming more transparent, Beijing has tried to become more opaque. In many ways, the

CCP has never been transparent, obscuring the role of party secretaries and party committees. Similarly, membership in the Chinese leading small groups, in which party and state officials interact to convert policy direction into actual actions, has typically been unavailable.

More recently, however, the CCP has tried to discourage analysis of Chinese politics. These efforts range from steadily reducing access to Chinese databases to discouraging foreign academics and institutions from analyzing sensitive topics, such as treatment of the Uyghurs, to open harassment of both domestic and foreign scholars.[62]

This reduction in transparency makes open-source analysis more difficult, but also more urgent because of the greater need to understand how the Chinese political system is functioning. This need, however, has not led to an increase in academic study of the Chinese political process. Instead, there has been a decline in "area studies," with much more emphasis on the study of Chinese society and sociology (for example, women's studies and the history of science) rather than political or leadership studies.

As a result, for those who choose to study Chinese politics, there is a significant unmet demand for more analysis of all aspects of Chinese politics. Similarly, a better understanding of China's top ministries, the interplay between chief executives of SOEs and the national political leadership, and studies of provincial leadership trends could yield data that enhance our understanding of the next generation of Chinese leaders.

Technology

Technology in this context means information technology and its many components. This is an area with critical implications for U.S. security.

The role of technology was highlighted in the PRC's Made in China 2025 industrial policy plans. More recently, on March 5, 2021, CCP leadership released the 14th Five-Year Plan for the National Economic and Social Development of the People's

Republic of China and the Outline of Long-Term Goals for 2035.[63] The plan gives us a good overview of the critical technologies the CCP is focusing on such as artificial intelligence, biotechnology, blockchain, neuroscience, quantum computing, and robotics.[64]

The PRC government has also adopted a $1.6 trillion infrastructure initiative that surges funding and focus on seven main areas, including 5G communication networks, charging equipment for electrified vehicles, data centers, artificial intelligence, and the development of an industrial internet for connected factories.[65]

Finally, a third CCP plan, called China Standards 2035, is an ambitious 15-year blueprint to shape the global standards for the next generation of technologies such as the Internet of Things, cloud computing, big data, 5G, and artificial intelligence.[66]

All of these technologies are shaping a global race for who will lead the information age in the future—the authoritarians such as China and Russia or the democracies found in the West and the Indo-Pacific.

CCP leadership, including Chinese President Xi Jinping, sees information technology as a Fourth Industrial Revolution where heated competition now will determine who leads into the future. Xi has said that "a new round of technological revolution and industrial change—artificial intelligence, big data, quantum information, and biotechnology—are gathering strength." Xi indicated that these "earth-shaking changes" would provide an "important opportunity to promote leapfrog development," whereby China could assume a dominate position globally, replacing the United States.[67]

The Chinese government regularly reports on national expenditures of research and development (R&D) funding in science and technology, primarily through the NBS, Ministry of Science and Technology, Ministry of Commerce, Ministry of Industry and Information Technology, and Ministry of Education.

Like most of the official figures proffered publicly by the PRC, these statistics do not tell the whole story. Official government statistics merely show how much the central Chinese government ministries spend (or at least as much as they are willing to acknowledge). The statistics do not

include how much has been allocated in these areas by the individual provinces, prefectures, or districts. Further, CCP-sanctioned data does not include a clear breakout of PRC investments in the major public/private funds that steer technology research, development, and commercialization such as Chinese Government Guidance Funds.[68]

Further, much of the R&D—as well as the state-sponsored cyber and human-enabled espionage campaign to acquire technology—is not easily identifiable and likely in a "black" or classified budget that would not be found in public data.

As China has entered the international stage as a global technology leader in the past 15 years with national champions such as Huawei, Alibaba, and Tencent, international global attention has expanded beyond the PRC's government-sponsored technology funding. Growing attention has been paid to private Chinese companies (such as those listed above) that engage in R&D but which the PRC government has access to.

To supplement incomplete official reporting, prominent think tanks around the world have created research projects dedicated to tracking this public and private funding.

- Georgetown University Center for Security and Emerging Technology[69]

- Brookings Global China Project[70]

- Stanford-New America DigiChina Project[71]

- McKinsey Global Institute[72]

- Australian Strategic Policy Institute International Cyber Policy Centre[73]

- Center for International Governance Innovation[74]

Transparency from the Chinese Government: 3 out of 10

There are severe gaps in the data provided by the Chinese government with regard to technology. On one hand, the Chinese government's research activities are not that secretive. It publishes information about major R&D projects hosted at State Key Laboratories and supported by the National Natural Science Foundation of China (NSFC). Chinese scientific literature and patent information is generally available. But, because they do not need to attract private sector sponsors, China's state-backed research institutions generally do not publish as much information about their activities as do those in more democratic countries. Moreover, many projects financed by the NSFC in 2020 were not disclosed publicly, and little, if anything, is known about them. On the other hand, technology transfer is not transparent. The Chinese state leans on predatory investment practices and clandestine intelligence-gathering operations to monitor and absorb foreign breakthroughs in science and technology. The Chinese government used to be more transparent on its talent programs but has regressed considerably. The PRC is somewhat transparent about its budgeting and expenditure. Most local government and CCP offices (at the provincial level and below) publish information about their annual budgets and expense reports. Yet this is changing with time, as Chinese internet companies are beginning to block foreign access to such information. The PRC does not publish any information about the budgets of central-level CCP offices, and little is known about the budget of the central CCP committee.

Overall Transparency: 6 out of 10

Private efforts have been instrumental in improving overall transparency with regard to technology. Through painstaking work, these efforts have been able to piece together some surviving information about major talent programs over the past decade. But today's major plans, including the National High-End Foreign Expert Recruitment Plan, are still largely opaque. No information is being published about award winners. Private efforts to compile information about China's science- and technology-gathering operations have been met with some success in recent years. Private efforts to compile and analyze public budget documents have shed more light on the Chinese government's priorities. Transparency on the Chinese government's surveillance technology deployment has also improved as a result of private efforts.

By far the biggest challenge in understanding China's technological development plans is the lack of detailed visibility into the PRC's defense and state security spending. Some U.S.-based and international think tanks do a decent job of estimating how much the CCP allocates to its military, intelligence, and vast domestic security services based on output and the broad figures released, but it is difficult if not impossible to estimate how much is spent that is unseen—namely R&D for advanced technologies. Clearly, many AI, robotics, information technology, quantum computing, autonomous vehicles, and other technologies have military, police, and intelligence applications. Resources are clearly being poured into developing these technologies from the PRC's "black" budget in addition to what is being published in its open-source reporting. Just how much is unclear and very difficult to ascertain. Further, the PRC has clearly maintained an intense focus on developing domestic technologies to track, surveil, and suppress its own population, such as the social credit score, mass surveillance, facial recognition, and the Great Firewall of China. The R&D of most of these technologies would have been perfected as part of the unseen budget of the Ministry of State Security.

Economy

Defining Economy

At its heart, the study of economics involves analyzing the choices people make based on the resources available to them. An economy is the collective choices of those individuals. To study the economy of 1.4 billion individuals in China is a colossal task. It compels many to default to broad, macro-level data and trends. One common method is to look at the components of China's gross domestic product (GDP). This includes the total of consumption, investment, government spending, and net exports within China.

There are two problems with measuring China's GDP, however. The first problem is one that every country has: GDP is an imperfect model that fails to fully reflect the welfare of a country. China may have one of the world's largest GDPs, but its GDP per capita (or GDP per person) is one-fifth the size of those in the world's most advanced economies. A better assessment of the welfare of China's economy requires more inputs than GDP. Even GDP per capita is an insufficient measure of the wealth of the Chinese people.

The second problem is that GDP accounting is corruptible. Chinese government officials, both at the provincial level and at the national level, can falsify numbers to make it seem as if China's economic growth is stable, if not increasing.

Government actions such as increasing investment and government spending can make it seem as though GDP is increasing when components like consumption are decreasing (which might reflect a poorer economy).

The Heritage Foundation has created the China Transparency Project to highlight the world-class, publicly available resources that can help interested individuals and agencies to determine the true health of China's economy.

Why Chinese Economic Transparency Is Important

An accurate assessment of the health of China's economy is important for a number of reasons. The first is that most public policy analysts are not economists. Many simply rely on the fact that China's economy is the second largest in the world when measured in U.S. dollars or first when measured by purchasing power parity. This ignores many of the problems China faces as an increasingly assertive socialist economy. China's economy is large, but riddled with problems.

Understanding the strengths and weaknesses in China's economy will give analysts a better picture of China's economy. But because of China's lack of transparency—and its careful management of the official data it does release—there has been far

too much focus on its strengths and far too little on its weaknesses.

Beijing continues to struggle with the economic consequences exacted by decades of socialist policies, whether it is a gender gap or economic inequality between the eastern and western provinces. The actions that Beijing is taking today, whether by attempting to build a self-sufficient domestic economy or by trying to create the illusion of stable economic growth, will affect the economy in the future as well.

Finally, it is important to understand how China's economy works differently from the economies of the U.S. or other countries. It is not just that economic choices in China can be different from those in America; it is also important to understand that China's economy is much more susceptible to political interference than the U.S. and other free-market economies are.

Official Data from China

Official data on China's economy as released by the People's Republic of China government are plentiful but not always reliable. Perhaps to create the illusion of transparency, Beijing publishes a significant amount of information on China's economy through its National Bureau of Statistics (NBS), but more data does not guarantee quality data.

All sorts of economic data can be found through the NBS: information on China's GDP, population size, and wage and income rates; its travel, retail, and education industries; and more. Provincial government data will feed into the information collected by the NBS. Government agencies will also publish more in-depth information on industries they cover like trade or the digital economy, but much of that topline information ends up being published by the NBS too. While some of the data that NBS publishes may be more reliable—trade statistics, for example, because they can be compared to other countries' statistics—others are more questionable.

For years, economists have questioned the reliability of China's official GDP statistics and their components. Since the early 1990s, the growth of China's GDP suspiciously became less volatile. Government officials now had a knack for predicting the growth rate for the entire country, even

though gaps would become evident between what the provincial governments were reporting and what would be announced at the national level.

Components of GDP, like statistics on retail (a feature of consumption) or investment, are sometimes readjusted for Beijing's benefit. Adjustments are not uncommon in most countries, but the size of the adjustments in China's official statistics is unusual. For example, Beijing revised its 2019 statistics on investment down by several hundred billion dollars to make it appear as though the decline of investment in 2020 appeared to be less influenced by the global recession.[1]

Beijing has both a political and an economic incentive to make GDP and other statistics appear better than they are. A stable or growing economy (as measured by GDP) allows Beijing to signal to the world that its economic model is succeeding. Strong growth rates in areas like retail or investment can send signals to potential foreign investors that China is still a profitable market for investment when in actuality areas like household consumption may be stagnating.

Perhaps just as worrisome as Beijing's reporting of corrupted statistics is the general lack of information. For example, some of China's state-owned and state-invested enterprises are among the largest companies in the world, whether they are measured by total assets or by total employment, but just as many, if not more, smaller state-owned and state-invested companies exist throughout China. Given state enterprises' proximity to China's national interest, there is no significant transparency with respect to how these organizations are financed and operated. This creates questions about China's financial stability, its ability to service debt, and the overall performance of China's economic productivity.

Private Efforts

China has one of the world's largest economies and therefore merits a fair amount of attention, but collecting data on any economy can be troublesome for a myriad of reasons. There are other indicators to consider when looking at an economy besides the components of GDP (consumption, investment, government spending, and net exports): interest rates, productivity, health and education, and working age population, among

others. For example, there is a significant overlap with this chapter and the China Transparency Project's chapter on China's outbound investments, investment being a component of any economy.[2] The same could be said for China's defense spending and other government-funded operations, all of which constitute economic activity.

When it comes to analyzing China's economy, however, the lack of transparency, the unreliability of government data, China's size, and the difficulty of gathering information make analyzing the health of the economy extremely difficult. Even when a significant amount of economic data is available, economists are notorious for debating about which are more important and how to measure them correctly (adjusting for inflation, for example). Derek Scissors at the American Enterprise Institute has written about what he thinks of the economic data that are available in China, which indicators are more important in assessing the health of China's economy, and the quality of those data. Generally, his conclusion is that the most valuable indicators are those that are worst measured such as unemployment, debt, and national wealth.[3] Some of the least important are stock prices, money supply, and trade.

There are prominent for-pay resources that one can use to analyze China's economy—resources that are often used by companies and individuals that are invested in or planning to invest in China— but there is far less open-source information that is as comprehensive and available. The following are a few examples of the open-source resources that are available.

- **MacroPolo: "China's Debt Hangover."**[4] Macro-Polo is the in-house think tank of the Paulson Institute. Its "China Debt Hangover" is an interactive map that looks at debt within China's 31 regions and provinces. The indicator measures the extent to which local government financing debt is affecting real economic output across all provinces and regions. Specifically, it looks at the ratio of debt through local government financing vehicles to GDP (debt-to-GDP ratio). The dataset currently covers the years 2009–2018. The level of China's debt and China's ability to service that debt are important questions. A high amount of debt for any country

can be a particular burden on its finances. Debt can slow the growth of China's economy, which is still considered a middle-income economy. MacroPolo also has digital projects on China's high-speed rail and value in global supply chains and provides a quarterly outlook on the health of China's economy.

- **Milken Institute: "Best-Performing Cities China."**[5] China has some of the largest cities in the world. Shanghai, for example, has a population of more than 25 million and a local GDP of roughly $500 billion. The Milken Institute's "Best-Performing Cities China" series, which includes an interactive map, began in 2015 and tracks the economic performance of "34 first- and second-tier cities" from Beijing to Zhengzhou and "228 third-tier cities." There are nine indicators: two measures each of job, wage, and GDP per capita growth; foreign direct investment (FDI) growth: FDI-to-GDP ratio; and high value–added industry employment. The best-performing cities are then ranked as to whether they are first-tier or second-tier cities or third-tier cities. The difference between city tiers generally depends on the size of the cities with first-tier cities being the largest.

- **Center for Strategic and International Studies: China Power Project.**[6] Economics is just one of five categories, along with military, technology, social, and international image, that CSIS's China Power Project uses to examine the evolving nature of Chinese power relative to the power of other countries. Economic issues include China's infrastructure spending, its global competitiveness, and the future of its currency, the renminbi, among others. CSIS is not the only institute to look at the relative strength of China. The Lowy Institute's Asia Power Index also uses the economy as a component of its measurement of China's relative power in Asia. An explanation of the Lowy Institute's Asia Power Index can be found in the China Transparency Project's chapter on "Indexes and Rankings."[7]

- **Mercator Institute for China Studies: "Trade and Investment."**[8] Based in Europe, the Mercator

Institute for China Studies (MERICS), provides reports analyzing China's trade and investment. MERICS also covers other topics such as China's digital economy, industrial policy, and outbound foreign direct investments.

- **Caixin Global: Purchasing Managers' Index (PMI).**[9] Caixin, partnered with IHS Market, releases monthly indexes that gauge the economic activity of China's manufacturing and services sectors. Based on surveys sent to 500 manufacturing companies and 400 companies that provide services, Caixin's monthly manufacturing and services PMI shows whether economic activity in these two sectors is generally expanding or contracting compared to the preceding month. While these surveys are not necessarily useful when comparing data year over year, they do give analysts a sense of the health of China's economy from month to month. A PMI score higher than 50 points indicates an expansion of activity, and a score lower than 50 points indicates a contraction.

- **Individual Reports and Papers.** Much of the economics profession is built on data analysis published as reports, as peer-reviewed articles, and in scholarly journals. These can provide much deeper insight into what the available data actually mean when trying to analyze the health of China's economy. The problem with these reports is they are only published depending on whether they're accepted by a journal or not. This can make them hard to find and therefore keep track of. The following are just a few reports from various think tanks and journals.

  1. Tianlei Huang at the Peterson Institute for International Economics has done work that explores the survival of non-profitable firms in China, sometimes referred to as zombie firms. In works such as "As China Recovers from the Pandemic, Will Zombie Firms Return?" he looks at non-performing loans, loss-making state-owned enterprises, and the number of bankruptcies in China.[10]

  2. Logan Wright and Lauren Gloudeman of CSIS and Daniel Rosen of the Rhodium

Group have done work looking at the potential risk of an economic crisis in China. In *The China Economic Risk Matrix*, they look at five indicators (property, banks, debt or credit, external pressure, and capital account liberalization) to assess the likelihood of a financial crisis.[11]

3. Chad Bown, also at the Peterson Institute for International Economics, has focused on Chinese trade, particularly U.S.–China trade. His "US–China Phase One Tracker: China's Purchases of US Goods" tracks the progress of the Phase One trade deal signed in early 2020.[12]

4. A paper, prepared for the Spring 2019 Brookings Papers on Economic Activity and published by the National Bureau of Economic Research examines differences in China's reporting of GDP at the local and national levels.[13] There is no doubt that China's GDP growth has been positive over the years, but this research suggests that Chinese officials have also been overstating GDP numbers for the past decade. Specifically, China's National Bureau of Statistics has been overestimating national investment, thereby inflating GDP growth statistics. Investment, savings, and industrial growth rates have all been overstated for years.

5. While the International Monetary Fund (IMF) is not a private organization, it is an important resource in analyzing China's economy. The IMF regularly monitors the economic and finance policies of its members, including China. This involves sending economists to China to consult with government, representatives of business, labor unions, and civil society in what is commonly known as its Article IV consultations.[14] These consultations are generally published on a regular basis, usually annually. In addition to government data, the reports include assessments by the IMF staff. Because of the IMF's mission, these reports tend to have a focus on fiscal and monetary policies. They will also provide helpful analysis of

China's foreign exchange reserves and the relative strength of China's currency. Over the years, there has been particular interest in the strength of the renminbi, especially relative to the U.S. dollar. The IMF will also predict what it thinks China's GDP will be over the next few years, though this is questionable given China's already unreliable GDP numbers.

Grade and Reasoning

In this section are scores assessing the transparency of the Chinese government and overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 4 out of 10

The data provided by the Chinese government on its economy has significant gaps. While the Chinese government is fairly transparency with data on consumption, wages, and employment, there is a lack of information on the nature of the CCP's control over Chinese state-owned enterprises (SOEs) and businesses. Official data on SOEs lack basic firm-level statistics. When it comes to debt and government spending, the central government seems more transparent than local government is. Local debt is more complicated, and much of it is off budget. There is also a severe lack of reliable data from the Chinese government on subsidies and aggregate gross domestic product (GDP) figures.

Overall Transparency: 5 out of 10

Private efforts have helped filled some of the gaps in data, especially in shedding light on the nature of the CCP's control over Chinese SOEs and businesses. Private efforts have also significantly improved transparency on Chinese government subsidies and China's GDP. With that said, these efforts have not been able to provide sufficient data on Chinese government spending and debt, as this area of transparency must be provided by the Chinese government.

Trends from the Data

China's economic development has been impressive since it opened more to the world in the late 1970s and allowed for a more capitalist economic model to succeed. Entry into the World Trade Organization in the early 2000s further opened China's market to foreign trade and investment, helping to lift millions more out of abject poverty and giving more Chinese access to a better quality of life and leisure. But Beijing never completely abandoned its socialist ideology. External shocks, such as the 2009 global financial crisis and now COVID-19, have shifted Beijing toward a more authoritarian capitalist economic model under the leadership of President Xi Jinping.

Beijing has long taken credit for China's economic success and wishes to keep it that way. This means that Beijing is more willing to invest resources (efficiently or not) to make sure that China's economy is not susceptible to further disruptions, whether to production, employment, or GDP. For example, the issuing of loans by local and national-level governments to keep economic activity going has increased the ratio of local government debt to GDP by over 30 percentage points since 2008.[15] Some local governments have managed this better than others but the future of China's economic development is in question given the increasing levels of debt.

Decades of other socialist policies like migratory worker restrictions and efforts to control population growth have also led to significant imbalances within China, whether it is an imbalance in the ratio of men to women or in wealth between eastern and western provinces. China currently has a population of 1.4 billion, but only 800 million (58 percent) are considered economically active. By 2050, China is expected to see its working-age population to have fallen by 25 percent.[16] Coupled with rising debt levels, China's economy is on track to become old before it becomes rich.

China has increasingly become a consumer market, which explains why many foreign companies still want to invest in China. Rising wages have allowed for more disposable income, which has had huge effects on China's development of automobiles, e-commerce, financial technologies, and proliferation of smartphones. But China is still not a consumer market comparable to the U.S. or Europe, and there are questions as to whether it ever can be. Can China change from being the "world's manufacturer" to the "world's consumer?"

Opportunities for Further Research

Chinese government data are notoriously unreliable, and this offers researchers an opportunity to provide a more objective analysis of China's economy. Keeping track of when and how Beijing corrupts its statistics, whether by adjusting GDP, investment, or retail numbers, is another area of opportunity. Beijing, either directly or through its state media organizations, is unlikely to report when the economy is not doing well (for example, because of rising inflation or a shortage of goods).

One research area that could have the most significant impact in analyzing the health of China's economy is trying to figure out how efficient China's economy actually is. Generally speaking, the efficiency of an economy is based on what is being produced given a country's labor, capital, and technology. Measuring what is actually produced based on these inputs is sometimes referred to as total factor productivity. China has a lot of labor and capital compared to many other economies, but whether they are being used efficiently is questionable, especially in view of the fact that manufactured goods have a tendency to be overproduced in China.

Measuring the efficiency of China's economy can give analysts a better sense of how China's economy is progressing throughout its development as well. This would tie in nicely with criticisms that data on the returns to labor and capital border on useless, but the economic importance of those data can still be high.[17]

Many analysts try to compare the health of China's economy with the health of the U.S. or other economies, but comparing the Chinese and American economies is like comparing apples and oranges. The same is true of trying to compare the Chinese economy to European and other economies. The U.S. and Chinese economies are large, but similarities beyond that are negligible. China's economy and the U.S. or other advanced economies are not at the same stages of development. American and Chinese consumption patterns are different. Efforts to compare the U.S. and Chinese economies, such as adjusting GDP for purchasing power parity, expose flaws in the methods economists use more than they give any sense of the relative size of China's economy.

Those who are trying to gain a better understanding of the health of China's economy would benefit from looking at the progress—or lack of progress—that China has made throughout its history. The study of economics is not just a study of people and resources. It is also the study of trends. For example:

- How has China's economy developed since its last five-year economic plan?

- How has China's economy developed since smartphones were first introduced?

- How has China's economy developed since it joined the World Trade Organization?

There is a lot still to be learned about the true state of China's economy: not just how it has developed, but how it continues to develop as the world recovers from the COVID-19 pandemic or becomes increasingly digital and automated.

Energy and Environment

Defining Energy and Environment

This chapter offers a snapshot of China's energy and environmental data. While each area is independent, there is interplay between energy and environmental issues. Energy production and use can have both positive and negative impacts on environmental quality, and environmental policy impacts access to energy resources, and therefore, development. Together, they provide an important benchmark for evaluating human well-being.

Categories of energy data include energy production and use by source of energy, end use by sector, and imports and exports. They also encompass energy infrastructure investment, energy poverty, and energy consumption per dollar of gross domestic product (GDP). Reliable trend data in these areas can help evaluate how China's energy mix is changing or (equally important) not changing.

Environmental data survey a wide range of environmental stewardship and human health categories, including the extent to which pollution directly affects human health and the environment. Categories include:

- Air quality, which is generally assessed by measurements of particulate matter, sulfur dioxide, nitrous oxides, carbon monoxide, and ozone;

- Indoor air quality, which is a more difficult measure because households are affected by the sources of the fuel they use for cooking and heat;

- Water quality and water pollution;

- Stewardship of water resources and industries such as commercial fishing;

- Land and soil pollution, which involve tracking pesticide use, mining runoff and chemicals, and other contaminants that leach into the soil as a consequence of human activities; and

- Greenhouse gas emissions trends and annual output of carbon dioxide and methane emissions.

Why Transparency on China's Energy and Environment Is Important

China's commitment to transparent and reliable data is important chiefly for the Chinese people, who must live with the consequences of poor energy and environmental policy. Energy use and a healthy environment strike close to home because they are the core building blocks of well-being and livelihoods. Affordable, reliable energy

is a necessity for families, but so too is a clean, sound environment. China's pollution is directly responsible for a number of serious public health problems, declines in worker productivity, migration patterns, and harm to people's well-being.[1] Clear, objective data can identify where problems exist and incentivize data-driven solutions.

Accurate data will also help to measure the impact of policy decisions on energy use and environmental protection. Such data provide more concrete and defensible evidence as to which policy choices and government structures best provide energy access and environmental well-being. Free economies are generally cleaner economies,[2] not only because these societies possess greater wealth to improve their environments, but also because the tools of stewardship— property rights, rule of law, transparency and accountability, incentive to innovate and become more efficient—contribute to environmentally sustainable economic outcomes. Unfree economies, such as China's,[3] put those tools and accountability for them largely in the hands of government and party authorities—where conflicts of interests negate its effectiveness.

Chinese energy and environmental data also have international implications. China's economy has a global reach, and its energy market ambitions and environmental practices affect, for better or worse, its neighbors,[4] its trading partners,[5] and the global commons.[6] Data are useful benchmarks for discerning the health of China's economy, its progress as a developing and developed nation, and its trustworthiness in upholding its international commitments. For example, China is a rising manufacturer and exporter of nuclear power, and its government and companies will play a critical role in influencing peaceful uses of nuclear power and exporting both safety and international nonproliferation practices and norms.

In addition, because China is a party to a number of international environmental agreements with major economic implications such as the Paris Agreement, Kyoto Protocol, and Montreal Protocol, reliable data are necessary to ensure that China is living up to its obligations and commitments. Such data are similarly useful in formulating U.S. policy responses to China in these international arrangements and markets.

Official Data from China

After decades of fraudulent, inconsistent, nonexistent, or undisclosed national data and anecdotal evidence of poor environmental stewardship, the Chinese government does not have a reputation for reporting energy and environmental data consistently or accurately. It has been caught withholding or misrepresenting data on multiple occasions by its own citizens,[7] nongovernmental organizations (NGOs),[8] and U.S. government resources.[9] In recent years, however, outside pressure, whether from the Chinese people or from other countries, has helped to create accountability and drive change by the government—for example, with respect to monitoring and publishing data on air quality.

In the past, the Chinese government has treated some energy and environmental data as state secrets, but in other cases, the absence of consistent data is due to the sheer complexity and magnitude of data collection across all of China's provinces. For example, a joint project between the Chinese Center for Disease Control and Prevention and the U.S. National Institute of Environmental Health to build a Chinese Environmental Public Health Tracking system has been complicated by the difficulty of "collecting, integrating, analyzing, and interpreting environmental and health data at various administrative levels ranging from provinces and cities to counties and villages."[10] This is important because environmental policies in one city or province affect economic decisions and environmental outcomes in others. For instance, efforts to reduce pollution in urban areas simply pushed industrial activity outside the city to more rural areas.[11] The ability to aggregate all of these data is essential if one is to understand the magnitude of China's environmental problems.

In June 2020, China released the "Bulletin on the Second National Census on Pollution Sources" with the results of its "second national pollution source census," a three-year effort undertaken by 15 ministerial departments. China releases the census every decade, and the data include "more than 1,800 database tables" with "over 150 million items of basic data."[12] If these data are objective, accurate, and publicly available, this could be a significant step forward for the country's environmental reporting.

Compounding the difficulty, data manipulation has occurred closer to the source at the local level of governments in some cases.[13] The Ministry of Ecology and Environment was created in 2018 to consolidate and standardize environmental data from the former Ministry of Environmental Protection and six other central government bodies.[14]

Air Pollution and Air Quality. These data have expanded rapidly since 2013 to provide real-time information on and monitoring of national, provincial, and municipal levels of particulate matter, sulfur dioxide, nitrous oxides, carbon monoxide, and ozone.

Sources of information on air pollution and air quality in China include:

- The China National Environmental Monitoring Center's Real-time National Air Quality,[15]

- The Ministry of Ecology and Environment's annual *Report on the State of the Ecology and Environment in China*,[16] and

- The National Bureau of Statistics of China's *China Statistical Yearbook*.[17]

Water Quality. Data on water quality are notoriously difficult to capture, and "multiple ministries have overlapping responsibilities in a system that is not conducive to effective groundwater monitoring and management. Insufficient coordination between provincial and national departments that monitor water quality creates discrepancies in data."[18] The former Ministry of Environmental Protection published weekly, monthly, and annual reports on the quality of surface water, but information on the quality of drinking water is not available to the public.[19] The government's "Black and Smelly Waters" reporting program allows individuals to report local water pollution.[20]

Sources of information on water quality in China include:

- The Ministry of Ecology and Environment's annual *Report on the State of the Ecology and Environment in China*,[21] and

- The National Bureau of Statistics of China's *China Statistical Yearbook*.[22]

Climate. Data on climate are reported largely by the China Meteorological Administration (CMA) and centers within the CMA. As China's national weather service, the CMA makes near-term weather forecasts and collects land publishing data on surface, upper air, meteorological, and satellite observations. The CMA opened this information to the public for free in 2015.[23] The CMA, along with the Ministry of Science and Technology and other government agencies, have published national climate assessment reports in 2007, 2011, and 2015. The integrity of those reports has not been called into question, but outside academics have commented on data gaps that limit effective policymaking.[24]

The primary hub of climate research within the CMA is the National Climate Center. In August 2020, the Climate Center published its *Blue Book on Climate Change*, which analyzes a number of climate-related trends both globally and specific to China.[25] Although China's National Climate Change Program used to publish information on greenhouse gas emissions trends,[26] there is no official annual reporting on greenhouse gas.[27] In the past, China has also underreported its coal consumption in its *Energy Statistical Yearbook*, which consequently underreports carbon dioxide emissions.[28]

The lack of any official and consistent data reporting is important in the context of China's commitment, pursuant to the Paris Climate Agreement, that its emissions would peak by 2030. Inaccuracies, data gaps, and uncertainties in reporting on emissions make it difficult to enforce any accountability.

Energy. In the past, data on energy in China have lacked reliability because of frequent, unexplained, and significant revisions.[29] The National Bureau of Statistics' *China Statistical Yearbook* includes data on mineral reserves, energy production and consumption by sector, total imports and exports, and energy intensity by GDP. The International Energy Agency notes that the National Bureau of Statistics' "revisions showed significant changes both on the supply and demand side for a number of energy products, resulting in breaks in time series between 1999 and 2000. Most importantly, the previously significant statistical difference for coal was allocated to industrial consumption based on

findings from a national economic census."[30] The recently formed Ministry of Natural Resources also reports data on land use and marine and mineral resources.

Sources of information on energy in China include:

- The National Bureau of Statistics of China's *China Statistical Yearbook*,[31]

- The Ministry of Natural Resources Natural Resources Bulletins[32]

- The China Electricity Council,[33] and

- The National Nuclear Safety Administration's *Annual Report*.[34]

Private Efforts

Citizen, NGO, and outside government sources of data and information on energy and environmental issues in China have been critical to exposing significant discrepancies between government data and actual conditions. Pressure from the bottom up and outside in has sometimes catalyzed reform and improved government transparency. Two examples show how this has worked.

- **Pressure from the bottom up.** In 2006, after years of reporting on environmental problems, Ma Jun founded the Institute for Public and Environmental Affairs (IPE) to collect and compile usable "environmental quality, emissions and pollution source supervision records published by the local governments of 31 provinces and 337 cities, as well as information mandatorily or voluntarily disclosed by enterprises based on relevant legislation and corporate social responsibility requirements."[35] IPE data and maps are now available as resources for individuals and foreign companies looking to do business in China.[36]

- **Pressure from the outside in.** In 2008, the U.S. embassy in Beijing installed air quality monitors on site to track particulate matter (PM2.5) and better inform U.S. citizens about pollution levels.[37] Embassy data, which repeatedly differed from Chinese government air quality

notifications that downplayed levels of pollution, were made widely available through social media. International exposure and public outcry forced the Chinese government to begin to build out its air quality monitoring, reporting, and regulatory network in 2013.

Independent data from external sources has also shed light on Chinese investment and patterns in global energy markets. For example, the Mercator Institute for China Studies, which maintains a database of spending on Belt and Road Initiative (BRI) projects, estimates that "about two thirds of Chinese spending on completed BRI projects went into the energy sector, and already amounts to more than 50 billion USD."[38]

Given the lack of scope and resources, it is extremely difficult for independent data to capture a full picture of energy and environment realities in China. For example, Yale, Columbia University, the Chinese Academy for Environmental Planning, and the City University of Hong Kong attempted to develop an environmental assessment of each of China's provinces but "concluded that data gaps, a lack of transparency, and inconsistencies in China's baseline official data were too prevalent to allow for the construction of a consistent and comparable provincial China Environmental Performance Index (EPI)."[39]

Nevertheless, independent efforts to generate and organize data have proved to be and will continue to be critical to achieving more accurate and transparent access to information in China. The following are a few examples of these open-source resources.

- **Yale Center for Environmental Law and Policy: Environmental Performance Index.** Compiled by the Yale Center for Environmental Law and Policy and the Center for International Earth Science Information Network of Columbia University's Earth Institute since 2006 with data going back to 1994, the Environmental Performance Index (EPI) uses "32 performance indicators across 11 issue categories [to rank] 180 countries on environmental health and ecosystem vitality."[40] The EPI uses a variety of government and independent sources of data, including NASA satellite data.[41]

- **Boston University, Global Development Policy Center: China's Global Energy Finance Database.** The China's Global Energy Finance (CGEF) database[42] is an interactive data project by Boston University's Global Development Policy Center (GDPC) that analyzes financing for global energy projects by China's two global policy banks: the China Development Bank (CDB) and the Export–Import Bank of China. The project notes that these two policy banks have provided $251 billion in energy finance since 2000, including $3.2 billion in 2019. The interactive map published on the website organizes Chinese spending by region; energy source type (coal, gas, hydropower, etc.); energy subsector (power generation, extraction, transmission, etc.); and lender (CDB, EX–IM Bank, and jointly financed projects). It also offers individual datasets for each year from 2000 to 2019. The data are collected from the "official websites at the [Chinese] banks themselves or host country ministries, news reports, and official documents" that are later "verified through interview contacts in China and other host countries, when possible. Every record includes the year, location, energy source, subsector, lender, and project description."[43]

- **Boston University, Global Development Policy Center: China's Global Power Database.** Boston University's GDPC also publishes the China's Global Power Database,[44] an interactive data project that tracks all of the power plants financed by the China Development Bank and the Export–Import Bank of China worldwide as well as other forms of Chinese foreign direct investment, including mergers and acquisitions, debt finance, and greenfield investments. As of the end of 2018, the database was tracking "upwards of 777 Chinese-financed power plants overseas," which were generating a total of 186.5 gigawatts of power-generation capacity. The database displays deal types, the Chinese investor, percentage of ownership, capacity of the project, type of technology, operating status, and estimated C02 emissions.

- **Harvard–China Project on Energy, Economy and Environment.** Founded in 1993, the Harvard–China Project "conducts rigorous, peer-reviewed studies with partner institutions in China of the global challenges of climate change, air quality, energy systems, and economic development."[45] It conducts and compiles field observations, emissions inventories, atmospheric modeling of China, and evaluation of China's greenhouse gas and pollution-control policies.

- **Global Energy Monitor.** Global Energy Monitor gathers data on fossil fuel use with the intent to inform climate and environmental decisions.[46] It maintains global trackers on coal plants, fossil infrastructure, coal mines, steel production plants, and public financing for coal projects. In many cases, these trackers include information on all operating, planned, cancelled, and closed facilities. Data come from a variety of government and independent sources.[47]

- *Our World in Data.* A joint project of the Global Change Data Lab and the Oxford Martin Programme on Global Development, *Our World in Data* includes extensive global and country-level trend data on energy and environmental topics. It also publishes China-specific articles and data in "China: Energy Country Profile" and "China: CO2 Country Profile."[48] Data come from a variety of government and independent sources.[49]

- **BP: *Statistical Review of World Energy.*** BP publishes annual reports covering energy production, consumption, and emissions by country, region, and sector with data going back to 1965. It uses publically available government and independent data.[50]

- **Climate Watch.** Climate Watch provides country-specific time-series data on greenhouse gas emissions and climate targets.[51]

- **Climate Action Tracker.** "A collaboration of two organisations, Climate Analytics and New Climate Institute," Climate Action Tracker "tracks government climate action and measures it against the globally agreed Paris Agreement aim of 'holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C.'"[52]

- **Henry L. Stimson Center: Mekong Dam Monitor.**
China's network of dams and reservoirs along
the Mekong River impacts water resources,
environmental stewardship, and agreements
with downstream countries Thailand, Laos,
Cambodia, and Vietnam. The Stimson Center
uses independent "remote sensing, satellite
imagery, and GIS analysis to provide near-real
time reporting and data downloads across
numerous previously unreported indicators in
the Mekong Basin."[53]

International Organization Efforts

Although the focus of this report is on pri-
vately generated transparency, it is important
to note the resources provided by international
organizations as they help to fill some of the gaps
in the overall data.

- **International Energy Agency.** The IEA com-
piles data and trends on global, regional, and
country-level energy supply, consumption,
and emissions. It uses data from the National
Bureau of Statistics of China, secondary sources,
and estimates to fill in gaps in data going back
to 1971.[54] The IEA also has tracked inconsisten-
cies in energy data provided by the National
Bureau of Statistics.[55]

- **International Atomic Energy Agency.** The IAEA is
the international governing body for nuclear
safeguards and nonproliferation under the aus-
pices of the United Nations. It houses a number
of nuclear power databases and issues reports
on nuclear reactors; uranium resources, produc-
tion, and demand; and nuclear waste. Among
these are the Power Reactor Information System
database;[56] *Uranium 2020: Resources, Production
and Demand* (the "Red Book"), prepared jointly
by the IAEA and the Organisation for Economic
Co-operation and Development's Nuclear
Energy Agency and published by the OECD;[57]
and *Status and Trends in Spent Fuel and Radioac-
tive Waste Management*.[58]

- **World Health Organization.** The World Health
Organization has a household energy database
that provides survey data on how people cook,
light, and heat their homes.[59] It also aggregates

data for ambient air quality standards and
national air quality data, with China's data
supplied by Beijing's National Environmental
Monitoring Center.[60]

Grade and Reasoning

In this section are scores assessing the trans-
parency of the Chinese government and overall
transparency as a result of private efforts. Each
score is rated on a 10-point scale. The methodology
for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 4 out of 10

The Chinese government's transparency on
energy and environment varies depending on
the type of data. Whereas it is very transparent
when it comes to air quality data, there is nearly
zero transparency on water and land manage-
ment and China's climate data. What little is
provided is often not verifiable or is disputed by
external efforts. Energy production data tend to
be more available because they are produced
by state owned enterprises that are listed and
floated on local Chinese, and sometimes global,
stock exchanges.

Overall Transparency: 6 out of 10

Private efforts have greatly improved transpar-
ency on energy and environment. These efforts
have been instrumental in filling gaps in data
on energy production, climate, and water and
land management. To note, private efforts have
not made as much of an impact on air quality
as the Chinese government has been reporting
indicators for air quality for more than a decade.
These indicators provided by the Chinese
government match the indicators provided by
non-government efforts.

Trends from the Data

In a matter of several decades, China has
become a major global energy consumer and
producer. Independent estimates and official Chi-
nese policy adopted in five-year plans for energy,
environment, and climate project that Chinese
demand will only continue to grow with conse-
quent implications for international energy fuel
and technology markets as well as international
environmental agreements.

Energy trends present a robust but varied picture across China.

- China's total energy consumption has more than tripled since 2000, and China is now the world's largest energy consumer.[61] However, China's energy consumption per capita is far below the OECD average.[62]

- China is the world's largest producer of electricity.[63] Electricity consumption per capita has quintupled since 2000, putting China in the top third of nations and just below Europe's per capita average. However, electricity consumption is drastically stratified across rural and urban provinces.[64]

- More than 80 percent of China's total energy comes from fossil fuels. China is the world's second largest consumer of oil after the U.S. and imports more oil than any other country.[65] It is also the third largest consumer and second largest importer of natural gas. China is the largest consumer of coal, and its coal production is the largest in the world, accounting for approximately 47 percent of the world's coal. At the same time, China is also the world's largest producer and consumer of renewable energy.[66]

- Air quality remains a persistent problem despite more concerted efforts by the central government to establish standards. Vice Minister of Ecology and Environment Zhao Yingmin recently noted "grim environmental trends" in advance of the 14th five-year plan on environment for 2021–2025.[67] Approximately 40 percent (about 560 million) of China's people do not have access to clean cooking fuels, putting China well above levels for OECD countries.[68]

- China emits more carbon dioxide than any other country—nearly double the amount emitted by the second-place U.S.[69]

These trends are a barometer of China's economic health. While it is unclear whether the relationship between increased access to energy and economic growth is correlated or causally related, it is clear that the two go hand in hand.[70] As the Chinese people have experienced increased access to fuel, power, and heat, both standards of living and economic growth have improved dramatically. Consequently, Philippe Benoit and Kevin Tu of Columbia University's Center on Global Energy Policy have argued that China is "the world's only hybrid superpower" displaying trends akin to both developing and developed nations.[71]

China's energy and environmental trends also have international implications. As a major energy consumer (and, increasingly, producer and exporter), China will continue to shape international markets. Several examples illustrate the point.

- China generates more solar energy than any other country, and mass Chinese production of solar panels and components has helped to reduce prices drastically over the past decade. Low component prices have triggered trade wars between the U.S. and China under the administrations of Presidents Barack Obama and Donald Trump that appear not to be resolved under President Joseph Biden.[72] There is also the link between China's production of solar panels and its use of forced labor to make those panels.[73] The appalling and exposed abuse of China's Uyghur population could have implications for Chinese solar exports.

- China continues to be the largest consumer and producer of coal, and its consumption is growing. According to Boston University data trackers, Chinese government finance and direct investment have provided $52 billion for coal projects and have supported more than 74 megawatts of new coal power plants globally.[74]

- Nuclear energy provides 5 percent of China's electricity, up from 2 percent a decade ago, and 17 reactors are under construction with another 38 planned.[75] China is a growing player in the nuclear energy trade and has aspirations to build as many as 30 reactors overseas in the next decade as part of its Belt and Road Initiative, particularly in developing countries.[76] This will influence both international markets and nonproliferation norms.

China is outgrowing its label as a developing nation even as some problems more characteristic of developing countries persist. As noted by Benoit and Tu, this tension is particularly at play in international climate and finance bodies such as the World Bank and the U.N. Framework Convention on Climate Change. China enjoys the favorable terms and flexibility granted to developing countries but is also the world's greatest source of greenhouse gas emissions and wields the financial wherewithal of the world's wealthiest economies.

Accordingly, energy and environment trends should inject necessary realism into aspirational international agreements. China has committed to achieving maximum CO2 emissions around 2030 and to being CO2 neutral by 2060 as part of the Paris Climate Agreement. Its most recent five-year plan and underlying implementing legislation, as well as its energy investments, appear to maintain China's status quo of robust economic and energy growth.[77] In 2020, China completed around 30 gigawatts of coal capacity, commissioned 38 gigawatts of new coal power plants (triple the global total), and proposed plans for another 73 gigawatts.[78] As it has over the past several decades, China will continue to grow as it looks both to its domestic energy needs and to international energy markets.

Opportunities for Further Research

China has improved its disclosure of environmental data over the past decade, both in terms of environmental issues covered and in terms of data published. Outside pressure as well as third-party reporting have increased data reporting and availability. However, there are plenty of opportunities to fill gaps in data and to pursue further research.

The first is increased third-party participation. A 2020 article in the *Journal of Environmental Management* found that increased third-party monitoring improved the data on air quality in China.[79] The authors concluded that the evidence "supports China's efforts to advance its environmental governance from a mono-centric and non-participatory policy process to one that integrates both authoritarian control and

market-based mechanisms."[80] To the extent possible, more third-party monitoring should extend to the other environmental indicators mentioned in this chapter. This is particularly true where the quality of data is poor, as it is with respect to data on indoor air quality, drinking water, surface water, and soil toxicity.[81]

Another opportunity for improvement is better and more consistent information at the local level. For example, Yale's Data-Driven Solutions Group found that

> [T]he [Ministry of Environmental Protection's] annual *State of Environment Report* demonstrates the need for improving data quality. The report summarizes key water quality statistics, showing that data from different ministries are often untimely, presented in inaccessible formats (e.g. low resolution images that cannot be downloaded from the web in tabular format), and without information on original data sources or methodologies.[82]

A similar lack of standardization and coordination between local provinces and national agencies exists in the reporting of other environmental data as well, whether it be with respect to fisheries, forests, or other biodiversity metrics.[83] Improved data collection at the provincial level and more uniformity in reporting that makes the data accessible and verifiable would do much to improve both accountability for and transparency of environmental data in China.

Another potential avenue for research would be more investigative in nature. China has hidden industrial projects and environmental data under the guise of "state secrets." Like many other public policy issues, there is no clear understanding of how China formulates environmental policy. Consequently, researchers should investigate how environmental laws, regulations, and strategies are formulated. A better understanding of this would shed light on the progress or lack thereof in environmental data reporting and environmental progress.

Human Rights

Defining Human Rights

The Chinese Communist Party (CCP) has a consistent record of ignoring its duty as a government to protect and preserve the rights of Chinese citizens. This chapter highlights the situations in Xinjiang, Tibet, and Hong Kong, as well as threats to internationally recognized freedoms in general.

In short, these are rights that exist independently of government. They are not granted by governments and therefore cannot be taken away by governments—even if governments fail to respect them. These rights are inherent in each person as a human being and therefore merit protection and preservation.

Data on human rights in China are difficult if not impossible to acquire because the CCP does much to conceal critical information on human rights trends. Because of the restrictions unique to collecting information on human rights in China, this chapter relies on various forms of data collection, including firsthand accounts from survivors as documented by the media, to supplement efforts by government and civil society to promote transparency with regard to human rights.

Why Transparency on China's Human Rights Is Important

As Andrew Nathan and Andrew Scobell argue in their book *China's Search for Security*, China's foreign policy is motivated largely by vulnerability to threats.[1] China's vulnerabilities include both internal and external threats. The CCP places a particular premium on maintaining its own internal stability and ensuring its sovereignty. The CCP sees regions like Taiwan, Tibet, and Xinjiang as internal threats. It also views the Chinese people themselves as a threat.[2] The CCP has responded to these perceived threats by severely restricting the Chinese people's fundamental freedoms including freedom of speech, press freedom, religious freedom, freedom of association, and other core human rights.

While successive U.S. Administrations have often viewed issues of human rights in China as peripheral, the CCP sees their suppression as central both to the country's survival and to its own. At best, the U.S. government's decision to sideline or deprioritize human rights concerns in broader strategies toward China has led to inconsistencies in U.S. policy; at worst, it has hamstrung U.S. strategy toward China.

There is, therefore, an abiding need to promote transparency with respect to the CCP's efforts to curtail human rights. Civil society—including nonprofits, nongovernmental organizations, legal aid organizations, academics, and others—have sought to pull back the veil on the CCP's efforts to

undermine freedom and human rights in China, but much work has yet to be done.

Official Data from China

The CCP lacks transparency in many areas, but few aspects of its policies are more shrouded in secrecy than those related to human rights. However, while Chinese government data on these issues are often hard to track down, many researchers have found ways to shed light on these trends.

The CCP is often very open about new laws or regulations that it puts into place. In 2018, the CCP instituted new regulations on religious affairs.[3] Although it does not acknowledge that they restrict a person's ability to practice his or her faith, the regulations do violate international standards of religious freedom. Regulations like these provide insight into the CCP's policies and often inadvertently reveal information about human rights conditions inside China. Therefore, they can be useful in gaining an understanding of the broader landscape.

The government of China publishes other ostensibly unrelated data that, for example, outline security expenditures or job postings in the security sector that speak to an increased level of securitization in the Xinjiang region. Researchers like Adrian Zenz use this information to draw inferences about broader trends in the government's policies and rights abuses. Thus, while the CCP may not be especially transparent about the data it releases or the trends that it observes, creative researchers can use data on other subjects to get a clearer understanding of the bigger picture with respect to the CCP's violations of human rights.

Mining CCP data is a double-edged sword. Once the data are published or become the subject of comment by outside researchers, the CCP will often take down the information, removing it from websites or other venues where it had been publicly available. These tactics are not unique to the human rights field. Many Chinese-language researchers find that once they write something based on publicly available CCP data, the data disappear. This is an unfortunate consequence of writing about sensitive issues, but it should not discourage researchers from investigating

this information to gain insight into conditions inside China.

Private Efforts

There is a great deal of data-driven research and reporting on violations of human rights in China. In recent years, civil society has devoted significant attention to pulling back the veil on the CCP's human rights abuses. Reports have drawn on Chinese government data, ingeniously reverse-engineered technology used in the violation of rights, and collected firsthand testimony; their work has shed a much-needed light on the severity of the situation.

The following is a representative sample of the cutting-edge, data-driven projects that are contributing to these efforts.

Xinjiang

- **Xinjiang Victims Database.**[4] The Xinjiang Victims Database is a crowdfunded database of testimonies from victims of the mass incarcerations of ethnic minority citizens in China's Xinjiang Uyghur Autonomous Region. The database documents primary evidence and includes various tools with which to analyze the data.

- **International Consortium of Investigative Journalists.**[5] The ICIJ's many important stories on Xinjiang include its reporting on the China Cables, a Chinese government document characterized as a manual for running the internment camps. The China Cables "represents the first leak of a classified Chinese government document revealing the inner workings of the camps, the severity of conditions behind the fences, and the dehumanizing instructions regulating inmates' mundane daily routines." These briefings "are the first leak of classified government documents on the mass-surveillance and predictive policing effort."[6]

- ***The New York Times*: The Karakax List.**[7] *The New York Times* acquired 400 pages of leaked Chinese documents known as the Karakax List, which detailed speeches given by Chinese leaders, including Xi Jinping, justifying mass internment. It also revealed resistance within

the CCP to carrying out the mass crackdown on the Uyghurs. In particular, the Karakax List provided additional insight into justifications given for the Uyghurs' internment. It is one of the more detailed leaks from China; the documents were provided to *The New York Times* by an anonymous CCP official.

- **Radio Free Asia: Uyghur Service.**[8] Radio Free Asia's Uyghur Service has been among the more reliable and consistent sources of detailed firsthand accounts of life in Xinjiang. Its regular reporting is critical and is augmented by longer-term, more systematic reporting, including a February 2021 report, *Trapped in the System: Experiences of Uyghur Detention in Post-2015 Xinjiang,* based on firsthand testimony from eight individuals with "recent, direct experience in detention facilities" in Xinjiang.[9] RFA has also kept track of mosques destroyed in Xinjiang.[10] Its regular reporting has been critical to gathering firsthand information and insights into life on the ground in Xinjiang.

- **BuzzFeed.** The Open Technology Fund, Pulitzer Center, and Eye Beam Center for the Future of Journalism funded a four-part BuzzFeed series that estimated the total number of camp facilities,[11] collected firsthand accounts of conditions inside the camps,[12] modeled conditions inside a specific camp,[13] and revealed the existence of forced labor facilities within the camps.[14] The project analyzed thousands of satellite images to evaluate the size and scope of the camps, providing indispensable proof of their existence that is corroborated by firsthand testimony from camp survivors.

- **Human Rights Watch: "Algorithms of Repression."**[15] Human Rights Watch (HRW) acquired the code for the Integrated Joint Operations Program, an application used by Chinese authorities to engage in mass surveillance activities in Xinjiang, and reverse-engineered the application to gain insight into the indicators that were used to justify internment. This report provides unprecedented insight into the surveillance system that enabled the government to round up and intern the Uyghurs at such a rapid pace.

- **Reports by Adrian Zenz.** Adrian Zenz, Senior Fellow for China Studies at the Victims of Communism Memorial Foundation, has produced a suite of studies on the crisis in Xinjiang. Zenz sourced CCP documents and analyzed patterns to explain how the security apparatus that was piloted in Tibet was later repurposed in Xinjiang to carry out mass collectivization of Uyghurs.[16] He also uncovered the CCP's stated goals of sterilizing (by force and en masse) Uyghur women of child-bearing age[17] and studied the forced labor-transfer schemes to which Uyghurs have been subjected in Xinjiang and throughout the region.[18] Among the methods he uses in his reporting are analyzing and evaluating Chinese documents, analyzing Uyghur testimony, and applying rigorous academic methodology to discern trends in the region.

- **Uyghur Human Rights Project: The Qaraqash Document.** The Uyghur Human Rights Project's report on the Qaraqash Document confirmed local involvement in the repression of Uyghurs and exposed specific official justifications for their internment. Among the justifications used: "visiting abroad," "applied for a passport," "applied for a passport and didn't leave the country," "overseas communication," "prayed regularly," "religious knowledge comes from grandfather," and "had a beard."[19]

Tibet

- **Jamestown Foundation: "Xinjiang's System of Militarized Vocational Training Comes to Tibet."**[20] This report documents the CCP's mass mobilization and training of approximately 543,000 "rural surplus laborers" in Tibet. The vocational training program is similar in many ways to labor-transfer schemes rolled out in Xinjiang. The labor-transfer scheme in Tibet seeks to reeducate rural laborers to transform the members of a minority group that the CCP deems problematic. The program transfers laborers both out of and within the Tibetan region. The report draws on Chinese data and satellite imagery in reaching its conclusions.

- **Jamestown Foundation: "Xinjiang's Rapidly Evolving Security State."**[21] This report analyzes public service postings to map the rapid expansion of Xinjiang's security state apparatus: "the recruitment of nearly 90,000 new police officers and a 356 percent increase in the public security budget." The report also draws parallels between the security state's growth in Tibet and in Xinjiang under the leadership of CCP Party Secretary Chen Quanguo. Specifically, it highlights the creation of so-called convenience police stations (police stations that are as common as a convenience store) in both regions. The report draws on publicly available job postings (recruitments) for police to demonstrate the rapid expansion of the security state.

- **Tibetan Centre for Human Rights and Democracy: Tibetan Political Prisoner Database.**[22] Maintained by the Tibetan Centre for Human Rights and Democracy, the Tibetan Political Prisoner Database documents more than 5,000 current or former political prisoners in Tibet. The purpose of the database is to document human rights violations perpetrated by the Chinese government in the Tibetan region. The database provides updated information on their detention status and notes whether they are religious political prisoners or imprisoned for some other reason.

Hong Kong

- **Hong Kong Watch: Protest Prosecution Database.**[23] Hong Kong Watch's Protest Prosecution Database keeps track of all persons prosecuted, arrested, or in detention for their involvement in protests. As of February 4, 2021, more than 10,000 individuals had been arrested and more than 2,300 faced charges for their involvement in protests in Hong Kong. The database links to open-source news articles to track the rate of increase in imprisonments and prosecutions from year to year.

Religious Freedom

- **Freedom House: *The Battle for China's Spirit*.**[24] Published in 2017, this report was written against the backdrop of Xi Jinping's increasing

persecution of persons of faith. It details how the CCP's attempts to Sinicize (secularize) religion led to upticks in repression. In addition to providing a broad overview of religious persecution in China, it attempts to measure the persecution of various groups relative to one another in four categories: "low," "moderate," "high," and "very high." The report finds that at least 100 million Chinese are religious and facing high or very high levels of persecution.

- **Open Doors USA: World Watch List: China.**[25] Every year, Open Doors USA's World Watch List measures the persecution of Christians in countries worldwide. The list evaluates two different kinds of persecution: various forms of pressure that Christians face and violence perpetrated against Christians. It uses a questionnaire consisting of 84 questions, filled out by Opens Doors staff in conjunction with people on the ground in each country, to evaluate different types of persecution. China ranks 17th on the most recent index, exhibiting "very high" levels of persecution and especially high restrictions on church life.

Miscellaneous

- **College of William and Mary, Global Research Institute: AidData.**[26] Self-described as a "research lab" housed at the College of William and Mary's Global Research Institute in Williamsburg, Virginia, AidData has published numerous reports examining and evaluating the impacts of Chinese investment on developing democracies,[27] including individual reports on countries in Africa[28] and South and Central Asia.[29]

- **Freedom House: "Freedom on the Net: China."**[30] Freedom House conducts a comprehensive review of freedom on the Internet, evaluating scores in three categories: obstacles to access, limits on content, and violations of user rights. The methodology involves 21 questions with 100 subquestions to determine the extent of a country's Internet freedom.[31] In the most recent report, which covers developments from June 1, 2019–May 31, 2020, based on a scale of 0–100, China receives a score of 10/100 and is

rated "Not Free." According to the report, China has been "the world's worst abuser of internet freedom" for six consecutive years.

- **Freedom House: "Freedom in the World: China."**[32] Freedom House's annual "Freedom in the World" report evaluates the state of freedom—specifically, political rights and civil liberties—in 195 countries and 15 territories worldwide. Countries are ranked numerically on a scale of 0–100, with a possible total of 40 points for political rights and a possible total of 60 for civil liberties. The report evaluates rights as defined under the Universal Declaration of Human Rights.[33] In the most recent report, which covers developments in 2019, China receives a score of 10/100 (–1/40 for political rights and 11/60 for civil liberties) and is rated "Not Free." The report evaluates Hong Kong and Tibet separately from China and rates Hong Kong "Partly Free"[34] and Tibet "Not Free."[35]

- **ChinaFile: State of Surveillance.**[36] According to its web site, ChinaFile's State of Surveillance database documents and analyzes "some 76,000 government procurement notices and corresponding documents related to the purchases of surveillance technology by both central and local governments in China between 2004 and mid-May 2020—the most comprehensive accounting of China's surveillance build-up to date."

- **ProPublica: Inside the Firewall.**[37] ProPublica's web site reflects that "[e]very day since Nov. 17, 2014, ProPublica has been testing whether the homepages of international news organizations are accessible to browsers inside China. Of the 18 in our test, 14 are currently blocked."

Government-Supported Efforts

U.S. government–produced reports demonstrate the premium that the U.S. places on understanding the CCP's human rights practices. Many of the reports listed below are annual, comprehensive reports documenting violations of human rights that the CCP is perpetrating against its own people. These efforts supplement (and often draw on) rather than replace the invaluable research produced by private sources.

- **Congressional–Executive Commission on China: Annual Report.**[38] The Congressional–Executive Commission on China, created by the U.S. Congress, produces an annual report that covers violations of human rights in China. The report includes region-specific sections on the rule of law in Taiwan, Xinjiang, and Tibet and examines functional issues as religious freedom, human trafficking, population control, and ethnic concerns. The commission also maintains a database of political prisoners in China.

- **Congressional–Executive Commission on China: Political Prisoner Database.**[39] The Congressional–Executive Commission on China's Political Prisoner Database includes a chronological list of nearly 10,000 individuals believed to be detained currently or have been detained previously on political or religious grounds. The database lends insight into the total number of people currently detained in China (a little more than 1,500) and is also useful for tracking the release of political prisoners and those that perished while in custody.

- **U.S. Department of State, Bureau of Democracy, Human Rights, and Labor:** *Country Reports on Human Rights: China (includes Hong Kong, Macau, and Tibet).*[40] The U.S. Department of State's annual report on human rights conditions across the globe includes a section on China that also covers Hong Kong, Macau, and Tibet. The report has been issued annually since 1999 and covers "internationally recognized individual, civil, political, and worker rights, as set forth in the Universal Declaration of Human Rights and other international agreements."[41] Among other subjects, the report covers threats to the rule of law, freedom of expression and association, academic freedom, Internet freedom, political prisoners, and arbitrary detention. While the report cannot cover all threats to human rights, it is a relatively comprehensive survey of conditions in China.

- **U.S. Department of State, Office of International Religious Freedom:** *Report on International Religious Freedom: China (Includes Tibet, Xinjiang, Hong Kong, and Macau).*[42] The U.S. Department of

State's annual *Report on International Religious Freedom* documents conditions of religious freedom worldwide. The report is issued pursuant to the International Religious Freedom Act of 1998[43] and covers religious demography, the legal framework for respecting religious freedom, government practices, societal respect for religious freedom, and U.S. government responses to threats to religious freedom in a country. Certain countries that regularly fail to respect religious freedom are designated "Countries of Particular Concern,"[44] The report on China also includes conditions in Tibet, Xinjiang, Hong Kong, and Macau. It is a useful resource for documenting year-to-year changes in conditions affecting freedom of religion and is considered to be among the most comprehensive reports on religious freedom.

- **Hong Kong Policy Act Report.**[45] Every year, consistent with the 1992 Policy Act, the State Department produces a report assessing the conditions in Hong Kong, along with certification as to whether Hong Kong warrants treatment under U.S law in the same manner it was treated prior to the 1997 handover.

- **U.S. Department of State, Office to Monitor and Combat Trafficking in Persons: *Trafficking in Persons Report: China*.**[46] The U.S. Department of State's *Trafficking in Persons Report* is issued pursuant to the Victims of Trafficking and Violence Protection Act of 2000[47] and monitors trafficking in all its various forms in countries worldwide. The report measures compliance with internationally recognized standards for combatting trafficking in persons and ranks countries according to their compliance from best to worst in four tiers: Tier 1, Tier 2, Tier 2 Watch List, and Tier 3. China has been ranked on Tier 3 almost every year since the inaugural report in 2000.

- **U.S. Commission on International Religious Freedom: *Annual Report: China*.**[48] The U.S. Commission on International Religious Freedom's annual report identifies topline trends in threats to religious freedom and issues policy recommendations on how to respond. The nonpartisan, independent federal commission

monitors international religious freedom conditions globally.[49] Its annual report on China has recommended that China be designated a "Country of Particular Concern" in the *Report on International Religious Freedom* every year since its inception in 1998. The commission's annual report is distinguished from the State Department's *Report on International Religious Freedom* by being focused primarily on making policy recommendations rather than on documenting violations of religious freedom.

- **U.S. Commission on International Religious Freedom: Freedom of Religion or Belief Victims List.**[50] The U.S. Commission on International Religious Freedom maintains a database on religious prisoners of conscience, categorizing them as detained, disappeared, under house arrest, imprisoned, forced to renounce their faith, or "Other." Of the 1,008 individuals included in the database, a significant number are from China. In addition to the database, members of the commission are able to adopt Religious Prisoners of Conscience to advocate on their behalf; four of the 17 currently adopted religious prisoners of conscience are from China.[51]

Grade and Reasoning

In this section are scores assessing the transparency of the Chinese government and overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 1 out of 10

The Chinese government is not transparent when it comes to human rights. To be clear, there is data reported by the Chinese government. The issue is that the data provided have been widely criticized as inaccurate and categorized as propaganda. Data that deviate from the Chinese government's narrative are either quickly removed or not readily available.

Overall Transparency: 5 out of 10

Private efforts have significantly improved transparency on human rights, given the complete lack of transparency from the Chinese

government. Private efforts have been instrumental in uncovering the Chinese government's actions in Xinjiang. Transparency on Tibet has also improved, although not as much as on Xinjiang. This is not to say that more should not be done for transparency on both Xinjiang and Tibet. Private efforts have also been instrumental in improving transparency on rule of law, freedom of speech, and religious freedom.

Trends from the Data

Much time and energy has been devoted to peeling back the layers on the CCP's human rights violations. The CCP has done much to conceal critical information about its violations of human rights, but scholars, civil society, and the U.S. government have done much to close the knowledge gap on these important issues. A few key trends are worth noting.

- Creative forms of information gathering have augmented human rights research. Many cutting-edge techniques have been pioneered as a consequence of the significant attention devoted to understanding the crisis in Xinjiang. The use of satellite imagery analysis, mining of Chinese government-produced data, and ample use of firsthand and victim-centered accounts can and should inform future research in the human rights field. This is true for research on China in other areas as well.

- The landscape of reports on human rights issues in China is vast. A common complaint in the human rights field is that it is not data driven. However, it is clear that many groups in the China space are undertaking reports with complex methodologies and data-driven research that may contribute to data collection and reporting methods in fields beyond human rights.

- When the CCP carries out human rights abuses against one group (the Uyghurs), it is only a matter of time before it uses the same or similar techniques against another (the Tibetans). This places the onus on researchers and organizations to produce timely reports. Forward-looking research projects, as well as those that document the CCP's historical human rights record, are integral to gaining a better understanding of human rights challenges. Researchers should do more to identify potentially vulnerable groups in China, like the Hui Muslims, and closely monitor emerging threats.

Opportunities for Further Research

The methodologies applied to these reports were incredibly varied. Many of the reports mined and used Chinese data to demonstrate the CCP's stated goals of violating or undermining human rights; others drew on first-person testimony to elucidate individualized persecution; still others used open-source news to draw conclusions about the Chinese government's nefarious intentions. Some of these reports, like the Human Rights Watch report on the Integrated Joint Operations Program, provided new insight into the Chinese government's repressive use of surveillance technology by reverse-engineering the application itself, while others applied quantitative methods to evaluate the impacts of aid on individual governments' decision-making.

This report can serve not only as a resource for identifying information and reports that lend insight into the CCP's intentions and actions, but also to inspire future research projects that fill in the gaps in current research. While all of the issues covered above merit additional research, a few subjects seem ripe for future cultivation.

In conducting research for this report, we found significantly fewer data-driven resources on the situation in Tibet and Hong Kong, especially as compared to Xinjiang. Some of this may have to do with the fact that some of the events and rights abuses are new and emerging (as in Hong Kong); in other places (like Tibet), it may be more difficult to access information, or there may be less political will to conduct research on these subjects. Nevertheless, they merit further investigation.

In an episode of *China Uncovered*, a Heritage Foundation podcast within the China Transparency Project, researcher Adrian Zenz suggested that additional deep research is needed to gain a better understanding of the forms of forced labor carried out by the CCP.[52] His own work has focused on Xinjiang and Tibet, and while there may be a need for more research in both of these regions,

more information on the CCP's historical use of reeducation-through-labor methods is also needed.

Although this report does not directly cover the activities of civil society in China or the freedom of civil society to operate in China, we believe that additional work should be done to improve our understanding of the extent to which an underground or above-ground civil society has space to operate in China. Heritage Senior Policy Analyst Olivia Enos recently published a report on limitations experienced by civil society in response to the COVID-19 pandemic.[53] Further research should be done to understand the extent to which civil society and grassroots organizations have changed over time in China.

This chapter has more reports on Xinjiang than any other issue. The research and attention directed toward Xinjiang may therefore serve as a model for the creativity and ingenuity that can be applied to investigate a human rights issue—especially when there is the political will to do so.

This report should also help to dispel the misconception that efforts to address human rights concerns in China are not data-driven. One of the many concerns raised by policymakers is the lack of information to inform decision-making; this is true on a range of issues, but it comes up repeatedly in human rights advocacy. On the vast majority of issues covered in this report, it is simply not true that these issues are covered with less academic rigor. Human rights concerns may be considered "soft" issues, less conducive to quantitative analysis per se, but the fact that they are covered every bit as comprehensively through rigorous research is evidenced by the long list of reports already in existence.

Finally, future research should do a better job of unpacking some of the motivations for China's violations of human rights. A more thorough understanding of why the CCP does what it does will deepen the application of research in the policy context, particularly for policymakers focused on safeguarding U.S. national security and advancing U.S. interests. This may require additional analysis of the CCP's historical and contemporary justifications for its abuses. An understanding of these motivations will almost certainly help policymakers to craft effective remedies for the harm that they cause.

Influence Operations

Defining Influence Operations

Influence operations are government operations aimed at changing foreign popular perceptions in order to enhance a country's global influence. A range of soft power tools are used in influence operations, from benign civilian exchange and cultural programs to military psychological operations (psy ops). Likewise, the content of influence operations can, depending on the government in question, range from "white propaganda" (the origin of which is truthfully disclosed) to "black propaganda" (the origin of which is hidden or disguised).

The Rand Corporation defines influence operations as:

> The coordinated, integrated, and synchronized application of national diplomatic, informational, economic, and other capabilities in peacetime, crisis, conflict and postconflict to foster attitudes, behaviors, or decisions by foreign target audiences that further...interests and objectives.[1]

Influence operations have been used by modern states for centuries in some form and are widespread tools of foreign policy and military strategy. In their broadest application, influence operations represent a whole-of-government approach focused on specific targets. However, influence operations can also be seen as a more general strategy to deal with future crises and generally enhance a country's global standing.

This chapter will examine influence operations in the context of China's global ambitions. The German Marshall Fund, which houses the Alliance for Securing Democracy initiative that develops strategies to "deter, defend against, and raise the costs on autocratic efforts to undermine and interfere in democratic institutions," describes the tools of China's influence operations as, "[i]nformation manipulation, cyber operations, malign finance, civil society subversion, and economic coercion.[2]

Why Transparency on China's Influence Operations Is Important

Influence operations are key to China's efforts to control and manage its image globally, extend its regional reach, dominate the narrative vis-à-vis Hong Kong's democracy, persecution of Uyghurs in Xinjiang, and Taiwan's de facto independence, and ultimately compete for global leadership with the United States.

Until fairly recently, the Chinese Communist Party's (CCP's) efforts to influence global public opinion were heavy-handed and crude,

straight-out propaganda, such as forced confessions by prisoners of war during the Korean War, haranguing by Chinese diplomats, and belligerent threats toward Taiwan. However, as China's global ambitions grew and the desire to export the Chinese model to developing countries grew as well, greater sophistication was necessary. In 2003, taking a page from the U.S. government's playbook on public diplomacy, the CCP promulgated its white paper "China's Peaceful Development Road." Ironically, Beijing adopted this strategy after the U.S. government abolished the U.S. Information Agency in 1999 as a relic of the Cold War.

The Chinese concept of ideological competition was explicated in *Foreign Affairs* in 2005 by Chinese strategist Zheng Bijian.[3] While one would question the sincerity of the initial premise, the strategy is clear, a gauntlet thrown down to the United States and its Western allies: "China does not seek hegemony or predominance in world affairs. It advocates a new international political and economic order, one that can be achieved through incremental reforms and democratization of international relations."[4]

The Chinese government's Central Propaganda Department (CPD) and the CCP's United Front Work Department are the two controlling agencies for a sprawling governmental system, encompassing state and party.[5] Their purpose is to engineer domestic and international public opinion, favorable to the People's Republic of China (PRC). Under President and CCP General Secretary Xi Jinping, the work of these agencies has taken on new importance.[6] As a Freedom House report states, "the Chinese party–state, particularly under the leadership of Xi Jinping, is engaged in a massive campaign to influence media and news consumers around the world."[7] The report points out that many aspects of these efforts are "covert, coercive, and potentially corrupt."

Among the important tools that the PRC has developed over recent years are the Confucius Institutes—billed as harmless cultural-learning centers—which are a part of a different bureaucratic chain than the CPD, through which China seeks to insert its agenda into high schools and colleges worldwide. According to then-Secretary of State Hillary Clinton in testimony to the Senate Foreign Relations Committee, China has greatly outcompeted the United States. "On the Confucius Centers, the Chinese government provides each center with $1 million to launch, plus they cover operating expenses that exceed $200,000 per year. We don't have that kind of money in the budget."[8] With the Confucius Institutes, China has found a model that works in free and open societies.[9] Conversely, the United States was not allowed to open a single similar operation at a school or university in China.

Another significant Chinese investment is in global media. The China Global Television Network (CGTN) has offices and studios around the world. Until 2017, its staff was able to operate freely in the United States, whereas tight control has always been in place over the far more limited numbers of foreign reporters in China. Chinese restrictions have always been especially tight for staff from the U.S. Agency for Global Media, which oversees the U.S. government's international broadcast networks. This asymmetry lasted until the Trump Administration, when the State Department requested that Chinese "reporters" working for China's state-run media be classified as foreign agents under the Foreign Agents Registration Act of 1938.[10]

The Internet early on became a powerful tool for the CCP for control of information and global propaganda. China has a massive cyber army and controls its own information space behind the so-called Great Fire Wall of China. Every new information tool from radio to the Internet has been successfully integrated by the CCP into that model, in a whole-of-government system of capabilities.[11]

The Coronavirus Pandemic

The effectiveness of China's influence operations were on full display with the outbreak of the coronavirus pandemic in January 2020. China immediately ramped up an aggressive propaganda campaign to pin the blame for the coronavirus pandemic on the United States. Less than three months after the first cases of COVID-19 in China, the Chinese government began censoring social media that employed keywords such as "unknown Wuhan pneumonia." It punished users for "spreading rumors" and fomenting "social unrest."

The propaganda campaign began accelerating in earnest on January 20, 2020, when it no longer was possible for China to conceal the coronavirus outbreak. The communist regime's highly coordinated influence operation was threefold:

- Directing Chinese diplomats across the world to tout the nation's accomplishments through hundreds of interviews and articles.

- Accusing the United States of creating the new coronavirus and spreading it in Wuhan, the capital of Hubei province.

- Charging President Donald Trump with racism for referring to the coronavirus as "the Chinese virus."

In tweets, China's ambassador to South Africa, Lin Songtian, repeated the Foreign Ministry's official line that a visit by 300 U.S. military athletes to Wuhan caused the coronavirus outbreak.[12] Lin's line was touted by Chinese media and diplomats the world over. The Chinese government itself had identified a new, unknown illness spreading in Wuhan. Physicians and scientists, such as Dr. Li Wenliang, tried to warn of the new pathogen they thought had emerged from a Wuhan seafood market.[13] Government censors punished and silenced Li and others. Li later died from COVID-19.

Meanwhile, the Cyberspace Administration of China ensured that the country's social media platforms started to censor any references to the new coronavirus as well as critiques of the government's handling of the spreading epidemic. According to a report by Citizen Lab, a cyber-research group associated with the University of Toronto, Chinese social media platforms, such as YY and WeChat, began to censor content as early as December 2019.[14] Social media companies are subject to strict laws requiring them to censor content that "undermines social stability" or is critical of the central government. So YY added 45 key phrases to an internal blacklist, including "Wuhan unknown pneumonia" and "Wuhan seafood market" on December 31, a day after eight people, including Li, raised the alarm about the virus in a WeChat group.

Official Data from China

Chinese government and CCP's influence operations are not easily quantified through official Chinese data. Evaluation is made even more complicated by the sprawling structure of agencies and offices within the Chinese government and the CCP that contribute to the CCP's massive well-funded propaganda campaign. As Lowy Institute Senior Fellow and journalist Richard McGregor observes in his book *The Party*, "the big party departments controlling personnel and the media keep a purposely low public profile."[15]

However, there are some relevant publicly accessible data, often available only in Chinese, such as registrations of organizations within government and party agencies. For example, the State Council's Ministry of Civil Affairs maintains a database of officially registered social organizations, including those registered under the United Front Work Department. The regime employs formal processes to mobilize its agencies for major operations, necessarily generating information on their efforts.

China's state-owned enterprises (SOEs) sometimes publish information that reveals, at the very least, the party's use of the financial sector in influence operations. China's top petroleum conglomerate, China Petrochemical Corporation, also called the Sinopec Group, published an annual report in 2019 that noted the SOE "promoted the implementation of *Guidance Opinion of Enhancing the United Front work,* summarized and popularized the measure of United Front workshop."[16]

Chinese state media and party directives provide a glimpse into objectives and leadership structures of the various agencies involved in influence operations. The CCP sometimes publishes documents that serve as guidance for carrying out United Front work, as was the case on September 15, 2020 when the party issued a directive for expanding the United Front role in supervising the private sector.[17] With that said, the role of the CCP in activities such as targeting political actors to build political influence is often covert and is usually denied when asked directly.[18]

Also, Chinese media operating in the United States have to disclose their ownership and finances through the Foreign Agent Registration Act (FARA), so at least some financial figures are

available from official Chinese channels. This applies to the CCP-owned China Daily Distribution Corp., which has been registered with FARA since 1983, which provides financial data on it operations and the nature of some of the operations.[19] Thus according to a filing of May 17, 2017, the China Daily Corp. spent $4,585,000 on advertising in *The Wall Street Journal* and *The Washington Post* during a six-month period. These "country" supplements are an important revenue source for the newspapers and although they are marked as separate, they look similar to regular sections of the newspapers. Over 30 independent, mainstream newspapers in the United States have been paid to run "China Watch" articles, written by *China Daily* staff.

In February 2019, the Chinese media giant CGTN also registered (under protest) as a foreign agent under FARA, as mandated by the Trump Administration in September of 2018.[20]

Private Efforts

While official data provide a very limited and incomplete picture of the scope and scale of Chinese influence operations, private efforts have helped to unveil these operations by exploiting some of the various data sources listed above and using technological tools. Translation applications and social media analytic platforms have made it easier to spot and analyze the data. The following is a sample, and by no mean exhaustive, list of cutting-edge private efforts helping to fill out the picture of Chinese influence operations.

- **Alliance for Securing Democracy: Hamilton 2.0 Dashboard.** The Hamilton 2.0 Dashboard, published by the German Marshall Fund of the United States' (GMFUS's) Alliance for Securing Democracy,[21] provides a summary analysis of the narratives and topics promoted by Russian, Chinese, and Iranian government officials and state-funded media on Twitter, YouTube, state-sponsored news websites, and via official diplomatic statements at the United Nations. The aim of the dashboard and search tool is to increase understanding of the focus and spread of state-backed government messaging across various information mediums. The Alliance for Securing Democracy and Institute for Strategic

Dialogue's *Reply All*: report utilizes the Hamilton 2.0 Dashboard to conduct a case study of a pro-CCP Twitter network targeting Chinese and English-language audiences online.[22]

- **Alliance for Securing Democracy: Authoritarian Interference Tracker.** The GMFUS Alliance for Securing Democracy's Authoritarian Interference Tracker[23] catalogues the Russian and Chinese governments' activities to undermine democracy in more than 40 transatlantic countries since 2000 using five tools: information manipulation, cyber operations, malign finance, civil society subversion, and economic coercion. The Tracker shines a light on the tactics and trends that define the Russian and Chinese governments' interference efforts, and highlights the interconnectivity between different parts of the asymmetric toolkit.

- **AidData: China's Public Diplomacy.** AidData's China Public Diplomacy is an interactive map[24] that displays quantifiable data on China's public diplomacy from two of AidData's reports: "Ties That Bind" and "Influencing the Narrative."[25] This includes metrics for five types of public diplomacy—financial, cultural, elite-to-elite, exchange, and informational diplomacy. AidData is a research lab at William & Mary, a university in the United States.

- **MapInfluenCE.** Mapping Chinese Influence in Central Europe (MapInfluenCE)[26] focuses on China's influence in Central Europe—the Czech Republic, Poland, Hungary, and Slovakia, and intersections with influence of other, authoritarian international actors. Analysis includes media, social network, and parliamentary issues.[27] The project, known initially as ChinfluenCE (2017 to 2020), has used various tools, such as media analysis, to uncover who shapes the China discourse in the Visegrád countries, and how, mapping of agenda-setters to reveal links between pro-China businesses and local political elites, analysis of changes in political parties' positions on China at the Czech and Hungarian parliaments since 1990. Through a variety of outputs (media articles, interviews, research reports, open-door as well

as closed-door events, and briefings of stake-holders), MapInfluenCE broadens and shapes expert as well as public debates on China's influence and activities in Central Europe.

- **The Citizen Lab.** The Citizen Lab is an interdisciplinary laboratory based at the Munk School of Global Affairs and Public Policy at the University of Toronto,[28] focusing on research, development, and high-level strategic policy and legal engagement at the intersection of information and communication technologies, human rights, and global security. The Citizen Lab uses a "mixed methods" approach to research combining practices from political science, law, computer science, and specific area studies. Its research includes investigating digital espionage against civil society; documenting Internet filtering and other technologies and practices that impact freedom of expression online; analyzing privacy, security, and information controls of popular applications; and examining transparency and accountability mechanisms relevant to the relationship between corporations and state agencies regarding personal data and other surveillance activities. The Citizen Lab produced a highly detailed and revealing analysis of the COVID-19 timeline, based on the rhetoric and censorship of the Chinese regional and central government on social media during the initial outbreak of the Coronavirus.[29]

- **Freedom House.** Freedom House is an independent research institution dedicated to the expansion of freedom and democracy around the world.[30] Its annual report *Transnational Repression* tracks authoritarian reach across borders to silence dissent.[31] Freedom House's *Beijing Global Megaphone* report examines the expansion of the CCP's media influence since 2017.[32] The *China Media Bulletin* is a monthly newsletter from Freedom House that provides insight on censorship, media freedom, and Internet freedom issues related to China, using English and Chinese-language sources.[33]

- **Hoover Institution: China's Global Sharp Power.** China's Global Sharp Power project from the Hoover Institution at Stanford University[34]

tracks, documents, and evaluates China's sharp power activities at sub-national, national, and transnational levels. As the project states, sharp power "burrows deeply and deceptively into the soft tissues of democracies, seeking to subvert and sway them though methods" that are covert, coercive, or corrupting. The project's research team has released two major reports that look into various mechanisms of China's influence operations in the U.S.: "Global Engagement" and "China's Influence & American Interests."[35] The Hoover Institution and Stanford Internet Observatory have also conducted case studies on the CCP's campaign to shape global narratives on Hong Kong, the 2020 Taiwan presidential elections, and the COVID-19 pandemic.[36]

- **International Republican Institute (IRI).** The IRI is a nonpartisan, nongovernmental institute.[37] As an international democracy-development organization, IRI works with organizations and individuals across the globe to help citizens build democratic societies that are open, responsible, accountable, and resilient. IRI's report "A World Safe for the Party" contains 13 case studies of the CCP's influence tactics.[38] In a joint report with Graphika and Institute for the Future's Digital Forensics Lab, IRI has also traced Chinese disinformation in Taiwan.[39]

Grade and Reasoning

In this section, you will find scores assessing the transparency from the Chinese government and overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 3 out of 10

There are severe gaps in the data provided by the Chinese government with regards to influence operations. On one hand, there is some transparency provided by official data on health and economic diplomacy, and united front work (within Chinese language sources). On the other hand, there is no transparency on digital and cyber operations that involve information manipulation or spreading disinformation.

Trends from the Data

It was once predicted that the Internet would be a force for democracy and would promote challenges to authoritarian rule. However, as seen in the human rights context, technology has in some ways enabled and amplified China's influence operations. While there is certainly a more liberalized access to media, the medium has also provided a range of toolkits for the CCP to carry its message abroad.

The increased use of Western social media platforms by Chinese officials and pro-Chinese propaganda networks is a case in point. According to an analysis by the Alliance for Security, "Twitter accounts connected to Chinese embassies, consulates, and ambassadors have increased by more than 250 percent" since the end of March 2019. These platforms have spread China's narrative on the origins of COVID-19, its policies in Xinjiang, and the Hong Kong protests. Also, Graphika's "Spamouflage Breakout" report points out that a pro-Chinese propaganda network, dubbed "Spamouflage" by Graphika, has found increasing success by using realistic "bot" accounts that have, in turn, been amplified by Chinese diplomats.[40] The report does note that there is no evidence that these diplomats intentionally promoted these bot accounts.

Although new tools are available, the foundational concepts that guide these operations hardly differ from those of the CCP. While the United Front Work Department is certainly larger and holds more responsibilities than several decades ago, the purpose it serves for the CCP fundamentally remains the same.

While the drumbeat of China's propaganda machine has certainly become louder, the effectiveness of these narratives in shaping global perceptions seems to be mixed. Prior to the pandemic, MapInfluenCE conducted a media analysis of the media outputs published from 2010 to 2017 by the four Visegrad countries: the Czech Republic, Slovakia, Hungary, and Poland.[41] This study yielded interesting results on the image of China within these countries, ranging from mostly negative to highly positive. The CCP's mishandling of the COVID-19 pandemic and "wolf warrior" diplomacy have undoubtably had an impact on global perceptions of China, but as pointed out, Graphika's "Splamouflage" report shows a limited but growing ability to engage real users, not just fake accounts.[42]

On the other hand, there are specific areas where China's influence operations seem to no longer achieve the same results. When it comes to global perceptions of the CCP's Xinjiang policy, the landscape looks much different than just a few years ago. In 2020, 16 fewer countries around the world defended China than in 2019.[43] There is increasing action by nongovernmental organizations in countering China's media influence.[44]

The Internet is not static. It will continue to evolve as new platforms emerge. There will certainly be more tools and voices, whether real or manufactured, to "tell China's story well."[45] The question is, who will believe it?

Opportunities for Further Research

The CCP's influence operations have received tremendous attention recently from the general public, media, and national governments. However, the available open-source research has only scratched the surface.

One specific opportunity is Beijing's use of influence operation mechanisms to support its technology objectives. As pointed out in the book *China's Quest for Foreign Technology*, there is still insufficient understanding of the United Front system's role in technology transfer and talent recruitment programs.[46] While there is some publicly available literature on this role thanks to organizations such as Georgetown CSET, which have conducted analysis on professional organizations and technology transfer to China, more can be done.[47]

There also needs be more open-source research on agencies and mechanisms that are not under the United Front Work Department, or within the United Front system, but do play a role in

expanding China's influence. The Project 2049 Institute's 2013 report on the People's Liberation Army (PLA)'s General Political Department (renamed the Political Work Department of the Central Military Commission) detailed the political warfare component of the PLA.[48] These sorts of mechanisms do not exactly fall within the United Front system, but do play an instrumental role in shaping global perceptions.

While it is expected that most of the available literature is focused on the CCP's influence operations in Western and developed nations, there needs to be greater study of operations in underdeveloped and developing nations. A prevalent issue that these nations face is limited access to international media outlets. As such, there is a rising dominance of Chinese state-media in, for instance, Kenya and other African countries.[49] Analyzing influence operations in these regions is incredibly

important in the context of multilateral organizations, as these nations may have membership and voting rights. Their votes can make the difference for countries, such as Taiwan, in gaining representation in these organizations.

More broadly speaking, there needs to be more attention evaluation of the actual effectiveness of the CCP's influence operations. It is one thing to become a target of influence, it is another thing to become influenced. Much of the discourse has focused on what the CCP is doing and identifying the targets of those operations, as it rightfully should. This has raised the alarm on the issue, so now closer attention can be paid to the actual effectiveness. This will not be an easy task, but public opinion surveys, such as those conducted by the Lowy Institute, help to paint a clearer picture.[50] Simply labeling everything as being influenced by China gives the CCP more credit than it is due.

Military

Defining Military

The realm of national security—including military affairs, intelligence activities, and internal security operations—is typically one of the most opaque, even in open democratic societies. In an authoritarian system like that of the People's Republic of China (PRC), access to information is bound to be even more restricted.

At the same time, the U.S. defense and intelligence communities (collectively referred to here as the national security community) are arguably the most long-standing and yet often least noticed consumers of Chinese open-source literature. The widespread misimpression is that the national security community relies primarily or even solely on classified information. In reality, the national security community has often been not only the biggest consumer, but also one of the larger generators of open-source literature.

For many decades of the Cold War, the Central Intelligence Agency maintained and supported the Foreign Broadcast Information Service (FBIS). FBIS was a vital resource for both government analysts and academics. It had access to hard-to-obtain journals and articles, providing translations of a variety of recent papers, books, newspaper and magazine articles, and radio and television broadcasts from countries around the world. Moreover,

it had a substantial linguistic capacity, translating dozens of these articles and broadcasts five days a week. It was commonly cited by university professors, think tank analysts, and contractors as well as analysts across a range of government agencies.

With the end of the Cold War, however, this effort was curtailed. FBIS became the Open Source Center (OSC), which spent much more time analyzing than translating foreign articles and broadcasts. Access to OSC, later renamed the Open Source Enterprise (OSE), became steadily more restricted; where once many university libraries and think tanks could get subscriptions to FBIS translations, OSE became harder and harder for nongovernmental organizations and agencies to employ. The latest restrictions indicate that OSE outputs are now available only through classified networks.[1]

The irony is that this reduction in access has occurred precisely when there has been a massive proliferation of Chinese materials and data. In the 1960s, to have an entire year's run of the *People's Liberation Army Daily* (the PLA's official newspaper) was a rarity. Now there is much readier access to a variety of Chinese journals, newspapers, and broadcasts as well as social media and economic data. The opening of China to academics, including students, has meant the ability to explore

provincial and even township newspapers, official reports, and electronic media. Many Chinese newspapers and journals, including *People's Liberation Army Daily*, are available online.

As important, the growth in Chinese-language sources has made it far easier to undertake research using original-language sources rather than relying on translations. All of the various private institutes and research organizations examined in this report employ people who can read Chinese to varying degrees of fluency. As several analysts observed, however, the challenge is linking "tangible" and "intangible" aspects of Chinese strategy and military.

The enormous expansion of Chinese sources has raised new issues on how to define authoritativeness. When current Chinese-language materials were largely limited to *People's Daily*, *People's Liberation Army Daily*, and Radio Beijing, one had to assume that these publications and broadcasts reflected some degree of official approval—while also recognizing the potential for disinformation from these same sources. Because access to Mao Zedong's China was so limited, there simply were few other options.

Beginning with Deng Xiaoping's opening of China to the world, however, a far greater variety of Chinese voices has emerged. How does one assess *Global Times*, for example, which is published by the state-run *People's Daily* but appears to publish extreme opinions and employ incendiary rhetoric that does not appear to mirror official government positions? And how should one assess publications like *Unrestricted Warfare*, a controversial book that emerged in 1999, written by two PLA colonels? Is it a statement of Chinese doctrine, the opinion of two Chinese military officers, disinformation, or revelation?

Why Transparency on China's Military Is Important

Transparency about China's military is important because it provides researchers with a baseline of data for assessing the current state of and ongoing trends in the Chinese military. Understanding the Chinese military requires consideration of both its tangible and its intangible aspects.

In terms of tangible aspects, there is a fair amount of information (usually not from the Chinese themselves) regarding weapons, equipment, and force structure. China's aircraft carrier, the *Liaoning*, has been closely observed since it arrived in China from Ukraine. The annual U.S. Department of Defense (DOD) report on *Military and Security Developments Involving the People's Republic of China* [2] provides numbers of various major Chinese platforms, as do other publications such as the Institute for International Strategic Studies' *The Military Balance*.[3]

What is much more difficult—and what is also the focus of many of the reports, papers, studies, and conferences that these various organizations support—is assessing the intangibles: governance, norms, processes, and interest groups. This is less a matter of assembling databases of quantitative information and more an issue of qualitative assessments of the Chinese national security establishment, its decision-making and management processes, and its own assessments of China's security situation.

Much as the DOD Office of Net Assessment concluded that a proper understanding of the Soviet threat required going beyond the "bean count" of numbers of Soviet nuclear and conventional systems, analysts tasked with examining the Chinese military often try to go beyond the numbers and types of Chinese platforms to understand how those systems might be staffed, trained, and employed.

Official Data from China

China publishes a wide variety of information, including information about its military and security forces, but it does so in an often incomplete fashion, omitting key details and figures. Thus, the People's Liberation Army has published white papers for over two decades that have discussed such issues as the PLA's individual services, "military strategic guidelines" of the "Active Defense," and mobilization.[4] These biannual white papers have been the most authoritative sources of information on PLA doctrine and China's evolving military thinking.

But these same white papers provide little insight into many of the more basic aspects of the world's largest military, including such essentials as the Chinese military budget. At no time was a breakdown of the single aggregate Chinese

defense budget figure ($178 billion in 2019) ever provided to indicate how much might be spent on each service. It has never been clear exactly what activities—for example, military research and development, space infrastructure, or biological research—are included in this figure and, equally important, what activities are not.

Similarly, the work reports issued in conjunction with the National People's Congress and Chinese Communist Party Congresses provide important data and signposts on major Chinese security initiatives. They have provided hints, for example, as to the extent of Chinese internal security spending—but only sporadically. The announcement of the 14th Five Year Plan (governing 2021–2025) noted that China's military was accelerating its efforts to become "fully mechanized and informationized,"[5] but no details were forthcoming on exactly what those terms might mean and what metrics were being employed, much less on how mechanized and informationized the PLA is now.

Open-source information is vital to any understanding of the Chinese national security establishment, Chinese strategic thinking, and therefore likely Chinese national priorities. This is especially true because the intelligence community is often much more focused on "current intelligence": the who, what, where, when, and how of daily developments. There is much less time for more in-depth examinations of issues such as national strategy, the evolution of military doctrine, and other "why" questions.

Consequently, there is much greater reliance on think tanks, federally funded research centers, and academia to flesh out current intelligence and provide the background and context essential to fully understanding it. In some cases, the monitoring provided by nongovernmental organizations and analysts is as close and detailed as might be expected from the government. At the same time, a number of government-supported efforts provide public funding to encourage research by academics and other nongovernment analysts by promoting conferences and publications.

Private Efforts

There is a vast array of nongovernmental sources focused on aspects of China's military and national security establishment, and many are not American. Two of the most notable reference volumes, for example, are produced in Britain and Sweden.

- As noted, the International Institute for Strategic Studies produces the annual *Military Balance*, which provides basic data (numbers of troops, tanks, planes, warships, nuclear weapons, etc.) for every nation, including the PRC. For more than a decade, the China section has included an overview of the past year's national security developments, including assessments of overall Chinese strategy, changes in force structure and organization, and major additions to the PLA's order of battle.

- Similarly, the Stockholm International Peace Research Institute publishes an annual yearbook that covers major military developments around the world. It includes assessments of Chinese and other military expenditures, recent arms control agreements, and arms transfers.[6]

In combination, these two volumes provide a baseline of data regarding the Chinese national security establishment, including generally accepted data on the size of the force and its organization and key weapons platforms, as well as insight into Chinese military sales and expenditures.

However, these tangible elements provide only the skeletal outline of the Chinese national security establishment. To gain a more complete understanding, intangible elements such as doctrine, training, and organization must be incorporated to add muscles and tendons to the skeleton.

Much of the work on intangibles is undertaken by various think tanks, contractors, and federally funded research and development centers. The following organizations and programs are indicative of the range of their activities.

Two of the largest nongovernmental programs that monitor Chinese military and security developments are at the RAND Corporation and the Center for Naval Analysis. Each of these programs involves several dozen analysts. However, because these are federally funded research and development centers, much of their work is for U.S. government

clients, although analysts from both institutions do contribute regularly to academic monographs and conference volumes, making some of their research available to the broader public.

Similarly, a host of government contracting organizations such as Johns Hopkins University's School of Advanced International Studies, Leidos, and Booz Allen Hamilton conduct research that exploits available Chinese-language materials. One of the largest such groups is Defense Group Inc. (DGI), a subsidiary of SOS International LLC. DGI's products are not necessarily available to the public, but the head of DGI, James Mulvenon, has written about and discussed Chinese cyber security threats.[7]

These various efforts typically focus on examining Chinese documents (usually in the original language by analysts who are fluent in Chinese) with a focus on specific topics such as Chinese views on nuclear deterrence, civil–military fusion, or counterspace operations.

In addition, there are larger efforts by nonprofit think tanks whose products are more generally available. The examples provided here are by no means exhaustive or comprehensive; rather, they are intended primarily to provide a sense of their programs and the kind of analysis that is possible.

- Australian Strategic Policy Institute: China Defence Universities Tracker.[8] The Australian Strategic Policy Institute's China Defence Universities Tracker is a database of Chinese institutions engaged in military or security-related science and technology research. The tracker was created by the institute's International Cyber Policy Centre, and its database includes information on 100 civilian Chinese universities; 50 PLA institutions; China's nuclear weapons program; three institutions associated with the Chinese Ministry of State Security (China's foreign intelligence organ); four universities associated with the Ministry of Public Security (China's internal security organ); and 12 state-owned defense industry conglomerates.

- Center for Strategic and International Studies: Asia Maritime Transparency Initiative.[9] The Center for Strategic and International Studies' Asia Maritime Transparency Initiative (AMTI) is an excellent example of the power of new

technologies in creating transparency even where the PRC might try to increase its concealment. The AMTI provides regular updates on Chinese land reclamation efforts as well as broader policy initiatives in the South China Sea. Its reports have documented the expansion of China's artificial islands in the South China Sea, employing a range of data sources that includes observation satellite data, a portfolio of data that was once the preserve of militaries and intelligence agencies.

- National Bureau of Asian Research and Sasakawa USA: Maritime Awareness Project.[10] Launched in 2016 by the National Bureau of Asian Research (NBAR) and the Sasakawa Peace Foundation and maintained by the NBAR, the Maritime Awareness Project features an interactive map that depicts the maritime issues and disputes in the Asia–Pacific region. The project also features a timeline of incidents and an imagery database of various reefs and islands along the South and East China Seas.

- Warsaw Institute: China Monitor.[11] The Warsaw Institute's China Monitor tracks Chinese influence operations in Europe. As one of their analysts noted, the purpose of such operations is not simply to improve China's image, but also to counter and suppress opposing views. This is consistent with Chinese concepts of "information warfare," which spans both political and military activities and organizations. As PLA writings regularly note, "information warfare" is conducted as other military operations are conducted, with including explicit objectives, efforts to concentrate mass and gain surprise, and unity of effort.

- University of California San Diego: Institute on Global Conflict and Cooperation.[12] Headed by Professor Tai Ming Cheung, UC San Diego's Institute on Global Conflict and Cooperation was one of the first recipients of a U.S. government Minerva Research Initiative grant, intended to promote social science research on broadly defined security issues. One major focus of the Minerva grants is Chinese security thinking. Professor Cheung has done extensive work on China's military–industrial complex.

Government-Supported Efforts

Although the focus of this report is on private, nongovernmental analyses of China, in the military realm, it is important to note that a key source of information is the United States government.

Under the National Defense Authorization Act for Fiscal Year 2000,[13] for example, DOD produces an annual report on developments in the Chinese military and security establishment. This is perhaps the most authoritative source on Chinese military capabilities and reflects in filtered form the U.S. intelligence community's assessment of key development trends in the PLA.

Other U.S. government agencies that have issued important reports on Chinese military capabilities include the U.S. Defense Intelligence Agency, the Office of Naval Intelligence, and the National Air and Space Intelligence Center. These reports often provide vital information that is not available from the Chinese, including much more detailed information on the Chinese military's order of battle (what units they have) as well as key equipment developments and observed military exercises and activities.

In addition to these agencies, several centers have been established by the U.S. government to foster greater interaction with the academic and think-tank communities. These organizations host conferences and publish monographs that provide opportunities for various members of the China military–watching community to share their research and findings.

- **U.S. National Defense University: Center for the Study of Chinese Military Affairs.**[14] This center within the Institute for National Strategic Studies at the U.S. National Defense University provides senior DOD officials with analysis on various aspects of China's military and strategic capabilities. It also produces a variety of publicly available reports, which have included recent studies on PLA strategic support and Chinese military diplomacy (for which it also maintains a database that is shared with both academia and other parts of the U.S. government).

- **Air War College: China Aerospace Studies Institute.**[15] The China Aerospace Studies Institute was established in 2015 as an institute within the Air War College that focuses on all of China's flight-related activities. It therefore covers not only the PLA Air Force (PLAAF), but also Chinese army and naval aviation, the PLA Rocket Force, and Chinese space capabilities. It sponsors an annual conference and also publishes a variety of research papers, including papers by outside authors.

- **Naval War College: China Maritime Studies Institute.**[16] Established in 2006 and located within the Naval War College, the China Maritime Studies Institute examines the maritime dimensions of China's military and economy, researching not only the PLA Navy, but also China's approach to shipbuilding, maritime law, and marine technologies. It sponsors an annual conference and publishes studies and papers examining various aspects of China's maritime power.

- **U.S.–China Economic and Security Review Commission.**[17] This commission, established by congressional mandate in October 2000, produces an annual report examining various aspects of the U.S.–China economic and strategic relationship. To support its work, it commissions a variety of longer studies, which are usually incorporated in its annual report. The commission also holds regular hearings and roundtables that delve into aspects of China's security and economic policies, organizations, and processes.

Growing Challenges

While the Chinese publish more and more material, their efforts to limit the ability of outsiders to access that material are also intensifying. This is partly reflected in crackdowns on foreign scholars. The arrest of Japanese professor Nobu Iwatani in 2019, for example, raised concerns about whether other academics might face similar fates.[18] Although he was subsequently released, this does not provide much reassurance. The announcement of new laws governing Hong Kong, under which anyone found advocating independence for Hong Kong may be liable to prosecution even if such advocacy was outside of Hong Kong or China,

has raised additional concerns about potential vulnerability.[19]

The apparently systematic refusal to grant foreign academics access if they are researching sensitive or problematic topics is of even greater concern. In 2004, M. E. Sharpe published *Xinjiang: China's Muslim Borderland*.[20] This anthology discussed various subjects related to Xinjiang and its Uighur population. It has since been determined that by 2011, 13 of the 16 authors had been blacklisted by China and are no longer able to obtain visas to conduct research.[21] The study of the region and its people is now clearly considered to be a matter of national security concern, and foreign analysts are openly discouraged from pursuing such efforts.

At the same time, access to Chinese publications is also becoming more difficult. Bookstores in China where it was once possible to obtain Chinese military publications have imposed tighter restrictions on the ability of foreigners to purchase various materials that would seem to be publicly available. Nor is this solely a matter of accessing physical copies. The Chinese were among the earlier adopters of electronic databases for journals. The China National Knowledge Infrastructure (CNKI) database is one of several that provide subscribers with access to thousands of Chinese journals, including their back issues.

Some discussions among China watchers, however, suggest that access to the CNKI and other databases is increasingly being monitored with sensitive topics, especially those relating to aspects of national security, leading to incomplete search results. If these reports are accurate, it is not clear whether this is the result of a deliberate policy of restricting foreign access or the effect of Chinese data managers not wanting to violate China's own laws regarding access to information. In either case, the effect has been to reduce foreign scholars' access to Chinese materials.

Grade and Reasoning

In this section are scores assessing the transparency of the Chinese government and overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 5 out of 10

While the Chinese government scores low on transparency with regard to its military, the score is notably higher than some of the score in other categories within this report. Military size is slightly better documented by the Chinese government but is still incomplete and without much detail. Details on military armaments outside of images are limited from the public. There is a lack of transparency on PLA activities and arms sales by the Chinese government. PLA activity can be seen, but the official info is often not reported.

Overall Transparency: 7 out of 10

Private efforts have been most impactful in providing transparency on arms sales by the Chinese government and tracking PLA activities and movement. Other areas—such as doctrine, reform efforts, and policies—have also become more transparent because of these efforts.

Trends from the Data

Ongoing open-source research efforts provide some indications of the kinds of information that available Chinese sources can provide.

- **China's Steadily Growing Military and Security Budgets.** While China does not provide breakdowns of its defense spending and there are serious doubts about the accuracy of China's defense spending figures, there is nonetheless a general sense of the scale of this spending based on increases in outlays and especially in comparison with the projections of overall Chinese economic growth. Over the past several years, the announced increases in the Chinese defense budget have begun to outpace the projected growth in the Chinese economy. This would suggest that the past decision to limit defense spending in favor of building the domestic economy is under review if not eclipsed.

- **The PLA's Expanding Area of Operations.** In the 1990s and early 2000s, Chinese writings focused on "near sea" operations by the Chinese navy, and reporting on the PLAAF indicated that it tended to operate mainly over the mainland. Coverage of the PLA Navy and PLAAF

during the past decade, however, indicates that they are steadily moving farther afield. Chinese writings regularly discuss PLA Navy ships deploying to the Indian Ocean and the central Pacific, and a variety of sources mention that PLAAF units circumnavigate Taiwan.

Nevertheless, the declining ability to access Chinese sources, including the restrictions on scholars and academic exchanges more broadly, suggests that it may become more difficult to obtain information on some key areas of Chinese military activity, including their ongoing reorganization. As the Chinese reporting on the PRC's 14th Five Year Plan indicated, the PLA is pushing to become "fully mechanized and fully informationized" by 2027. Chinese reporting will be a major source of information on how well the PLA accomplishes this, but access to information in the coming seven years is likely to become more difficult.

Opportunities for Future Research

Given China's translucent if not opaque nature, there is an enormous range of areas that could benefit from sustained open-source research. With the massive reform of the PLA in 2015, which saw a complete overhaul of the Central Military Commission (CMC), the transformation of seven military regions into five war zones/theaters, and the creation of several new services, each area includes a wealth of topics. For example:

- What are the functions of each of the 13 offices, commissions, and departments that now comprise the new CMC? How do these relate to each other, in terms of seniority and staffing? How are each of these staffed? For example, are they predominantly from the ground forces (now their own service), or are they deliberately made joint?

- What is the structure of the war zones? Do they all follow the same organizational approach, or are they customized to their environment? For example, how does the western war zone, which has no maritime border, compare with the eastern or northern war zone?

- What is the structure of the new services (PLA Ground Forces, PLA Rocket Forces, PLA Strategic Support Force)? How do they recruit and train their forces? How do they relate to the other services (PLA Navy, PLA Air Force) in terms of seniority? How are they represented in the war zone headquarters? For example, are there more senior PLAAF officers in one than there are in another?

Similarly, the steady modernization of the PLA, and especially the ongoing emphasis on "informationization" of the force, raises a host of questions. Specifically:

- How does the PLA train its forces to accommodate all of the new technologies? How successful have these efforts been thus far?

- How well has the PLA developed a cadre of noncommissioned officers (the backbone of Western militaries), and how do they relate to the unit's political officers, who are responsible for, among other things, monitoring the welfare of the enlisted personnel?

- What is the process for acquiring more advanced weapons from the state-owned enterprise system, and what has been the impact of efforts to inculcate "civil–military fusion"? How responsive are elements of China's military–industrial complex to changing requirements as defined by their customers, the PLA?

Outbound Investments

Defining Outbound Investments

The Organization for Economic Co-operation and Development (OECD) defines foreign direct investment (FDI) as a "category of cross-border investment in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise in another economy."[1] Broadly defined, FDI can assume multiple forms, including an entity constructing new factories or power plants, expanding existing businesses, providing loans to overseas subsidiaries, acquiring voting stocks, mergers and acquisitions, and joint ventures.

Horizontal FDI generally refers to funds invested abroad in the same industry: for example, a retail clothing store in China opening a new branch in the U.S. or purchasing a competing clothing store in the U.S. Vertical FDI generally refers to investments up and down the supply chain: for example, a retail clothing store purchasing the garment manufacturer that supplies the clothing that it sells.

Finally, different definitions may include or exclude different classes of FDI. Some definitions, for example, limit FDI to investments that net at least 10 percent of voting power in a firm, distinguishing FDI from short-term portfolio investment in stocks.

This chapter examines the various research initiatives dedicated to tracking Chinese outbound foreign direct investment (OFDI) or FDI originating from China. Many of them are housed at foreign policy think tanks or educational institutes. Many of them are relatively recent creations, a product of the dramatic growth in Chinese OFDI over the past 10 to 15 years.

Why Transparency on China's Outbound Investments Is Important

When the liberal economic reforms launched by leader Deng Xiaoping in the late 1970s began to bear fruit in the early 1990s, China was transformed into an economic juggernaut. Between 1992 and 2012, China's annual GDP growth averaged in the double-digits, never falling below 7.7 percent and reaching as high as 14.2 percent, inaugurating one of the greatest economic expansions in history.

For the first 15 years of this expansion, China was largely a destination for FDI from foreign sources. China also ran massive current account surpluses with the U.S., largely from the increase in trade, allowing it to amass large foreign currency reserves. Chinese OFDI began to rise precipitously in the mid-2000s, not exceeding $5 billion until 2005 and reaching $27 billion in 2007. It nearly

doubled in 2008 to $56 billion as the world reeled from the global financial crisis; nearly doubled again to $108 billion by 2013, the year President Xi Jinping unveiled China's colossal economic connectivity project, the Belt and Road Initiative (BRI); and finally peaked in 2016 at $196 billion before witnessing a sharp decline from 2017–2020.[2]

The economic and geopolitical ramifications of this outflux of Chinese capital have been profound and far-reaching, from the Pacific Islands to Central America, from Africa to South Asia, and from the developing world to advanced economies like the U.S. In the process, China has overtaken the U.S., Japan, and the EU as the leading trade and investment partner for a large and growing number of countries.

For many countries, Chinese OFDI has been transformative in ways that are good, bad, and ugly. First, the good: In several developing economies, Chinese investments in infrastructure, energy, and connectivity projects have improved economic performance, infrastructure, and productivity, enhancing living standards and propelling economic growth. In a number of high-risk developing economies, Chinese lenders and investors have financed projects deemed too economically or physically risky by more traditional Western and international lenders. The developing world has a compelling need for trillions of dollars in infrastructure investments, and in some cases, Chinese sources have been their only options for financing and construction.

The bad: In more than a few cases, Chinese FDI flows have proven a double-edged economic sword, providing economic benefits that are either limited—in some cases to small groups of business elite, leadership networks, or Chinese firms themselves—or outweighed by economic costs. Chinese investments, particularly large-scale infrastructure projects, have frequently and credibly been criticized for failing to meet international financial and technical standards, for lacking transparency, and for contributing to irresponsible debt practices. The Belt and Road Initiative is littered with examples of projects that have been hand-picked by autocratic elites and would not have met international standards widely adopted by more traditional lenders. While there are bright spots, the dark underbelly of the BRI is a trail of non-performing loans, unfulfilled promises, at-risk economies, and white elephant projects.

And the ugly: In a number of cases, Chinese OFDI has brought not just unfavorable economic consequences, but adverse strategic ramifications. Chinese investments, particularly in sensitive infrastructure projects and telecommunications networks, have repeatedly drawn espionage concerns. National security concerns have led numerous capitals worldwide to restrict Chinese telecom giant Huawei from assuming a role in developing their 5G networks.

In some cases, as with Sri Lanka, Chinese firms have been accused of signing secretive deals that later were shown to include sovereignty-violating provisions. Chinese firms have also been accused of illegally funneling funds to pro-Chinese politicians. In addition, the Chinese government has grown increasingly brazen in using economic linkages and leverage as an instrument of its foreign policy, punishing foreign capitals economically when they upset the Chinese Communist Party or object to aspects of Chinese foreign policy.[3]

In most cases, FDI flows between countries, particularly advanced economies and democracies, are treated as purely economic transactions. Only occasionally do FDI flows into sensitive industries and advanced technologies trigger national security considerations and concerns. With China, however, a wider array of economic transactions have assumed geopolitical characteristics and implications. This is the product of two complementary trends.

- In the U.S. and a growing number of like-minded capitals, China is increasingly viewed as a strategic rival or at least a potentially hostile competitor. Investments from geopolitically antagonistic sources naturally tend to attract greater scrutiny.

- China's outbound FDI has attracted unique scrutiny because of the intimate relationship between the public and private sectors in China and China's unique ways of doing business.

Put simply, "Chinese company relationships with the Chinese government aren't like private sector company relationships with governments

in the west."[4] There is an enforced nexus between the private and public sectors and a unique fusion between economics and geopolitics in Chinese foreign policy to an extent not seen in other developed economies.

Many large Chinese firms and even a growing number of joint ventures with foreign firms are required to have Communist Party committees or "cells" embedded in their organizations with a formal role in business decisions.[5] They are required by law to share intelligence, upon request, with the Chinese state. "Chinese domestic laws and administrative guidelines, as well as unspoken regulations and internal party committees, make it quite difficult to distinguish between what is private and what is state-owned," argues analyst Ashley Feng.[6]

According to one analysis done by Datenna, in roughly 40 percent of Chinese acquisitions in Europe from 2010–2020, the Chinese government had either a high level of influence (ultimate controlling shareholder is a part of the Chinese government) or a medium level of influence.[7]

This phenomenon has accelerated since Xi Jinping's rise to power in 2012, which heralded the reversal of a trend toward very gradual economic liberalization under his predecessor. "Since 2012, private, market-driven growth has given way to a resurgence of the role of the state," notes China expert Richard McGregor.[8] Even where the Chinese government does not exert direct control, the "lines have been blurred." China's 2015 National Security Law, 2016 Cybersecurity Law, and 2017 National Intelligence Law effectively require firms to render assistance to the Chinese government when national security—a broadly defined concept in China—is invoked. The National Intelligence Law, for example, "instructs every organization or citizen to support, assist, and cooperate with national intelligence work."[9]

Official Data from China

The Chinese government regularly reports on trade and investment statistics, principally through its National Bureau of Statistics (NBS) and Ministry of Commerce (MOFCOM). However, while these statistics are sometimes corroborated by more reliable sources, China is often accused of manipulating its economic statistics—whether at the federal, regional, or local level—to serve the Communist Party's interests.

OFDI statistics can be more difficult for the Chinese government to manipulate, particularly when the counterparty is an advanced economy, as the figures are generally corroborated by the destination of the investment. However, even when Chinese OFDI statistics are accurate, there are numerous cases of planned foreign investments that for a variety of reasons fail to materialize. And while there is often much publicity around "new" investments, the cancellation or scaling down of proposed investments often goes unreported.

Private Efforts

In recent years, there has been a dramatic proliferation of new research initiatives, particularly in the U.S. but also further abroad, that are devoted to tracking Chinese FDI statistics and analyzing their implications. The growth in the number of Chinese FDI "trackers" is partly a result of the exponential growth in Chinese OFDI flows beginning in the mid-2000s and peaking in 2016.

The prominent attention now being accorded to Chinese OFDI is also a result of the geopolitical character that these investment flows have assumed, particularly since the 2013 announcement of the Belt and Road Initiative and the growing resources and attention that the BRI began to command in the years that followed. The BRI became a legacy project of Chinese President Xi Jinping and was enshrined in the Chinese constitution in 2017. Since then, however, the BRI has faced a growing international backlash.[10] In recent years, it has also suffered from a dramatic decline in new projects that parallels a larger decline in Chinese OFDI flows.

Today, several prestigious think tanks and research institutes host a variety of Chinese OFDI "trackers," each with different emphases and different sets of data and variables that they are tracking. Some are global in scope, tracking Chinese investments wherever they materialize; some look only at certain categories of investments; and some are focused on specific regions. The following are some of the most prominent Chinese OFDI trackers now in use.

- **American Enterprise Institute: China Global Investment Tracker.**[11] Inaugurated in 2005 and initially hosted by The Heritage Foundation, the American Enterprise Institute's China Global Investment Tracker (CGIT) is one of the oldest and most respected "trackers" in the U.S. The CGIT database includes 3,500 economic transactions across energy, transportation, real estate, and other industries. The CGIT is a global tracker that covers only large Chinese-origin transactions of more than $100 million and only investments that involve ownership of real assets, such as the purchase of a company or the construction of a factory. It does not cover, for example, portfolio investments, bond purchases, foreign aid, or trade or investments of less than $100 million.

- **AidData: "Mapping China's Global Investments and Inequality."**[12] AidData is described as a "research lab" housed at the College of William and Mary's Global Research Institute in the U.S. In September 2018, it published a dataset "geolocating" 3,485 Chinese investment projects worth $274 billion and implemented between 2000 and 2014. It does not appear to be an ongoing effort.

- **Mercator Institute for China Studies: Belt and Road Tracker.**[13] The Belt and Road Tracker published by the Berlin-based Mercator Institute for China Studies (MERICS) "provides analyses of BRI-related developments and trends." MERICS bills itself as the "largest European research institute focusing solely on contemporary China studies," and its Belt and Road Tracker includes "a wide range of regional and thematic maps to visualize the initiative's scope and progress—as well as its setbacks." It focuses on BRI-related infrastructure projects, including railroad, pipeline, and port projects, investments in power generation and transmission, and digital infrastructure, but does not track projects still under construction or in the planning phase. MERICS publishes highly detailed, high-resolution maps based on a private database that it maintains with more than 2,500 entries drawn from "a wide set of Chinese and international official sources, industry associations, companies, and media."

- **Council on Foreign Relations: Belt and Road Tracker.**[14] The Belt and Road Tracker published by the Council on Foreign Relations tracks three key economic indicators across 67 countries participating in the BRI. The three indicators are imports from China as a percentage of GDP, FDI from China, and external debt to China. It conveys the information in a shaded interactive map and also offers separate charts for each country included in the study, visualizing trends in the three indicators from 2000–2017. Data on imports from China and Chinese FDI are drawn from the International Monetary Fund databases. Data in the Index of Debt to China is based on data from the IMF and Export–Import Bank of the U.S. as well as "analysis of government announcements and media reports about Chinese development loans to Belt and Road countries." The data take into account FDI, portfolio investments, and development loans and draw from other tracker projects listed in this study, including AidData.

- **Boston University Global Development Policy Center: China's Global Energy Finance Database.**[15] The China's Global Energy Finance (CGEF) database is an interactive data project that analyzes financing for global energy projects by China's two global policy banks: the China Development Bank (CDB) and the Export–Import Bank of China. The project notes that these two policy banks have provided $251 billion in energy finance since 2000, including $3.2 billion in 2019. The interactive map published on the website organizes Chinese spending by region; by energy source type (coal, gas, hydropower, etc.); by energy subsector (power generation, extraction, transmission, etc.); and by lender (CDB, EX–IM Bank, and jointly financed projects). It also offers individual datasets for each year from 2000 to 2019. The data are collected from the "official websites at the [Chinese] banks themselves or host country ministries, news reports, and official documents," and "[t]hese sources are later verified through interview contacts in China and other host countries, when possible. Every record includes the year, location, energy source, subsector, lender, and project description."

- **Boston University Global Development Policy Center: China's Global Power Database.**[16] Boston University's GDPC also publishes the China's Global Power Database, an interactive data project tracking all of the power plants financed by the China Development Bank and the Export–Import Bank of China worldwide as well as other forms of Chinese FDI, including mergers and acquisitions, debt finance, and greenfield investments. As of early 2019, the database had tracked some 777 Chinese-financed power plants across the globe with a total of 186.5 gigawatts of power-generation capacity. The database displays deal types, the Chinese investor, percentage of ownership, capacity of the project, type of technology, operating status, and estimated CO_2 emissions.

- **Center for Strategic and International Studies: "Reconnecting Asia."**[17] The Center for Strategic and International Studies' Reconnecting Asia tracker offers an interactive map with detailed information on 14,000 infrastructure projects across the Eurasian landmass, including inter-modal, railway, road, seaport, pipeline, power plant, and transmission programs. Each listed project is supported with detailed information on project status, total costs, start dates, completion dates, contractors, consultants, funders, and operators. Currently, the website and interactive map are down for maintenance with a new website planned for 2021.

- **Johns Hopkins University School of Advanced International Studies and China–Africa Research Initiative: Chinese Loans to Africa Database.**[18] The SAIS–CARI Chinese Loans to Africa Database tracks Chinese lending to Africa since 2000. The database draws from official government documents, contractor websites, fieldwork, interviews, and media sources. "Between 2000 and 2019," according to the website, "SAIS-CARI estimated Chinese financiers signed 1,141 loan commitments worth US$153 billion with African governments and their state owned enterprises." For each loan, the database offers details on dollar amount, country, sector, purpose, and year.

- **Datenna: China–EU FDI Radar.**[19] The China–EU FDI Radar is an interactive map produced by Datenna, an information services company in the Netherlands that tracks Chinese investments in Europe. The project makes a determination on the level of Chinese state influence in various European investments, grading projects as having high, medium, or low state influence. To make that determination, Datenna uses a "proprietary algorithm which takes into account the entire shareholder structure, shares being pledged, level of state-control of any investors and other relevant factors." A "high-level of state influence" grade means that "the ultimate controlling shareholder is part of the Chinese government." The China–EU Radar also organizes acquisitions by sector and country.

- **Henry L. Stimson Center: Mekong Infrastructure Tracker.**[20] The Washington, DC-based Stimson Center's Mekong Infrastructure Tracker platform is a "resource for researchers to track, monitor, and quantify the development of energy, transportation, and water infrastructure assets and the social, economic, and ecological changes they bring to South East Asia." It focuses on several regional countries, including Myanmar, Vietnam, Cambodia, Laos, and Thailand, and also tracks several projects in the bordering provinces of southeastern China. The tracker is run by the Stimson Center's Southeast Asia Program and supported in part by the U.S. Agency for International Development (USAID). It offers three "Data tools," including a Mekong Infrastructure Tracker Dashboard, Suitability Mapper, and Mekong Project Impact Screener. All of the data are derived from open sources, including government websites, company project profiles, development banks, nongovernmental organizations, media reports, and other research institutions, including several of the other trackers listed in this chapter. Data are updated on a quarterly basis.

- **Lowy Institute: Pacific Aid Map.**[21] The Australia-based Lowy Institute's Pacific Aid Map is an analytical tool designed to examine the

provision of foreign aid among the South Pacific island nations within Micronesia, Polynesia, and Melanesia. It includes data on close to 40,000 projects in 14 countries from 64 donors from 2010 to the present. The data are freely available through the website's interactive map or an Excel spreadsheet. The map offers detailed data on total aid committed to and spent in countries like Kiribati, Samoa, Vanuatu, and the Cook Islands. The data are further categorized by donor; sector; type (grant or loan); and status (complete, in progress, on hold, etc.). The map also offers basic population, demographic, and economic statistics for each country. Currently, the Pacific Aid Map offers comprehensive data from all donors through 2018 and allows the viewer to compare the levels of foreign aid provided by China to the levels provided by the U.S. Australia, Japan, the World Bank, the Asian Development Bank, and other donors.

- **Inter-American Dialogue and Boston University Global Development Policy Center: China–Latin America Finance Database.**[22] The China–Latin America Finance Database tracks loans from China's policy banks, the China Development Bank, and China Export–Import Bank to Latin American and Caribbean governments and state-owned enterprises. Chinese loans are organized by destination; dollar amount; type (energy, infrastructure, mining, other); and year. The website also shows the number of loans accepted by each country from 2005–2019, from one $50 million loan to Peru to 17 loans to Venezuela worth $62.2 billion. The GDPC gathers its data from China policy bank websites, host country ministries, other official documents, and news reports.

- **Rhodium Group and National Committee on U.S.–China Relations: U.S.–China Investment Project.**[23] The U.S.–China Investment Project is "a multiyear research initiative" with the Rhodium Group, a U.S.-based economic research firm, and National Committee on U.S.–China Relations, a nonprofit educational organization, as its lead organizations. It is designed to bring more transparency to China–U.S. capital flows. The

project's database uses proprietary transactions data to track new investments, acquisitions, and venture capital flows using data drawn from press releases, company filings, business registrations, and regulatory records, offering a degree of specificity and granularity. Presented through an interactive map, the data can be organized by industry (agriculture, energy, etc.); type (financial or strategic); investor ownership (private or state); stake (controlling or minority); and entry mode (acquisition or greenfield). An interactive map displays Chinese FDI into the U.S. by year, industry, sector, deal type, and government ownership. It estimates that Chinese investments in the U.S. peaked in 2016 at nearly $60 billion before falling rapidly to $8.8 billion in 2020. The data also display U.S. investments in China by province and Chinese investments in the U.S. by state. In addition, research papers provide qualitative and quantitative analysis of two-way investment flows.

- **Paulson Institute MacroPolo: The China Footprint.**[24] MacroPolo's China Footprint "looks beyond the highly scrutinized bilateral trade relationship and instead draws on the best available sources to paint a composite picture of Chinese consumption and direct investment in the United States." To that end, the project tracks various forms of China–U.S. economic engagement using data drawn from the Rhodium Group's US–China Investment Project, Pitchbook Figures, CB Insights, the National Association of Realtors, the U.S. Department of State's Bureau of Consular Affairs, the U.S. Department of Commerce, and the Institute for International Education. An interactive map offers annual statistics covering the years from 2010–2019 broken down into six categories: FDI; venture capital; home purchases; EB-5 investments (eligible immigrant investors are permitted to become lawful permanent U.S. residents by investing at least $900,000 in the U.S.); education; and travel. The total figure reached a peak in 2016 at $111.5 billion before falling to $75.9 billion in 2019.

Grade and Reasoning

In this section are scores assessing the transparency of the Chinese government and

overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 3 out of 10

There are severe gaps in the data provided by the Chinese government with regards to outbound investments. There is a near complete absence of official data on Chinese loans—specifically, information on the terms on which these loans have been provided. The Chinese government's defense-linked outbound flows are also not transparent. BRI projects and Chinese aid are slightly more transparent.

Overall Transparency: 6 out of 10

Private efforts have been instrumental in providing more transparency on BRI projects, FDI, loans, and aid. FDI gets tracked more closely on the receiving end. Even with private efforts, defense-linked outbound investments are still very non-transparent.

Trends from the Data

The defining contemporary trend in Chinese OFDI is the dramatic increase from 2005–2016, from $12 billion to $196 billion, and the precipitous decline in the years since then, caused in part by stricter capital controls from Beijing and later by a slowing global economy. In 2017, Chinese OFDI fell 19.3 percent from its 2016 peak to $158 billion.[25] It fell to $118 billion in 2018[26] and declined a further 8 percent to $111 billion in 2019.[27]

What explains this massive rise and fall? Inbound FDI into China began to surge in the early 1990s even as OFDI remained stagnant. From the mid-1990s to the mid-2000s, China was accumulating $40 billion–$60 billion per year in inbound FDI while OFDI was averaging well under $10 billion annually. This and a massive current account surplus from trade with the U.S. allowed China to accumulate large currency reserves.

In recent years, this gap has shrunk. By 2019, inbound FDI reached $137 billion, but outbound FDI reached $111 billion, netting China a $26 billion surplus. When this trend is combined with a slowing global economy, caused in part by the COVID-19 pandemic, capital controls, and rising

Chinese debt-to-GDP levels, it is perhaps not surprising that Chinese OFDI has plummeted.

Analysis shows that in the first half of 2020, Chinese OFDI in the U.S. amounted to only $10 billion, the lowest total in nine years, with one investment from Tencent accounting for a third of the total.[28] In the U.S., the fall in Chinese investments is partly a product of heightened investment screening for Chinese projects, tariffs imposed by the Trump Administration, and other impacts from the trade war, but the phenomenon is global.

According to Boston University's China Global Energy Finance Database:

> [I]n 2019, overseas energy financing by China's two policy banks with global operations—the China Development Bank (CDB) and the Export-Import Bank of China (CHEXIM)—was at its lowest level since 2008. In 2019, China's policy banks issued only three loans for energy projects totaling just $3.2 billion, down 71 percent from the $11.08 billion in lending to foreign governments in 2018.[29]

In Africa, China offered $148 billion in loans between 2000 and 2018 with over half, or $80 billion, of the total invested in the transport and power sectors. The SAIS–CARI Chinese Loans to Africa Database shows that total Chinese lending to all African countries peaked in 2016 at $29.4 billion but by 2018 had fallen by roughly 70 percent to $8.9 billion.[30] Similarly, the China–Latin America Finance Database website notes that "Chinese policy bank finance to [Argentina, Brazil, Ecuador, and Venezuela] and other countries in the region has decreased markedly in recent years."

Derek Scissors, creator of AEI's China Global Investment Tracker, argues that in 2020, it became increasingly challenging to find documentation of Chinese entities investing overseas. "COVID-19 either wiped out Chinese investments or Chinese *reporting* of investments."[31] China's numbers used to track at least loosely with independent data sourced from the destinations for Chinese investment. That, he said, is no longer the case. "Whenever things become stressful, Chinese companies say less." Chinese sources are reporting a 5 percent decline in OFDI in 2020, but independent figures suggest the decline is closer to 80

percent. While China is maintaining its position in foreign financial and bond markets, its construction activity and purchase of foreign assets have plunged considerably.

Opportunities for Further Research

There continue to be ample opportunities for additional research in this field beyond the expanding number of existing efforts. Many projects are now evaluating Chinese investments on a regionwide basis, but there is room for more data collection and analysis at a subregional level. The Stimson Mekong Infrastructure Tracker offers a great example and model for such an initiative.

To date, ongoing research efforts have focused largely on the "what" and "where" of Chinese investments. Less attention has been paid to how these investments are affecting the host countries and the regions at large. Specifically, there is a need for greater focus on the impact of Chinese investments on local governance, institutions, and populations. The Center for International Private Enterprise (CIPE), for example, has conducted regional case studies, including in Southeast Asia, that assess the impact of Chinese investment on regional transparency and good governance. This type of effort serves as an important tool both by identifying the benefits and risks of Chinese investments and by empowering officials to develop practical policy solutions in order to mitigate risk.

Politics and Law

Defining Politics and Law

The People's Republic of China (PRC) is governed by the Chinese Communist Party (CCP). Chinese politics therefore includes both the politics of the state (at various levels) and intraparty politics. The politics of the Chinese state, even when only discussing domestic politics, spans a wide range of issues.

National Governance. To understand Chinese politics, one must recognize the dual nature of China's political structure. Because the CCP rules China, it is necessary to determine not only the members of the State Council, which reflects the structure of the PRC government, but also the members of the CCP leadership and its ranks. While the vast majority of government officials are members of the CCP, their ranks in the CCP do not necessarily reflect their positions in the state. Thus, it is necessary to monitor the membership of the CCP Central Committee, especially its Political Bureau (Politburo) and the Politburo Standing Committee.

Provincial and Local Governance. This dual chain extends down through the provinces to cities and even to townships and villages. It is important to identify and track the career development of Chinese provincial governors and the mayors of provincial-equivalent cities such as Beijing, Tianjing, Shanghai, and Chongqing.

Given China's dual governance structure, however, it is also important to identify and track the various party secretaries. Because of the importance of the party committees that set Chinese policy, the position of party secretary is a vital one, at least the equivalent of the corresponding governor, mayor, or ministerial head. But the party secretary is not necessarily officially announced and may hold a relatively lower state position, such as deputy minister, lieutenant governor, or deputy mayor.

Ethnic and Religious Groups. Another aspect of domestic governance below the level of the national government is the issue of ethnic groups and associated politics. More than 50 ethnic groups are officially recognized in China, and while these groups are still only a fraction of the ethnic Han Chinese, they nonetheless represent a factor in Chinese domestic policymaking.[1] It is important to note that, despite Western references to "Han chauvinism," the PRC does not imbue the Han with the overtones the Nazis, for example, attributed to Aryans. Similarly, there clearly are religious issues at work in China that overlap with ethnic issues but are a separate source of concern for the CCP.

Political–Economic Institutions and Policymaking. Furthermore, because of the Chinese "socialist market" system, a significant number of

state-owned enterprises (SOEs) are still a vital part of China's economy, and their leaders are an important component of the CCP. China's banking system is also state-run. The heads of such entities as Sinopec (the China Petroleum and Chemical Corporation) or the China Aerospace Science and Technology Corporation (CASC) manage hundreds of thousands of workers and play a central role in the Chinese economy.[2] These people are also part of the governance structure.

In addition, not all SOEs are at the national level; there are also provincial and even township and village-owned enterprises, all of which have a measure of influence on Chinese politics. Because of the role and importance of SOEs at all levels, national to local, any understanding of Chinese politics must include assessing and monitoring economic decisions, which affect and are affected by other political decisions.

Factional and Guanxi Politics. Chinese politics and the broader Chinese society are built on relationships, not just formal lines of authority. The concept of *guanxi*, which embodies aspects of "faction" and "relationship," includes familial ties, academic background, and shared home town and home province, among other links.

Some relationship networks are sufficiently large and extensive to constitute factions within the Chinese political system. For example, Jiang Zemin was long regarded as head of the "Shanghai faction" perceived as generally supporting sustained economic liberalization. Others are more nebulous; former Politburo member Wang Qishan was viewed as a close associate of Xi Jinping. This overlay of *guanxi* networks affects the flow of information both within and between bureaucracies.

Politics and Civil Society. Because there is no real civil society in China—that is, a sphere beyond the reach of the CCP or the PRC government—political transparency must also consider aspects of what would constitute civil society (including nongovernmental organizations) in other systems. Thus, the Chinese government manages its own versions of various organized religions. Think tanks are usually associated with various government ministries. There are several authorities that manage universities and other academic establishments, including the Ministry of Industry and Information Technology and the Ministry of Education. In

all of these bodies, in addition to the relevant oversight ministries, there are party committees that keep the CCP informed of ongoing activities.

Foreign Policy

Another aspect of Chinese politics is Beijing's dealings with other countries, groups, and international organizations. As with Chinese domestic politics, understanding Chinese foreign policymaking is complicated by the very different structures and approaches that characterize the PRC. Because of the CCP's extensive reach, as well as China's "market socialist" system, the PRC has a much wider array of tools at its disposal for the conduct of foreign policy. Chinese SOEs, for example, can make decisions based in part on broader national objectives and are not as constrained by concerns about returns on investment. The Chinese government can invite foreign students to come to Chinese universities because the state runs the educational system. At the same time, the government can support various educational outreach efforts abroad including Confucius Institutes, which are managed by a body within the Ministry of Education, as well as direct Chinese students abroad.

This means that the range of Chinese foreign politics is as extensive as the range of its domestic politics.

Diplomatic Activities. For a long time, Chinese diplomats were relatively quiescent, but in the past several years, a number have assumed a higher profile, earning the sobriquet "Wolf Warrior diplomats." Not only does the Ministry of Foreign Affairs now more regularly hold press briefings (as does the Ministry of National Defense), but many diplomatic outposts and their staffs regularly engage on social media. The Chinese have also become more active at the United Nations and its subsidiary specialized agencies such as the World Health Organization and the International Telecommunications Union.[3] As important, given the growth in Chinese power, other countries are now seeking Chinese diplomatic participation, and Chinese views are consulted on a range of issues from climate change to North Korea.

Foreign Economic Activities. Since the rise of Deng Xiaoping in the late 1970s, China has complemented its political outreach to other countries

with overseas economic activities. Whether it is attracting foreign investment to the coastal special economic zones or integrating itself into various supply chains, China's trade, investment, and tax policies have played a role in its growing diplomatic strength. China exploits its position as a major importer and exporter in an effort to influence other countries; it views both positions as providing significant leverage.

In the 21st century, China has developed economically to the point that it has established an array of banks and programs that parallel and rival a range of Western entities. These include the Asia Infrastructure Investment Bank, the Chinese Export–Import Bank, and the Belt and Road Initiative as well as the BRICS (Brazil, Russia, India, China, South Africa) grouping and its associated New Development Bank. Chinese SOEs also play a role in expanding China's ties to foreign partners, integrating economic and diplomatic interests. China actively seeks to play a role in the setting of industrial and business standards. While part of these efforts is a matter of trade and economics, there is a political component as well.

Educational Outreach Activities. Another aspect of Chinese external relations has been the exploitation of educational opportunities, both at home and abroad. China has used the Ministry of Education's Confucius Institutes to establish outposts in various educational institutions around the world. Originally intended to promote Chinese language proficiency, these institutes have been able to use the large amounts of cash available to them to gain real and potential leverage over host institutions by becoming a significant part of their budgets. Similarly, China invites foreign students to attend Chinese universities, often at little or no cost. This helps not only to enhance China's image, but also to foster relations with potential future foreign leaders.

Scientific and Technological Cooperation. China also makes full use of its growing scientific and technological base to foster ties with other states. In the realm of space exploration, for example, China has established a regional space organization, the Asia Pacific Space Cooperation Organization, with itself at its head; has exported satellites to a variety of states; and has helped to construct space-related infrastructure in various

countries, ensuring that it retains access to and even control of many of those facilities. Beijing recently announced that it would cooperate with Russia on a joint lunar exploration program. China has also engaged in joint research with European partners in various areas of advanced computing.

China's Evolving Legal Situation

Another consideration in assessing China is the country's evolving legal situation. Because China is an authoritarian state ruled by the CCP, and considering its millennia-long history of rule by law rather than rule of law, it might seem paradoxical that China's legal situation should be a focus for Western analysts.

However, because of foreign investments in China as well as Chinese investments abroad, one cannot ignore China's creation of laws and regulations. In the first place, the legal code affects how the Chinese interface with foreign entities, especially corporations and other businesses. China's legal structure is arguably better developed in the realm of commercial law, precisely because various Chinese and foreign companies interact both in the PRC and abroad. Support for China's pursuit of initial public offerings (IPOs) and listings on global stock markets, as well as its participation in international supply chains, requires some degree of legal infrastructure.

In addition, because China is a rule by law society, it creates legal scaffolding to justify various other politics. Thus, China has passed a range of laws, including the National Security Law, National Espionage Law, and National Cybersecurity Law, to justify accessing a variety of data from both Chinese and foreign corporate entities. The Chinese government does so not by fiat, but by referencing these various laws; an understanding of these laws can therefore provide indications of Chinese interests and thinking.

Finally, China's doctrine on "legal warfare" (*falu zhan*) means that its approach to the law includes a security component that is not fully paralleled elsewhere. This is especially true in the use of legal warfare against external adversaries, which incorporates its approach to international legal bodies such as the International Court of Justice and the Permanent Court of Arbitration, its interpretation of international and domestic law,

and its interactions with international law enforcement bodies such as Interpol. Legal warfare is also applied against domestic enemies, however, and domestic law, law enforcement agencies, courts, regulations, and legal proceedings (such as extradition) are consequently an important part of its domestic policy.

Tools of Governance

Because of the pervasive nature of the CCP, an understanding of Chinese politics requires an understanding of the various tools of governance available to the CCP. This includes the blunt instruments of the security services such as the Ministry of Public Security and Ministry of State Security. It also includes, however, the tools of information management, such as the CCP's Central Propaganda Department as well as the government-run media.

Because of the explosive growth of social media in China and the exclusion of Western social media like Facebook and Twitter, insights into Chinese politics require a better understanding of the Chinese information environment. Consequently, it is important to examine and monitor developments in the Chinese portion of the Internet, which is an environment that is different from the Western or Russian cyber realms. This also makes the head of the Cyberspace Administration of China (CAC) and the associated ministries and entities key parts of the Chinese political landscape.

China has pioneered the establishment of social credit scores to monitor its population. By tying together financial, social, and economic data along with online behavior, Chinese authorities have enormous visibility into people's behavior. Consequently, the Chinese population is made aware that good behavior can open up new opportunities in such areas as jobs or internal migration, while poor behavior will lead to greater constraints such as prohibitions on rail or air travel.

Why Transparency on China's Politics and Law Is Important

In approaching the People's Republic of China, it is essential to understand how the PRC operates at the political level. Given the holistic, comprehensive approach that China takes toward accumulating "comprehensive national power,"

China's political activities overlap with its economic, diplomatic, and military actions. Grasping China's objectives therefore requires understanding the organization of both the Chinese Communist Party and the Chinese state: the relative rankings of individuals in terms of both the state and party hierarchies and their relationship to businesses, the military, and other entities.

Official Data from China

To provide insight into Chinese developments, the PRC's State Council Information Office (SCIO) publishes a variety of white papers. Some of these are produced regularly, such as Chinese defense white papers, which were produced biennially for more than two decades. Others, such as white papers on religious freedom, poverty reduction, and Arctic policy, appear to have been one-off reports. Nonetheless, the various white papers provide the single most authoritative position on Chinese policies on a given subject. The white paper production process requires bureaucratic reconciliation and agreement before publication and therefore provides the consensus view on a subject within the PRC government.

Another source of information is the annual reviews, reports, and statements from various Chinese ministries. The State Oceanic Administration, for example, an administrative agency under the Ministry of Land and Resources, issues an annual report on the state of Chinese maritime activities, including territorial claims, maritime economic activities, and the state of China's maritime environment. The Ministry of Foreign Affairs has long issued annual reviews of China's diplomatic activities.

Coming every five years or so are work reports associated with the "two big [meetings]" (*liangda* 两大), the CCP Party Congress and the full session of the National People's Congress (NPC). These conclaves lay out the expected policy direction for the next five years, set forth at the party congress, and key implementation efforts, set forth at the NPC. Both the national and provincial governments, as well as ministries, also typically provide work reports that review the gains and advances since the previous "two big" meetings. These reports provide important glimpses into both successes and failures, based in part on what is *not* reported or discussed.

Another important source of political insight is the five-year plan. Despite shifts away from the dead hand of centralized economic planning, the PRC continues to produce five-year economic plans for the substantial portion of the economy that remains under state ownership at all levels. As important, the economic five-year plans provides indicators of key priorities and national efforts. The overall five-year plan also sets guidelines and boundaries for subsidiary five-year plans (for example, within each ministry). Both the overall five year plan and ministry-specific five-year plans also feed into other Chinese planning such as medium-term and long-term plans in aspects of science and technology.

Providing additional information are reports, laws, and drafts. Some of these documents are released in conjunction with the annual meetings of the National People's Congress. These set economic targets (usually in line with the five-year plan) as well as key legislation and major decisions on a variety of topics. Apart from the plenum-related documents are other Chinese plans and projects, such as "Made in China 2025" and "China Standards 2035," which further detail Chinese objectives.

Private Efforts

A wide variety of groups are monitoring various aspects of Chinese political developments, exploiting some of the various data sources noted above. The following is only some of them.

- **China Digital Times.**[4] China Digital Times began as a blog tracking China's censorship of its media, but it has become a broader media organization that attempts to break through the censorship to report on developments in the PRC. This includes providing translations of various Chinese websites and electronic discussions, highlighting Chinese censorship directives, and providing translations and analysis of symbols and metaphor used in Chinese discourse.

- *China Leadership Monitor*.[5] Originally housed at the Hoover Institution on War, Revolution, and Peace at Stanford University and now edited by Minxin Pei of Claremont McKenna College, this electronic journal provides in-depth analyses of

leadership developments throughout the Chinese leadership structure, from the provincial and local levels to the national level.

- **Center for Advanced China Research.**[6] The Center for Advanced China Research (CACR) conducts Chinese-language research on China's domestic politics, foreign affairs, and security policy. The CACR publishes an annual report under its Party Watch Initiative that seeks to answer carefully selected questions on trends within the Chinese Communist Party regime.

- **Paulson Institute MacroPolo: The Committee.**[7] This MacroPolo digital project is an interactive database of biographic data on all members of the CCP Central Committee. This allows analysts to identify where various CCP Central Committee members have served and identify periods of overlapping careers—a key part of identifying potential guanxi or relationship networks.

- **NPC Observer.**[8] The NPC Observer is a blog that focuses on the activities of China's national legislative bodies: the National People's Congress and the NPC Standing Committee.

- **Polish Institute of International Affairs.**[9] Based in Warsaw, Poland, the Polish Institute of International Affairs (PISM) publishes research on Chinese political discourse on various issues from Chinese-language sources.

- **University of California San Diego China Data Lab: CCP Elite Portal.**[10] The University of California San Diego's China Data Lab maintains the CCP Elite Portal, which provides users with a visualization of key characteristics of some 1,700 members of the CCP's elite who were active government officials at the time of the 18th (2012) and 19th (2017) CCP Central Committees.

Grade and Reasoning

In this section are scores assessing the transparency of the Chinese government and overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 4 out of 10

The Chinese government scores low on transparency of its politics. Overall party membership is published annually, but there is little information of the makeup besides age. This has gotten worse over time. Government structure is generally well reported except for leaders of the party leading groups, which remain secretive in some cases. The activity of the leadership is reported, except in sensitive policy areas. In recent years, transparency in the publication of government decrees, even in economic policies, has worsened.

Overall Transparency: 5 out of 10

Private efforts, while still beneficial, have not made near enough impact on transparency on China's politics. The issue is that, in most cases, access to the data on political issues is guarded by the CCP. So, when CCP is not providing the public with accurate data it also prevents other entities from reaching the source-data which would than enable those outside China to produce more precise publications. This will remain the case unless Beijing implements new regulations to improve ease of access.

Trends from the Data

From the current uses of open-source research, evidence of some potential trends is emerging.

- **Ongoing Centralization of Power in the Hands of Xi Jinping.** The 19th Party Congress and 2017 meeting of the National People's Congress saw the consolidation of power by XI Jinping. Xi was able to persuade the NPC to remove term limits from the Chinese state constitution, effectively allowing him to remain in power beyond 2022 when he would have been expected to step down as head of the Chinese state. Similarly, China's military leadership now shows Xi's imprint and influence, as most of the top leaders rose to their positions under his administration and therefore presumably with his approval or at least acquiescence.

- **Growing Concern About Urban–Rural Divides.** China's effort to announce the end of extreme poverty, announced in the 2021 session of the National People's Congress, may be tied to the growth of the urban population and concomitant decline in the number of people in what are categorized as rural districts. These shifts in counting rules would suggest that there is higher-level interest in and concern about at least appearing to improve the lot of China's rural population.

- **Increasingly Severe Internal Crackdowns.** Reports from Uyghur dissident groups, human rights lawyers, and other observers both inside and outside of China make clear that Xi has been ever less tolerant of dissent. Given the lack of reporting by the Chinese state-run media, information about Chinese internal disagreements, especially when rooted in religious or ethnic terms, are almost wholly reliant on unofficial efforts to provide transparency. Awareness of the level of repression aimed at the Uyghurs should be credited to such efforts.

Opportunities for Further Research

As the PRC has become stronger, instead of becoming more transparent, Beijing has become more opaque. In many ways, the CCP has never been transparent, obscuring the role of party secretaries and party committees. Similarly, membership in the Chinese leading small groups, in which party and state officials interact to convert policy direction into actual actions, has typically been unavailable.

More recently, however, the CCP has tried to discourage analysis of Chinese politics. These efforts range from steadily reducing access to Chinese databases, to discouraging foreign academics and institutions from analyzing sensitive topics such as treatment of the Uyghurs, to open harassment of both domestic and foreign scholars.[11]

This reduction in transparency makes open-source analysis more difficult, but also more urgent because of the greater need to understand how the Chinese political system is functioning. This need, however, has not led to an increase in academic study of the Chinese political process. Instead, there has been a decline in "area studies," with much more emphasis on the study of Chinese society and sociology (for example, women's studies and the history of science) rather than political or leadership studies.

As a result, for those who choose to study Chinese politics, there is a significant unmet demand for more analysis of all aspects of Chinese politics. Similarly, a better understanding of China's top ministries, the interplay between chief executives of state-owned enterprises and the national political leadership, and studies of provincial leadership trends could yield data that enhance our understanding of the next generation of Chinese leaders.

Technology

Defining Technology

Technology in this context means information technology and its many components. This is a key area, which the Chinese Communist Party (CCP) has highlighted in its strategic Made in China 2025 plan.[1]

In recent congressional testimony, Central Intelligence Agency Director Bill Burns noted that "competition and technology is right at the core of our rivalry with an increasingly adversarial Chinese Communist Party and Chinese leadership in the coming years."[2]

On March 5, 2021, CCP leadership released the 14th Five-Year Plan for the National Economic and Social Development of the People's Republic of China and the Outline of Long-Term Goals for 2035.[3] The plan gives us a good overview of the critical technologies the CCP is focusing on, such as artificial intelligence (AI), biotechnology, blockchain, neuroscience, quantum computing, and robotics.[4]

The People's Republic of China (PRC) government has also adopted a $1.6 trillion infrastructure initiative that surges funding and focus on seven main areas, including 5G communication networks, charging equipment for electrified vehicles, data centers, AI, and the development of an industrial internet for connected factories.[5]

Finally, when considering how the CCP thinks of technology, one should look to a third CCP plan called China Standards 2035, which is an ambitious 15-year blueprint to shape the global standards for the next-generation of technologies such as the Internet of Things, cloud computing, big data, 5G, and AI.[6]

All of these technologies are shaping a global race for who will lead the information age in the future—the authoritarians such as China and Russia or the democracies found in the West and the Indo-Pacific.

This chapter will examine various research initiatives dedicated to tracking Chinese investment in the aforementioned technology areas, PRC talent programs, research and development (R&D), and technology transfer.[7]

Why Transparency on China's Technology Is Important

As leading global economies become increasingly information and innovation based, the importance of technology increases exponentially. The very reliance on technology provides those nations whose industries have mastered it with increased influence, leverage, and potential for espionage or even sabotage.

If the economy of the future is a data-centric, information-based innovation economy, the

nations whose industries have built the infrastructure controlling the data flows (5G and beyond), written the software code performing critical functions (software and firmware), and designed the microelectronics that make it all work will hold a powerful perch in the international order.

CCP leadership, including Chinese President Xi Jinping, sees information technology as a Fourth Industrial Revolution, where heated competition now will determine who leads into the future. Xi has said that "a new round of technological revolution and industrial change—artificial intelligence, big data, quantum information, and biotechnology—are gathering strength." Xi indicated that these "earth-shaking changes" would provide an "important opportunity to promote leapfrog development" whereby China could assume a dominate position globally, replacing the United States.[8]

CCP leadership is using technology to influence geopolitics similarly to how Russia uses oil and natural gas—as a blunt instrument to compel compliance. As with the Belt and Road Initiative, the geotech strategy—to condition technology exchanges to those nations who closely toe the CCP line—has ensnared allies and foes alike while alienating others and pushing them away from Beijing.

Reliance on critical technologies from untrustworthy providers creates major global national and economic security risks, unlike reliance in other areas.[9]

Official Data from China

The Chinese government regularly reports on national expenditures of R&D funding in science and technology, primarily through its National Bureau of Statistics (NBS), Ministry of Science and Technology, Ministry of Commerce, Ministry of Industry and Information Technology and its Ministry of Education.

As with most of the official figures proffered publicly by the PRC, these statistics almost certainly do not tell the whole story. As explained later in this chapter, official government statistics merely show how much the central Chinese government ministries spend (or at least as much as they are willing to acknowledge). The statistics do not include how much has been allocated in these areas by the individual provinces, prefectures, or

districts. Further, CCP-sanctioned data does not include a clear breakout of PRC investments in the major public/private funds that steer technology research, development, and commercialization such as Chinese Government Guidance Funds.[10]

Further, much of the R&D—as well as the state-sponsored cyber and human-enabled espionage campaign to acquire technology—is not easily identifiable and likely in a "black" or classified budget that would not be found in public data.

Chinese State Council

The Chinese State Council is the country's primary administrative authority. It includes 26 departments, 21 ministries, three national commissions, the National Audit Office, and the People's Bank of China.[11]

For the 2019 budget, the ministries below showed the following budget figures from officially released data:

- Ministry of Education.[12] The Ministry of Education is the largest budget item under the Chinese State Council. It includes every aspect of early childhood education and all higher education. Further, it includes funding for the CCP talent and scholars programs, which experts believe include robust efforts to illegitimately acquire sensitive technologies and innovations overseas and bring them back to China to advance the national priorities of the CCP.
  2019 Budget: $66 billion

- Ministry of Industry and Information Technology.[13] The Ministry of Industry and Information Technology includes funding for science, technology, and industrialization. It coordinates and funds the vast array of PRC-led military–civil fusion efforts across the government and private sector.
  2019 Budget: $19.4 billion

- Ministry of Science and Technology.[14] The Ministry of Science and Technology includes funding for 260 state research laboratories. The ministry also tracks international technology progress and tries to persuade overseas Chinese national scientists to return to China.
  2019 Budget: $8.3 billion

- Ministry of Commerce.[15] The Ministry of Commerce is responsible for trade and investment. It coordinates the CCP strategy to push out Chinese investment to lawfully obtain intellectual property, innovation, and technology through joint ventures, acquisition, and investment. **2019 Budget: $3.7 billion**[16]

National Bureau of Statistics

The NBS issues an annual "Communique on National Expenditures on Science and Technology." It breaks out the type of R&D that was funded, the province or location where the research occurred, the dollar amount, and how it compared with recent years.[17]

The most recent numbers issued by the NBS show a record figure of $378 billion for broad R&D funding, a 12.5% increase over the previous year and more than the United States federal government, which was $123 billion in federal dollars for 2019. (The American private sector accounted for $394 billion.) [18]

A desire to improve the domestic capacity for advanced technologies is not a new one. In 1986, the PRC launched the 863 Program, which infused $200 billion in spending over 30 years in biotechnology, space, information technology, laser technology, automation, energy, and new materials. Telecommunications and marine technology were added in 1996. Though the program concluded in 2016, its legacy lives on in PRC planning.[19]

Private Transparency Efforts

As China has entered the international stage as a global technology leader in the past 15 years with national champions such as Huawei, Alibaba, and Tencent, international global attention has expanded beyond the PRC's government-sponsored technology funding. Growing attention has been paid to private Chinese companies (such as those listed above) that engage in R&D but that the PRC government has access to.

To supplement incomplete official reporting, prominent think tanks around the world have created research projects dedicated to tracking this public and private funding.

- **Georgetown University Center for Security and Emerging Technology (CSET).**[20] CSET hosts a team of data scientists within the Walsh School of Foreign Service tracking PRC funding in science and technology. The scholars sift through publicly available budget data from dozens of official government entities, often in original language source documents. This project is dedicated to providing a much-more holistic picture of the state-sponsored funding of advanced technology R&D in much greater depth and detail than is provided in officially sanctioned PRC data.

CSET focuses on the foundations of AI, including people, data, and computational power. It also looks at how AI is used in national security and biotechnology.

CSET also maintains a Chinese Talent Program Tracker, which is a catalogue of CCP-sponsored initiatives to cultivate China's domestic talent pool in support of China's strategic civilian and military goals.[21] CSET researchers have identified 43 national-level talent programs and more than 200 talent programs at sub-national levels, and the numbers continue to trend upward.

They also maintain the Chinese State Council Budget Tracker, a repository of financial information published by the Chinese government on the State Council's 2019 budget.[22] The State Council is directly controls the country's 26 cabinet-level departments (and ministries) and dozens of smaller offices, including those critical to science, technology, and talent recruitment.

CSET has done groundbreaking research in the area of tracking Chinese government "guidance funds".[23] The PRC has set up over 1,700 guidance funds with the stated purpose to "catch up with and surpass" the United States in advanced technologies through advanced R&D and commercialization. These guidance funds are further industrial policy tools the CCP uses to further its geotech strategy. According to CSET, the funds have currently raised over $672 billion in public and private money. Though fraught with their own troubles, guidance funds are a critical component of the CCP's grand

plans to no longer have to rely on the West for technology but to become self-sufficient.

- **Brookings Global China Project.**[24] The Brookings Institution's Global China Project is tracking the PRC's talent development programs. These efforts are multi-faceted. First, the PRC seeks legitimate exchange of talent and knowledge globally. Second, it seeks to persuade overseas Chinese experts to return to the PRC to assist domestic advancements. Third, it seeks foreign talent to supplement, teach, and train domestic experts. CCP leadership puts a strong emphasis on future technologies as it seeks to leapfrog other global leaders in current technology while better controlling its population and conditioning future trade for its technology imports on acquiescence to the CCP global political agenda.

  The CCP believes that access to high-skilled labor is an impediment to achieving the goals listed above. Since 2012, Brookings found that the China Scholarship Council has more than doubled the number of study abroad scholarships that require a return to China. China has also worked to attract foreign students in nations where China is looking to build closer relations, such as those nations who have signed onto China's Belt and Road Initiative. Since 2008, the PRC has increased its international scholarships available to study in China from 225,000 to 492,000.

- **Stanford–New America DigiChina Project.**[25] The DigiChina Project is a collaborative effort between New America and the Freeman Spogli Institute's Cyber Policy Center at Stanford University. It seeks to understand China's digital policy developments, primarily through translating and analyzing Chinese-language sources. It focuses on data governance, AI, internet law, and technology in geopolitics.

  The DigiChina Project has recently focused on how U.S. government efforts to globally restrict Chinese technology giants such Huawei and ZTE has increased the urgency of the CCP's efforts to become technologically independent. DigiChina extensively tracks China's pursuit of advanced technologies, particularly AI.

Among other insights, the project found a clear-eyed assessment of where the PRC is in its AI development, including where it is deficient in areas such as basic R&D and a lack of domestic operating systems or advanced semiconductor production. The project leaves no doubt as to the import of domestic AI advancement as a top priority of CCP leadership.

- **Institute for Defense Analyses (IDA) Science and Technology Policy Institute (STPI).**[26] STPI is a federally funded R&D center operated by IDA, which is a nonprofit corporation. STPI was created and is funded by Congress to inform policy decisions of the Office of Science and Technology Policy in the White House.

  STPI provides in-depth tracking of Chinese government spending on such technology areas as AI. One report on China's AI spending found $138 million in Chinese non-defense AI R&D expenditures from 2018. That number is comparable to U.S. spending in the same category. Other publicly available spending sheds light on the Chinese commercial space sector and Chinese supercomputing efforts.

- **McKinsey Global Institute (MGI).**[27] MGI is a private think tank established in 1990 to develop a deeper understanding of the evolving global economy. Its stated mission is "to provide leaders in the commercial, public, and social sectors with the facts and insights on which to base management and policy decisions."

  McKinsey's Asia/Pacific research includes analysis on China's existing and future tech workforce, technology and capital flows in and out of China, and China's role in the next phase of globalization—which is highly targeted to technology. McKinsey takes a data-focused business approach to tracking PRC spending in critical areas such as R&D and commercialization of advanced technologies.

- **IISS–MERICS China Global Security Tracker.**[28] The International Institute for Strategic Studies (IISS), a London-based think tank, maintains a China Global Security Tracker in collaboration

with the German Mercatur Institute for China Studies (MERICS). The focus of the tracker is China's defense and security policies.

In biannual reports, the China Global Security Tracker has examined PRC forced technology transfer from European firms and highlighted European policy and structural weaknesses in competing with the Chinese on technology.

- **Australian Strategic Policy Institute (ASPI) International Cyber Policy Centre.**[29] ASPI is an Australian research institution focusing on defense and security issues in the Indo-Pacific theater.

  ASPI maintains a world-class International Cyber Policy Centre, which focuses on cybersecurity and emerging and critical technologies, among other topics.

  The center's data-driven, collaborative research and training examine China's military-related universities; provides an extensive mapping of China's domestic technology giants; and provides updates on the cyber, defense, and space spending in the region.

  ASPI's Mapping China's Tech Giants is a database that tracks the global expansion of 27 key Chinese technology companies.[30] The database covers major points of overseas presence including 5G initiatives, smart cities, research partnerships, submarine cables, significant telecommunications and technology projects, and foreign investments.

- **Center for International Governance Innovation (CIGI).**[31] CIGI's China program, based in Ottawa, Canada, closely tracks China's forced technology transfers from the private sector to the PRC. CIGI is an independent, nonpartisan think tank that has received support from the government of Canada.[32] One CIGI scholar, Anton Malkin, takes the tack that Beijing is not pursuing a deliberate strategy of technology transfer. Instead, he suggests that it is the result of a loose, uncoordinated web of local corruption, legitimate transactions, and a poor regulatory and legal framework. Malkin nonetheless does

acknowledge industrial subsidies, talent poaching, and some level of trade secret theft.

Malkin's writings prove that even in a framing that is favorable to the PRC, major systemic technology transfers have taken place in recent decades and continue largely unabated. Even if this were not a strategy, the trend is unquestionable and highly concerning for global trade and safeguarding Americans' intellectual property.

Grade and Reasoning

In this section are scores assessing the transparency of the Chinese government and overall transparency as a result of private efforts. Each score is rated on a 10-point scale. The methodology for calculating these scores can be found on p. 119.

Transparency from the Chinese Government: 3 out of 10

There are severe gaps in the data provided by the Chinese government with regard to technology. On one hand, the Chinese government's research activities are not that secretive. It publishes information about major R&D projects hosted at State Key Laboratories and supported by the National Natural Science Foundation of China (NSFC). Chinese scientific literature and patent information is generally available. But, because they do not need to attract private sector sponsors, China's state-backed research institutions generally do not publish as much information about their activities as those in more democratic countries do. Moreover, many projects financed by the NSFC in 2020 were not disclosed publicly, and little, if anything, is known about them. On the other hand, technology transfer is not transparent. The Chinese state leans on predatory investment practices and clandestine intelligence-gathering operations to monitor and absorb foreign breakthroughs in science and technology. The Chinese government used to be more transparent on its talent programs but has regressed considerably. The PRC is somewhat transparent about its budgeting and expenditure. Most local government and CCP offices (at the provincial level and below) publish information about their annual budgets and expense reports. Yet this is changing with time,

as Chinese internet companies are beginning to block foreign access to such information. The PRC does not publish any information about the budgets of central-level CCP offices, and little is known about the budget of the central CCP committee.

Overall Transparency: 6 out of 10

Private efforts have been instrumental in improving overall transparency with regard to technology. Through painstaking work, these efforts have been able to piece together some surviving information about major talent programs over the past decade. But today's major plans, including the National High-End Foreign Expert Recruitment Plan, are still largely opaque. No information is being published about award winners. Private efforts to compile information about China's science- and technology-gathering operation have been met with some success in recent years. Private efforts to compile and analyze public budget documents have shed more light on the Chinese government's priorities. Transparency on the Chinese government's surveillance technology deployment has also improved as a result of private efforts.

Trends from the Data

The trends in the area of PRC state-backed technological development are clear: Beijing seeks independence from the West on technology and looks to become an exporter of technology and standards governing its deployment. Not only has this desire been manifested in China's actions trending over the past two decades, but it is also outlined in its numerous state-issued grand strategies on the topic.[33]

CCP leadership seeks this independence for several reasons.[34] First, it seeks to reduce its dependency on what it correctly realizes are nations with which it will increasingly be at odds in the coming decades, such as the United States. Second, it seeks to reduce the opportunity that the PRC could unknowingly be introducing software and hardware into their own systems and supply chains that adversaries could use to disrupt their communications or collect intelligence or conduct espionage. Third, CCP leadership can use advances

in domestic technologies for mass domestic surveillance to further control its own population, track or limit dissent, and target internal minority populations of concern to the regime, such as the Uighurs or Falun Gong. Fourth, as China becomes its own technological powerhouse, it can export technology to compel acquiescence to the PRC agenda, track overseas Chinese dissidents, or export the Chinese authoritarian governance model. And fifth, as it perfects its own domestic surveillance, it can use those tools to target foreign adversaries and potential allies alike more broadly and effectively for mass surveillance to conduct espionage, potential disruption operations, cyber-attacks, and trafficking of personally identifiable information on billions of people.[35]

The trend here no doubt is to create a focused, whole-of-society approach to achieve the goal. As identified in the official and unofficial data—as well as the stated CCP strategies such as Made in China 2025 and in the 14th Five-Year Plan—the PRC is in the process of attempting to leapfrog its geopolitical competitors technologically.

As with most of the PRC's industrial policies, the efforts include theft of trade secrets and innovation through human and cyber-enabled espionage, legitimate foreign technology acquisition via investment and joint ventures, forced technology transfers, massive influx of state R&D dollars, targeted education and talent programs to support the national technology strategies, endless lines of credit to Chinese-based "national champions" such as Huawei and Hikvision, captured markets and illegal subsidies for those national champions, quotas and difficult market entry rules for the national champions' competitors, and flooding the global market to bankrupt national champion competitors and to increase national champions' global market share.[36]

Opportunities for Further Research

By far the biggest challenge in understanding China's technological development plans is the lack of detailed visibility into the PRC's largest budget items: its defense and state security spending. While some U.S.-based and international think tanks do a decent job of estimating how much the CCP allocates to its military, intelligence and vast domestic security services based on output and the

broad figures released, it is difficult if not impossible for an open-source estimate of how much is spent that is unseen—namely R&D for advanced technologies. Clearly, many AI, robotics, information technology, quantum computing, autonomous vehicles, and other technologies have military, police, and intelligence applications. Resources are clearly being poured into developing these technologies from the PRC's "black" budget in addition to what is being published in its open-source reporting. Just how much is unclear and very difficult to ascertain. Further, the PRC has clearly maintained an intense focus on developing domestic technologies to track, surveil, and suppress its own population, such as the social credit score, mass surveillance, facial recognition, and the Great Firewall of China, among other tools. The R&D of most of these technologies would have been perfected as part of the unseen budget of the Ministry of State Security.

Second, there is little data or research available on the holistic domestic impact for the PRC's two-decades-long master plan to conduct human and cyber-enabled espionage to acquire advanced technologies, sophisticated R&D, or even the intellectual property of commercially available technologies. Due to media reports, congressional investigations, prosecutions, and other legal actions, there is some sense of what technologies have been stolen from the United States and other advanced nations. In nations that do not have

those institutions in place, however, the scope of the problem is not as well known. The CCP leadership has cast a vast net and no region of the world has been spared. Couple this with the same time period of forced technology transfers for foreign companies to access the Chinese market, and the impact of the PRC's domestic technical know-how is surely substantial. How does this interplay with Beijing's plans to guarantee domestic market share for national champions? How do "private" companies in China deconflict this stolen IP into their own legitimate R&D efforts? Exactly how much of a leg up has this given them?

Finally, there is a growing body of private sector R&D occurring in China that is more difficult to measure. The aforementioned CSET at Georgetown has done a masterful job of tracking and explaining the use of Chinese government guidance funds, but what about the myriad of other private R&D taking place by startups or technology giants themselves? Some "private" Chinese companies such as Huawei do declare their R&D spending (though the accuracy is questionable), while so many more do not. What industries are leading private R&D efforts? Is it government backed or directed? Is it leading to commercial success in the global market? How successful are PRC-led commercialization efforts? And what advantages has this given the PRC over its competitors?

Creating Some Clarity on the PLA Budget

FREDERICO BARTELS

Like many other things in the People's Republic of China (PRC), how much money is dedicated to the People's Liberation Army (PLA) of the Chinese Communist Party (CCP) is quite hard to determine. According to a recent study from Georgetown University's Center for Security and Emerging Technology, which tracked how much is allocated to China's different cabinet-level departments, "The Ministry of National Defense (国防部; MND) and the Ministry of State Security (国家安全部; MSS) do not publish their budget documents."[1] Any information on how much is allocated to the Ministry of National Defense must be derived from other sources, including selective disclosures by the PRC government.

It therefore becomes necessary for the individuals and institutions that are trying to understand the PRC military burden to develop methods and data treatments that will approximate the available data to arrive at something close to the truth. Developing meaningful comparisons becomes even more challenging.[2] Comparing military expenditures is a tricky endeavor even when one is comparing transparent democratic allies within NATO: Each country defines military expenditures in a different manner and counts different things.[3]

Regardless of the difficulties, understanding our adversaries' military burdens is essential to shaping our strategies in the context of great-power competition. During the Cold War, the U.S. government devoted considerable resources and effort to determining an accurate estimate of the Soviet Union's defense burden. The different methods used included building estimates from the bottom up by, for example, pricing tanks and missiles and adding up the cost and from the top down by estimating the overall government burden and the size of the military within the Soviet government. Substantive differences and pitfalls in each of these methods led to important methodological discussions inside our government.[4]

No similar efforts seem to have been undertaken by the U.S. government with respect to China. As the United States reorients its national security apparatus toward great-power competition, however, it is imperative that we gain a better understanding of how our adversaries, including China, build their military instruments and how great is the impact of those instruments on their governments' resources.

Available Data

As of this writing, the United Nations Report on Military Expenditures, which used to include data on China's defense budget for 2010–2017, includes data for only three years: 2008–2010.[5]

However, the website has been has been intermittently accessible in the last few years.[6] The Chinese government reproduced data for 2010–2017 in the appendix to its 2019 white paper, *China's National Defense in the New Era*, and credited the U.N. reporting mechanism as the source.[7]

The U.N. reporting mechanism is voluntary and thus dependent on the cooperation and accuracy of the reporting country. Additionally, different levels of reporting can be used, from nil (countries that report zero military expenditures) to the standardized form that requires multiple layers of detail reported in a spreadsheet of 11 by 35 cells.[8] The Chinese submitted a version of the simplified reporting form.[9] The simplified form is a 5-by-5 matrix with spaces for each of the major domains (land, naval, air, other) and the total spent in four categories of resources (personnel, operations, procurement, research and development [R&D]) in each domain. However, the Chinese do not fill out all of the categories requested by the U.N. forms.

The eight years' worth of data provided in China's white paper are split into three different subcategories that compose the defense budget: personnel, training and sustainment, and equipment. (See Table 1.) As a baseline comparison, the U.S. defense budget is split into six subcategories: military personnel; operations and maintenance; procurement; research, development, testing, and evaluation (RDT&E); military construction; and family housing.[10]

For the years since 2017, only the topline data announced by the Chinese government are available. Professor Andrew Erickson of the U.S. Naval War College maintains a good source for these topline announcements.[11] These announcements do not have the same granularity as is offered for the 2010–2017 dataset. They are just the announced totals allocated for China's defense expenditures.

For data before 2010, the best sources are independent databases that compile toplines. The Stockholm International Peace Research Institute (SIPRI) maintains a database of global military expenditures based in publicly available sources that starts in 1949.[12] For China, the data start in 1989. The International Institute for Strategic Studies (IISS) also has an independent estimate of the Chinese defense budget and started

to assess this area with the 2006 edition of its annual *Military Balance* series.[13] Each institution has developed its own assessment of the Chinese defense budget for the preceding year. The principal question tackled by both institutions is the methodological composition of their independent assessments of the budget, especially considering the changes in Western understanding of the Chinese defense budget in the past decade.

IISS published a discussion of "Proposals for New Methodologies" in March 2020, and SIPRI published a paper updating its methodology on January 2021.[14] The major thrusts for revising the methodology are the changes the CCP has made in the organization of its military.[15] From placing the People's Armed Police (PAP) under the control of the Central Military Commission to creating the PLA Rocket Force to the policy of "civil–military fusion," these changes have substantial budgetary implications, especially with respect to what is counted and how it is counted in the defense budget. Both studies are great examples of the granularity that is needed to achieve a better understanding of Chinese military expenditures.

The annual report on Chinese military power produced by the U.S. Department of Defense (DOD) includes a short discussion of the Chinese defense budget.[16] The report acknowledges the incompleteness of the officially publicized budget and even acknowledges R&D and foreign weapons procurement as gaps.[17] However, there are no suggestions as to how those gaps might be closed.

Unavailable and Unknown Data

From the available data, two missing elements are immediately evident: a breakdown of expenditures by service and the resources dedicated to R&D. Both are extremely important to any assessment of how the Chinese military is evolving and changing.

Each of the three subaccounts—personnel, equipment, and training and sustainment—are presumably distributed through the different services of the People's Liberation Army, but there is no information of this nature in the disclosed data. Further, the United Nations requires a service breakdown on both its standardized reporting form and its simplified reporting form.[18] Such data would be very valuable for observers of the

TABLE 1

Official Chinese Figures on Military Spending

Year	PERSONNEL		TRAINING AND SUSTAINMENT		EQUIPMENT		TOTAL
	Billions of Renminbi	Share of Total	Billions of Renminbi	Share of Total	Billions of Renminbi	Share of Total	Billions of Renminbi
2010	185.9	35%	170.0	32%	177.4	33%	533.3
2011	206.5	34%	189.9	32%	206.3	34%	602.8
2012	195.6	29%	233.0	35%	240.6	36%	669.2
2013	200.2	27%	270.0	36%	270.9	37%	741.1
2014	237.2	29%	268.0	32%	323.7	39%	829.0
2015	281.9	31%	261.5	29%	365.4	40%	908.8
2016	306.0	31%	267.0	27%	403.6	41%	976.6
2017	321.1	31%	293.4	28%	428.8	41%	1,043.2

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Chinese military in their efforts to understand how the 2015 military reforms have affected the distribution of resources among the different military forces.

Included in the service breakdown category are the other services that could be counted within the Chinese defense budget: the People's Armed Police and the Chinese Coast Guard. The PAP is a paramilitary force that is counted under many definitions of military expenditures. Both old and new SIPRI estimates of the Chinese defense budget identify the PAP budget as one of the largest of the items that are not included in the official defense budget.[19] The Coast Guard was transferred to PAP military control in 2018.[20] This transfer makes it necessary to account for the PAP budget within the defense budget, but without any clarity on the service breakdown, it is not possible to judge whether it was included in the numbers report for 2019.

The other huge gap in the available data is military research and development, which is especially important in view of the role played by advanced technologies in great-power competition. As with service breakdown, the U.N. form requests the disclosure of resources spent on R&D, but the Chinese do not comply. However, even publication of those resources within the defense budget would not tell the whole story. As University of California, San Diego, Professor Tai Ming Cheung explains:

> Funding for defense-related research and development, for example, comes primarily from other areas of the central government budget, most notably those allocated to the State Administration for Science, Technology, and Industry for National Defense (SASTIND), which is not included in the official defense budget.[21]

Further, in its recent review of Chinese defense expenditures, SIPRI concluded that "[t]here is still no transparency in budgeting and spending for military R&D. Unless substantial changes are made to the reporting of budgets and actual spending

on R&D, military related RDT&E spending will remain an estimate."[22]

Additionally, there is the challenge of considering the push for civil–military fusion in calculating the military's research and development resources.[23] This push has made more R&D resources available to the PLA without necessarily using the military's R&D resources. This further muddles the possible estimates of Chinese military R&D expenditures.

One major challenge still unaddressed is conversion of Chinese defense budget data from yuan into dollars or any other currency to allow comparisons with other countries. The traditional answers for cross-country comparisons—market exchange rate and purchasing power parity—have substantial drawbacks when applied to Chinese military expenditures. Because of the government's control of currency and prices, neither rate fully reflects the costs experienced in China. Further, many of the goods and services that are classified as military expenditures are not tradable in an open market and thus are more subject to government determinations.[24]

Unanswered Questions

Achieving a better estimate of the Chinese defense budget still presents many unanswered questions, from determining what items should be included to the composition of these items and understanding how the different military services divide the overall budget. At the same time, the importance of having a clear understanding of the Chinese military burden has only increased.

The 2018 U.S. National Defense Strategy clearly states that "China is a strategic competitor."[25] In any competition with a military component, a well-developed sense of how your adversaries are developing their armed forces is imperative. SIPRI has succinctly captured the importance of accurate assessments of military expenditures:

> The uses of military expenditure data by interested parties can range from assessing the burden of a country's military forces on its economy; via determining how a

> government prioritizes the military relative to other sectors such as health and education; to understanding the factors that determine military spending and the impact of this spending on security and armed conflict.[26]

Congress understood the importance of gaining a better understanding of our competitors' military expenditures and acted accordingly in the National Defense Authorization Act for Fiscal Year 2021,[27] requesting that a federally funded research and development center produce a study that compares the defense budgets of the United States to those of the PRC and the Russian Federation. Congress's stated goal is a more precise comparison that accounts for the differences in how each nation reports and classifies the different portions of its budget. It explicitly asks for assessments of how market exchange rate and purchasing power parity affect cross-country comparisons.

The study, which is due in late September 2021, should serve to advance the discussion and understanding of this crucial subject and encourage others to engage in the debate. Of particular importance, DOD and the intelligence community could begin to publish more comprehensive assessments and discussions of how to estimate the Chinese defense budget accurately. Chairman Xi Jinping certainly knows how much the CCP spends on defense; by continuing to treat the PLA budget as a secret, the U.S. government only keeps the American public in the dark.

Conclusion

Achievement of a clear understanding of how the PRC funds the PLA still presents many challenges. However, recent progress shows that an accurate assessment of the PRC's military expenditures is possible. The effort will involve sharing knowledge and illuminating the problem areas so that individuals and institutions can come together to produce a clearer picture.

China Considers Big Data a Fundamental Strategic Resource, and Africa May Offer an Especially Valuable Trove

JOSHUA MESERVEY

On the outskirts of the Zimbabwean capital of Harare, a massive new parliament building is nearing completion. A gift of the Chinese government and built by the state-owned Shanghai Construction Group, it costs around $140 million,[1] an extraordinary sum in a country with a 2019 per capita GDP of just over $1,400.

The new luxury facility for Zimbabwe's political elites is one of nearly 200 government buildings that Chinese companies have constructed or renovated across the continent since 1966.[2] Moreover, the construction costs of many of these projects have been partially or fully subsidized by the Chinese government.[3] All of this is in addition to the parade of senior Chinese leadership that frequents the continent, the triennial Forum on China–Africa Cooperation extravaganza, and China's heavy lending and investment in Africa.

Such solicitousness for Earth's poorest continent may seem disproportionate to any benefit the Chinese government can earn, but it is not. Beijing's attentiveness reaps economic gains, access to important minerals, and diplomatic support for its international agenda. As technology has moved to the center of Beijing's increasingly overt competition with the U.S., the continent's value to the Chinese Communist Party (CCP) has only grown. Now the Chinese government's position in Africa likely gives its companies the ability to harvest unique, difficult-to-obtain data to fuel technologies that are critical to Beijing achieving its most cherished strategic priorities, including those that challenge American interests.

The world first glimpsed the Chinese government's surreptitious data mining in Africa when the French newspaper *Le Monde* reported in 2018 that the walls of the Chinese-built African Union (AU) headquarters building in Ethiopia were full of listening devices. The building's servers were allegedly uploading their data to Shanghai every morning as well. Last year, another report revealed that hackers likely from China were accessing the closed-circuit television (CCTV) footage from one of the buildings on the AU compound.[4]

It is implausible that Beijing is not taking similar advantage of some of the other sensitive, Chinese-built African government buildings that include presidential residences, ministries of foreign affairs, and military installations. The information gleaned in such eavesdropping could be used to tailor political influence campaigns targeted at African leaders who have emerged as faithful supporters of the Chinese government's foreign policy. Beijing can also use purloined data to benefit Chinese companies—something that it does in a uniquely intensive and aggressive way.[5]

Yet Chinese companies so dominate certain data-heavy industries that Beijing's surveillance access to government buildings is probably not even its most productive data-mining opportunity in Africa. Huawei, China's heavily subsidized, "national champion" telecommunications company whose ranks are sprinkled with Chinese intelligence officers and whose equipment often features security vulnerabilities,[6] has constructed more than 70 percent of Africa's commercial 4G networks.[7] This 4G dominance gives it pole position for deploying 5G networks on the continent; it recently unveiled in South Africa the continent's first stand-alone commercial 5G network.[8]

Late in 2020, Huawei rolled out a smartphone with a preinstalled e-wallet (complete with security backdoors) for the Bank of China's digital currency. Use of China's cryptocurrency is not widespread on the African continent—though there is a burgeoning Africa–China crypto trade—but Chinese companies' dominance of relevant sectors suggests the likelihood of the digital yuan's ascendance[9] and along with it access to troves of financial and other data.

A Huawei subsidiary, Huawei Marine,[10] has built or upgraded 11 undersea cables—the superhighways for almost all of Earth's transmitted data—that collectively touch 21 African countries. Five of those countries—Cameroon, Libya, Nigeria, Somalia, and South Africa—are served by more than one Huawei Marine-built cable.[11] Having physical access to these cables makes it easy to exploit them for data collection and obviates the need to penetrate a target's network and defeat its protections.[12]

Huawei has entered the cloud services and data center industry as well.[13] (If submarine cables are data superhighways, data centers are the parking lots.)

- In conjunction with another Chinese company and with financing from the Export–Import bank of China, it recently built Central Africa's largest data center in Cameroon, which will host data from, among others, the government and financial institutions.[14]

- In Senegal and Zambia, Huawei constructed data centers that currently hold,

or will hold soon hold, all government data in both countries.[15]

- In 2008 and 2009, ZTE was reportedly constructing something similar for the Kenyan government at its intelligence service's headquarters.[16]

- More recently, Huawei proclaimed itself the "ICT [information and communications technology] architect of the Kenyan government" and signed an agreement with Nairobi to further digitize its files.[17]

Huawei also has agreements with 16 African countries to implement its safe city platform,[18] and ZTE has rolled out its own version in countries like Ethiopia, Nigeria, and Sudan.[19] The smart city platform, which integrates and centralizes ICT and technology infrastructure to help governments manage their cities, gathers immense amounts of data. One of the services that Huawei provides to its safe/smart city customers is data mining.[20]

Other private Chinese companies also have excellent access to sensitive data in Africa. The Chinese artificial intelligence (AI) company CloudWalk struck an agreement in 2018 with the government of Zimbabwe to build a facial database of Zimbabweans (which would require "broad camera layouts").[21] The massive Chinese company that sells CCTV cameras, Hikvision, is active across the continent, including in Zimbabwe. Like Huawei, its gear is often compromised with backdoors.[22]

It took only 10 years for Shenzhen-based Transsion, through its affordable smart and feature phone brands such as Infinix, Itel, and Tecno, to claim the dominant market share on the continent.[23] In 2018, M-Pesa, Africa's largest mobile money platform with nearly 42 million customers,[24] was linked to the massive WeChat messaging platform to facilitate mobile payments between Africa and China. WeChat is owned by Chinese tech giant Tencent, which was funded in its early stages by China's Ministry of State Security.[25]

Chinese companies also have stakes in at least 46 sub-Saharan Africa ports.[26] In Djibouti, which sits on the Bab el-Mandeb Strait chokepoint

through which about 12 percent of the world's shipping transits, state-owned China Merchants Port Holdings owns or operates three of the port's five terminals.[27] Increasingly wired ports collect a huge amount of data on shipping from all over the world that may be vulnerable to Chinese government exploitation.[28] Exacerbating the problem is the possibility that Chinese companies operating these ports replace existing information technology systems with Huawei gear as Chinese Navy–linked COSCO Shipping often does.[29] Huawei and China Mobile have developed a "smart port" solution.[30]

In late 2020, following a rushed approval process that circumvented normal procedures, officials broke ground for the construction of an African Centers for Disease Control headquarters in Ethiopia that will be built by the Chinese government.[31] This will likely enable Beijing to gain access both to the eventual stock of genomic data that the headquarters will undoubtedly gather and to data collected in the five regional CDC centers.[32] The Chinese government also has pledged to fund and build a $75 million CDC hub in Kenya, built a Bio-Safety Lab and an Infectious Disease Prevention Center in Sierra Leone, is building the Ministry of Health in Liberia, and has already constructed hospitals in Cabo Verde, Cameroon, Liberia, Namibia, Somalia, Uganda, Zambia, and Zimbabwe.

The CCP Perspective on Data

The Chinese government may not exploit every data-mining opportunity in Africa, and profit-seeking doubtless explains some of its activities. For example:

- In 2017, Africa provided 5 percent of Huawei's global revenue.[33]

- The continent may supply nearly a third of the Chinese construction sector's overseas earnings.[34]

- Africa is home to important minerals: The Democratic Republic of the Congo supplies most of the world's cobalt, which is critical to certain high-tech products, and Chinese entities dominate the supply chain for the mineral.[35]

- The ports controlled by Chinese companies prioritize Chinese cargo and extract fewer fees, giving Chinese shipping an edge against its competition.[36]

- The market for data in Africa, home of the world's fastest growing population, has been barely exploited, so it could be lucrative for the tech firm that can deliver affordable services.

Yet it defies belief that the fabulous opportunity to mine African data does not at least partially motivate some of Beijing's labors on the continent. The CCP views big data as a "fundamental strategic resource."[37] Authoritarian governments like China's covet information because it facilitates control of their populations. The surveillance machine that Beijing has deployed in Xinjiang and Tibet regions runs off data,[38] and the government is deploying elements of that machine to the rest of China through its burgeoning Social Credit System.

Information is also critical to developing the world-beating technologies, such as AI, that the CCP believes are vital to rejuvenating the Chinese nation as an unassailable global power.[39] The CCP is so acquisitive that it sucks up mountains of data, as it did, for example, with the 2013 Office of Personnel Management hack, against the day when it will have a plan for its use.[40] Beijing signaled its preoccupation with data collection through its 2017 national intelligence law that requires any Chinese company to "support, assist, and cooperate" with the government on intelligence work,[41] which would certainly include handing over data if requested.

Evidence that Chinese companies siphon off data to send back to China has been accumulating steadily.

- Fourteen countries have warned about, restricted, or banned Huawei from their sensitive networks.[42]

- A recent report alleged that Huawei personnel gained unauthorized access to Dutch telecommunications company KPN's network of over 6 million subscribers and could eavesdrop on their conversations, including those of the then-prime minister.[43]

- The University of Toronto's Citizen Lab discovered that the WeChat messaging app surveils content of users even outside China's borders.[44]

- U.S. government agencies warned that China's market-dominating Dajiang Innovations (DJI) likely shares data that its drones collect with Beijing—something the company admitted it did with data collected in Hong Kong and China.[45]

- The Chinese company Lenovo sold laptops to the U.S. military with a chip that allegedly collected inputted data to whisk off to China.[46]

- Users of the popular Chinese-owned TikTok app sued the company for purportedly sending user information surreptitiously to Beijing. A European Union watchdog organization and a cybersecurity firm recently voiced similar concerns as well.[47]

- Lithuania recently banned another large Chinese company, Nuctech, from its market because of fears that the company would send harvested data to the Chinese intelligence services.[48]

Some of the illicit data harvesting may represent sharp practices used by Chinese companies to gain a competitive advantage, but every Chinese company must by law cooperate with China's intelligence services. Given the value the Chinese government places on data, the long-established practice of reciprocal data sharing between Chinese companies and the Chinese government,[49] and the virtual meaningless of a company being "private" in the Chinese context, it is more plausible than not that any information Beijing values that is collected by a Chinese company will eventually make its way to the Chinese government and its intelligence services.

Why Africa?

The information that Beijing can collect in Africa may be of outsized importance to the Chinese Communist Party because of the unique contribution it can make to refining the CCP's systems of control. Beijing has used artificial

intelligence and facial recognition technology from Chinese companies that are active in Africa, including CloudWalk, Huawei, and Hikvision, to surveil its Uighur population.[50] These companies could be feeding data from African faces into their systems, and those data could make it easier for those systems to distinguish dark-complexioned faces[51]—a useful refinement that the government might use to track ethnic minorities in China.

Such refinements can also help Chinese companies maintain or strengthen their lead in AI-enabled technology, a potentially massive industry. One market for these products is control-hungry regimes throughout the world, including in Africa: As of 2020, 12 of Africa's 54 countries had Chinese big data technology and AI products[52] (although it is worth noting that two of those countries, Botswana and Namibia, are among Africa's freest, suggesting that governments do not always procure Chinese surveillance technology for purposes of repression).

The genomic data the Chinese government can access in Africa are, like African facial data, markedly different from the data it can gather domestically. These different data can be used to develop valuable biotechnologies, a field featured in successive five-year plans and one that Beijing considers a "strategic emerging industry."[53] As biometric identification becomes increasingly prominent, stealing genomic and facial data could also facilitate intrusions into secure locations.[54]

Recent events demonstrate how aggressively China is pursuing competitive advantage in this field.

- In 2019, prompted by the FBI, scores of American academic centers began to investigate nearly 200 cases of potential theft of biomedical research, nearly all on China's behalf.[55]

- In 2020, the U.S. charged several scientists involved in biomedical research with concealing an affiliation with China or stealing trade secrets (one of the biomedical researchers was a lieutenant in the Chinese army).[56]

- At the beginning of the coronavirus pandemic, the U.S. warned that Chinese hackers were trying to steal information related to vaccine

development;[57] just under a year later, reports emerged of separate Chinese hacker groups targeting Indian vaccine makers and Microsoft products, in the latter case to gain access to, among others, infectious disease researchers.[58]

Finally, the CCP likely mines African data because it is relatively easy to do so. Its blitz of engagement during the past 20 years especially has made China the most consequential foreign actor on the continent. An economic relationship with China is critical to many African countries, and Beijing further cements access and cooperation with a range of blandishments for the continent's elites.[59] When that is coupled with the relative inability of many African countries to defend their critical systems from intrusion,[60] the stage is set for Beijing to pluck data almost at will.

Conclusion

The Chinese Communist Party believes that Washington is the single biggest foreign obstacle to achieving one of its primary—even existential—goals: the rejuvenation of the Chinese nation. Under President Xi Jinping, the Chinese government is prioritizing technology as a key to overcoming the U.S.'s advantages and to creating an international system in which Washington cannot gainsay Beijing. Although other factors that will help to determine the outcome of the U.S.–China competition, technology will be prominent among them.

The fact that the Chinese Communist regime has probably already narrowed the artificial intelligence technology gap with the U.S. to a scant one or two years and is already far ahead on facial recognition technology[61] should be a matter of deep concern to U.S. policymakers. Any strategy that they formulate to protect American interests in this vital area must account for the fact that the Chinese Communist Party is almost certainly taking advantage of its access to African data to refine the technologies that it thinks will help it to dictate terms both to the U.S. and to the rest of the world.

Chinese Influence on and Exploitation of U.S. Colleges and Universities

CHAD WOLF AND JAMES JAY CARAFANO, PHD

A survey of available data on the Chinese government's influence on American colleges and universities demonstrates that there is insufficient transparency with respect to the impact of Chinese government actions and the efforts of U.S. universities to address relevant issues and concerns. This assessment describes the major publicly known programs directed by the Chinese regime; the concerns that have been raised; and current research, open-source data, and gaps in open-source information.

Thousand Talents Programs

Since 1996, China has had formal programs to encourage foreign-trained talent to return to China.[1] In 2008, the Chinese Communist Party (CCP) first established a management framework and a program, the Thousand Talents Program, to attract top-tier Chinese students and researchers who were being educated and working abroad, particularly in the U.S.[2] The party also intended to attract "foreign" talent.

During the ensuing years, the Thousand Talents Program has expanded, changed focus, and been renamed. In 2010, it was reshaped to allow researchers to hold appointments simultaneously in China and overseas. A Young Thousand Talents Program was established to attract those below the age of 40, and a Foreign Thousand Talents Program was added to attract "high-end foreign scientists, engineers, and managers from foreign countries."[3]

These talent programs are managed and implemented by several institutions that report to and, like all Chinese government-backed programs, are overseen by the Chinese government and the CCP. Invitations and advertisements to participate come directly from the Chinese research institutions that manage individual programs. Both institutions and individual recipients receive financial compensation for participating. Participants are required to sign legally binding contracts with Chinese such entities as universities and research institutions.[4] Overwhelmingly, programs and grants focus on hard science, research, and engineering, not on social science or the humanities.

In 2015, as tensions over global competition from China escalated, the Thousand Talents Program received increased scrutiny including investigations by the U.S. Federal Bureau of Investigation.[5] The CCP abruptly ended all public discussions of the program,[6] and in the years that followed, the Chinese government intentionally deleted online references to the program.[7] There is little information on the program available in English.

The government-directed reorganization of the Chinese military in 2016 included a goal of overseas training for "defense-affiliated science and technology professionals."[8] The government prioritized "civil–military fusion" as a national strategy.[9] This raised additional concerns that the program was becoming more an instrument of national power than a cooperative economic development and scientific exchange.

In 2019, the program managed by the CCP Organization Department and the State Administration of Foreign Experts Affairs was absorbed by the Chinese Ministry of Science and Technology.[10] The ministry launched two new programs, the High-end Foreign Experts Recruitment Plan, which focuses on high-level experts in key strategic fields, and the National Thousand Talents Plan, which also focuses on recruiting foreign talent. Additional programs include (among others) the Jiaxing Talents Program and programs aimed at attracting foreign experts already working in China. By one estimate, the Chinese government and the CCP now oversee more than 200 talent recruitment programs.[11]

In 2020, two high-profile cases focused national attention on these programs.

- Harvard Professor of Chemistry Charles M. Lieber, a recipient of substantial research grants from the National Institutes of Health and the U.S. Department of Defense, was charged with crimes related to nondisclosure of funds received from a Chinese recruitment program.[12]

- Emory University Professor Xiojiang Li and his wife, who managed the university's neuroscience lab, were abruptly terminated when they came under federal investigation for not reporting hundreds of thousands of dollars in grants from the Chinese Academy of Science.[13]

Both cases, among many others that resulted in indictments by the Department of Justice, highlight the problematic nature of these talent recruitments as participants were not transparent about their funding and affiliation. That same year, the U.S. Department of State distributed warnings about Chinese Communist Party activities at U.S. universities including recruitment programs.[14] The Trump Administration subsequently issued an executive order barring graduate students and researchers linked to the Chinese military from entering the United States.[15]

Using open-source research, several efforts have been made to evaluate the impact of these programs. For instance:

- In 2019, the U.S. Senate Permanent Subcommittee on Investigations issued its highly critical staff report on Threats to the U.S. Research Enterprise: China's Talent Recruitment Plans, which detailed the origins, structure, and management of the initiative; U.S. measures to monitor the program and address concerns; abuses of the recruitment programs; and failures in government oversight of federal grants.[16]

- A study in 2020 by two researchers at the Center for Strategic and International Studies analyzed publicly available information on full-time and part-time participants in the Thousand Talents Program. The authors estimated that in in 2013, the program included 1,723 participants, 733 of whom they were able to identify. They assessed the quality of the participants by the number, prestige, and citations of their professional publications and concluded that "the best Chinese talent had not left the United States and, in fact, was making significant contributions to leading roles in scientific development."[17] The study also acknowledged that the program facilitated the transfer of technology to China and that there were abuses, principally failures to report participation in the program and undisclosed income.[18]

- A study by the Center for Security and Emerging Technology at Georgetown University assessed 3,586 individuals identified in publicly available records who participated in the Youth Thousand Talents Program from 2011 to 2018. The vast majority were postdoctoral students, most of them at top-tier universities and research institutions. Two-thirds of the awardees worked in the U.S. The report concluded that about 8 percent were offered work with institutions affiliated with the Chinese military, although it acknowledged difficulty in defining relationships between Chinese institutions and the PLA.[19] The report further concluded that

"[t]here is merit to concerns that plans awardees aid in China's military modernization," noting that "at least 13" individuals were offered positions in China's leading nuclear weapons lab.[20]

Similar concerns have been raised in other countries. In 2021, research in the United Kingdom concluded that British universities inadvertently assisted the Chinese military by sharing sensitive defense research. The report from Civitas alleges that "up to 15 UK universities have [established] relationships with 22 Chinese military-linked universities as well as weapons suppliers or other military-linked companies."[21]

In addition to concerns about the exploitation of sensitive and advanced U.S. technology and research for military use and other purposes, there are concerns that countermeasures will inhibit emerging research, detract from U.S. competitiveness, or disadvantage the U.S. in attracting top students and researchers.

Research that minimizes the threats points to the limited number of actually proven illegal activities and direct connections to the Chinese military. On the other hand, others argue that even a few serious cases can do significant damage to U.S. interests. Moreover, the significant lack of transparency makes it difficult to access the scope and extent of the threats and risks and devise efficacious countermeasures.

Confucius Institutes

The Chinese government has established Confucius institutes for the stated purpose of teaching Chinese language and culture worldwide. This program is overseen by the Office of Chinese Language Council International (Hanban), which is affiliated with the Ministry of Education. The Hanban was established in 1987 to provide language and cultural teaching resources worldwide. The first Confucius institute was established in South Korea in 2004.[22]

In the U.S., institutes are established in partnerships between Chinese institutions and American schools for the stated purpose of offering language instruction, cultural events, and funding for China-related research. Overseen by the Hanban, Confucius Institute activities are also reviewed by members of the 12 state ministries and

commissions that comprise the Hanban governing council.[23] The Hanban is clearly an instrument of the Chinese state and Chinese Communist Party.

"Since 2006," according to the previously referenced Permanent Subcommittee on Investigations staff study, "China [has] directly provided over $158 million in funding to U.S. schools for Confucius Institutes." Schools, center directors, and staff must also sign contracts with the Hanban that limit public disclosure of the contracts "establishing the terms of hosting a Confucius Institute."[24] In 2013, the Hanban established the Confucius Institute U.S. Center (CIUS) to coordinate U.S. activities of the institutes and their growing footprint. The exact nature of the center's role and responsibility was a subject of debate and uncertainty.[25]

According to a 2019 U.S. Government Accountability Office (GAO) report:

> Most Confucius Institutes in the United States are based at colleges and universities. However, there are several Confucius Institutes established directly in partnership with U.S. public school districts (primary and secondary education) and at least two Confucius Institutes established independently of any educational institution. We identified 96 Confucius Institutes in operation at U.S. colleges and universities in 44 states and the District of Columbia as of January 2019.[26]

In 2020, the U.S. Department of State designated the CIUS as a foreign mission. "This action will not close the CIUS, nor will it require U.S. colleges or universities to close individual Confucius Institutes," the department announced.

> Instead, designating the CIUS as a foreign mission will ensure much needed transparency by requiring the CIUS to regularly provide information to the State Department about PRC citizen personnel, recruiting, funding, and operations in the United States. With greater transparency, educational institutions can make more informed choices about the influence being exerted on their campuses and whether and how these Beijing-backed programs should continue to teach their students.[27]

MAP 1

Confucius Centers in Schools Across the U.S.

● School with Confucius Center
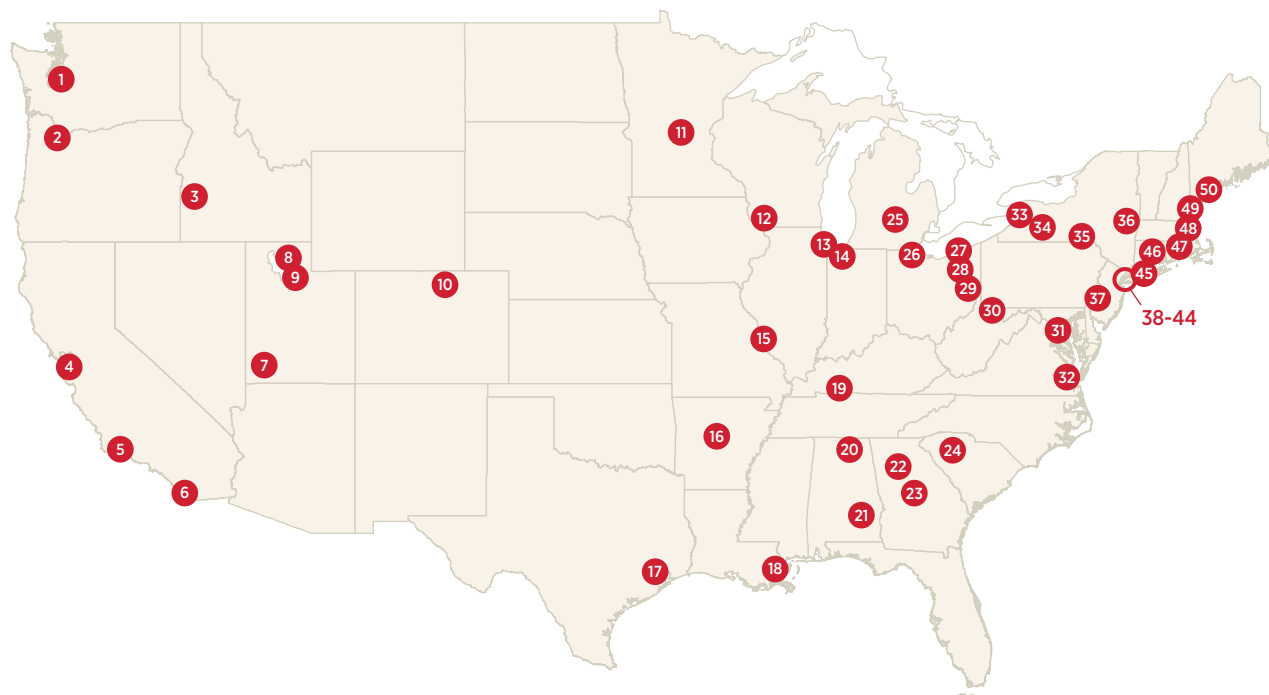
1. Pacific Lutheran University
2. Portland State University*
3. Northwest Nazarene University
4. Stanford University
5. University of California, Santa Barbara
6. San Diego Global Knowledge University (transferred in June 2019 from San Diego State University)
7. Southern Utah University
8. Davis School Disrict
9. University of Utah
10. Colorado State University*
11. St. Cloud State University (Confucius Institute "paused" while university conducts review)
12. University of Wisconsin - Platteville
13. Chicago Public Schools
14. Valparaiso University
15. Webster University

16. University of Central Arkansas
17. Houston Independent School District
18. Xavier University of Louisiana
19. Simpson County Schools
20. Alabama A&M University
21. Troy University
22. Emory University*
23. Wesleyan College
24. Presbyterian College
25. Michigan State University
26. University of Toledo
27. Cleveland State University
28. University of Akron
29. East Central Ohio Educational Service Center
30. West Virginia University
31. George Washington University
32. College of William & Mary*
33. SUNY at Buffalo

34. Alfred University
35. Binghamton University
36. State University of New York (SUNY) - Albany
37. Temple University
38. New Jersey City University
39. Medgar Evers College
40. State College of Optometry, SUNY
41. SUNY Global Center
42. Columbia University
43. Baruch University
44. China Institute
45. Stony Brook University*
46. Central Connecticut State University*
47. Bryant University (will not reapply for funding, possibly will close)
48. Tufts University*
49. University of New Hampshire*
50. University of Southern Maine*

* Confucius Institute scheduled to close in 2021.

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In December 2020, the U.S. Department of Homeland Security filed a proposed rule, "Establishing Requirement for Student and Exchange Visitor Program Certified Schools to Disclose Agreements with Confucius Institutes and Classrooms," with the Office of Management and Budget.[28] That rule would have required universities and K–12 schools to disclose their financial ties to Confucius Institutes. The Biden Administration, however, withdrew the proposed rule within days of taking office.[29] Nevertheless, the increased scrutiny seemed to have prompted Beijing to restructure the program.

According to media reports, in response to increased international scrutiny and negative responses to the program, including the closing of institutes in the U.S., the Chinese government reorganized its oversight of the Confucius Institutes. The Hanban was renamed the Ministry of Education Center for Language Exchange and Cooperation, and a separate spinoff organization, the Chinese International Education Foundation, "will fund and officially oversee Confucius Institutes."[30] However, this could simply be an exercise in renaming and rebranding, with little to no actual change in organizational membership or mission. According to one account, for example, "[m]ore than 100 Confucius Institutes serving K-12 schools…have rebranded as the Asia Society Chinese Language Partner Network."[31]

As of March 2021, the National Association of Scholars (NAS) "count[ed] a total of 50 Confucius Institutes in the United States," including institutes at Central Connecticut State University and Emory that are scheduled to close this year. The NAS also identified "44 Confucius Institutes at American colleges and universities," "one Confucius Institute at a private educational organization, the China Institute," and "5 Confucius Institutes at K–12 public school districts" in addition to "74 Confucius Institutes in the United States that have closed or are in the process of closing, along with the stated reason for the closure."[32]

In addition to the data provided by the NAS, the Permanent Subcommittee on Investigations, and the GAO, there are limited open-source authoritative studies of Confucius Institutes and their operations and influence. Some studies have been conducted in other countries, such as the United Kingdom. For the most part, they focus on pedagogy and the operations or controversies surrounding the institutes.[33]

Many assessments of U.S. operations are anecdotal. A study published in 2017 by the NAS based on case studies at 12 Confucius Institutes where the NAS surveyed hiring policies, funding arrangements, contracts, and pressure on affiliated faculty flagged four issues of concern: intellectual freedom, transparency, entanglement with Chinese state policies, and concerns that the institutes are instruments of propaganda.[34]

The controversies surrounding Confucius Institutes are significant. Although some argue that these centers provide valuable language and cultural structures, there are concerns that they may exert significant and inappropriate influence on curriculum development, teacher hiring, and instruction that would undermine academic freedom—including interference in academic and extracurricular activities and pressure "to avoid public statements or holding events on topics that the Chinese government considers politically sensitive."[35] With respect to this last concern, according to the GAO:

> Several school officials, researchers, and others we interviewed expressed concerns that hosting a Confucius Institute could limit events or activities critical of China—including events at the Confucius Institute and elsewhere on campus. Several researchers stated that a school with a Confucius Institute could choose to avoid hosting events on certain topics elsewhere on campus, such as Taiwan, governance of Tibet, or the Tiananmen Square protests, so as to not offend its Chinese partners or out of consideration for the terms of the agreement….[36]

These concerns about political censorship are not unfounded, as Tufts University's public hearings on its Confucius Institute program highlight. The hearings revealed that Chinese-language teachers who are hired by the program are required to sign an agreement not to participate "in activities that harm China's national interest." Tufts announced that it will be closing its Confucius Institute program in 2021.[37]

There also are concerns about the consequences of U.S. research and education institutions becoming increasingly dependent on funding directed by the Chinese government.[38] Moreover, the Chinese government does not practice reciprocity with the United States in promoting, allowing, or governing educational programs.

There is no question that there is a lack of transparency with respect to the scope of Confucius Institute activities, their financial and operational relationships with other institutions, and their impact. Part of this lack of transparency is on the American side. For example, according to Rachelle Peterson of the National Association of Scholars, "[n]early 70 percent of colleges receiving Chinese-government funding for Confucius Institutes never reported those donations to the Department of Education, the [Permanent Subcommittee on Investigations] report found—contra federal law."[39]

U.S. policymakers and educational institutions need a better understanding of these organizations' functions in order to assess risks and address other Chinese government activities that engage with U.S. civil society. This includes demanding greater transparency from the American recipients of Confucius Institute money.

Chinese Students and Scholars Associations

The Chinese government sponsors and funds Chinese Students and Scholars Association (CSSA) events on American university campuses. The CSSAs were established in the 1970s to support Chinese students overseas, and its activities are overseen by the CCP's United Front Work Department. In fact, the Chinese government supports and oversees CSSA activities worldwide.

CSSAs provide services to help students adjust to life and academic activities in foreign countries, from finding housing and roommates to studying and group and community activities. But while CSSAs may provide useful services for students, their ties to the CCP have led to concerns that they are also tools for espionage and help to strengthen the party's control of the activities of Chinese citizens abroad.

A 2018 report prepared by staff of the congressionally mandated U.S.–China Economic and Security Review Commission cites a website that

lists "142 individual U.S. CSSA chapters."[40] The report asserts that CSSA chapters appear to be directly subordinate to, in addition to receiving political direction from, the Chinese Embassy and Chinese consulates in the U.S. The report also provides examples of activities in the U.S. and other countries that include espionage, political intimidation and advocacy, and other illicit, illegal, or inappropriate activities.[41]

There have been several cases pointing to the connection between CSSAs and the Ministry of State Security—China's main civilian spy agency. An Axios investigative report, for example, revealed that a suspected Ministry of State Security operative spied on California politicians while serving as president of California State University East Bay's CSSA chapter. Fang, also known as Christine Fang, used political gatherings and campus events to target elected officials.[42]

There is a lack of systematic open-source analysis of CSSA operations in the United States. In particular, there is a lack of authoritative open-source information detailing the relationship between the CSSA and the Chinese Communist Party. The most significant concern with CSSA activities is that they have been fully integrated into the regime's strategy to strengthen state party control of the activities of Chinese citizens abroad. Many of these concerns were articulated in a 2018 *Foreign Policy* article.[43]

Transparency has been a chronic complaint among critics in assessing CSSA activities. While some associations are self-described as "supported by," "recognized by," or "closely connected with" the Chinese government, others describe themselves as "independent." On their face, these claims are difficult to evaluate. The U.S.–China Economic and Security Review Commission staff report notes that "CSSAs often attempt to conceal or obscure their ties to the Chinese government, frequently omitting incriminating language from the English-language versions of their websites—the ones typically reviewed by university administrators."

Gifts, Contracts, and Partnerships with U.S. Universities

U.S. universities enter into contracts with a variety of Chinese entities and individual sources

to foster collaborative partnerships. Some of these activities include contracts with Chinese companies. According to a Bloomberg analysis of data collected by the U.S. Department of Education, publicly disclosed funds from China amounted to almost $1 billion in gifts and contracts distributed to 115 colleges in six and a half years through June 2020.[44] China was the third largest contributor during this period, behind Qatar and the United Kingdom.

Chinese companies play a prominent role in these activities. The Chinese telecom Huawei, for example, has contracted with U.S. universities. Data from the U.S. Department of Education list at least nine U.S. colleges and universities that received more than $10.5 million from Huawei as gifts or contracts from 2014 to 2019.[45] This does not include funds that go unreported.

Chinese companies have also sought to purchase campuses and other educational properties. In 2018, for example, the Jiangsu Zhongtai Bridge Steel Structure Company attempted to purchase a nonprofit American music college.[46] Although the company eventually backed out of the purchase, the arrangement raises concerns about the impact that such purchases could have.

The U.S. Department of State maintains the most comprehensive available data on Chinese funding and gifts to U.S. universities. It is troubling that how this spending affects university activities and operations or how these funds are directed by the Chinese government and the CCP have not been systematically analyzed.

The Washington, DC-based Woodrow Wilson International Center for Scholars sponsored a study assessing Chinese influences on universities. The study, which was based on approximately 180 interviews that included interviews with more than 100 professors, concluded "that these concerns are warranted, even if they are sometimes overblown and fraught with potential for mischaracterization, or worse, racial profiling."[47]

The most significant concern raised is that these funds are in addition to the estimated $12 billion per year in tuition paid by Chinese students. Added to this is the fact that the U.S. Department of Education has found significant underreporting of foreign gifts and contracts.[48] Another concern is that it might be difficult to assess risks because

the relationship between Chinese universities and Chinese government entities, including the Chinese military, is not always clear. An Australian-based data tracker attempts to list these relationships but acknowledges the complexity of the task.[49]

This area of Chinese influence on U.S. universities and the potential risks associated with these activities is among the least understood. It is also difficult to assess whether adequate means for the mitigation of direct and indirect malicious influence are currently available.

The China Scholarship Council

The China Scholarship Council is a nonprofit organization within the Chinese Ministry of Education that funds academic exchanges and is the largest program administering scholarships abroad for Chinese graduate and postgraduate students. The council can serve as an avenue for the Chinese government to exert influence.

As of July 2020, Georgetown University's Center for Security and Emerging Technology (CSET) estimated that the government of China was supporting "between 26,000 and 65,000" students in the United States.[50] The council also funds Chinese scholars, professors, and other researchers. The CSET study describes the characteristics and features of the council's programs but "does not attempt to assess the intent of these programs beyond what is explicitly stated by Chinese primary sources."[51]

The major concern is that the Chinese government could manipulate these programs to exert influence on students for malicious, illicit, and illegal purposes. This is consistent with anecdotal concerns raised with respect to other engagements of the Chinese government.

While there currently are no direct cases of such manipulation, the January 2021 arrest of MIT professor Gang Chen does point to this possibility.[52] Chen, accused of failing to disclose financial ties and affiliation with Chinese entities, was an advisor to the China Scholarship Council and recommended students for scholarship awards. This does not necessarily implicate the council, but it does show that there are grounds for concern.

There are no systematic open-source data assessing the risks and concerns raised.

Conclusion

This survey has assessed the major public programs involving Chinese engagement with U.S. universities and research institutions. The level of transparency of Chinese government and government-directed activities is extremely low. This assessment concludes that there are significant gaps in open-source literature make it difficult to evaluate risks and assess the effectiveness of mitigation measures. Given the importance of U.S. university and research institutions to the security and prosperity of all Americans, and given the increasingly tense competition between the U.S. and China, it is vitally important that this knowledge gap be closed.

The Future of China's Maritime Militia in the "New Situation": A Primer

COLLIN KOH

Much has been written about Beijing's "gray zone" techniques[1] in the maritime domain. Andrew Erickson's scholarly enterprise has shed light on China's maritime militia, hitherto shrouded in public obscurity. Notable works focused on China's maritime law enforcement agencies by other scholars like Lyle Morris and Ryan Martinson have also broadened our contemporary understanding of Beijing's strategies short of war in such regional maritime flashpoints as the East and South China Seas.

The cottage industry of articles examining China's gray zone maritime activities has gradually expanded to include more nuanced perspectives. For instance:

- Hongzhou Zhang argues that as the "people's war" concept, long considered one of the key pillars of China's military doctrine, has evolved through time from the traditional "people's war" to "people's war" under modern conditions to the current "people's war" in the 21st century, the focal role of the militia has shifted from guerrilla warfare to the logistics and transportation for conventional forces.[2]

- In their analysis of China's maritime militia, Shuxian Luo and Jonathan G. Panter argue that

instead of being a "unitary actor" as commonly misperceived, China is composed of multiple domestic social, political, and economic audiences. Moreover, instead of being fixed, they argue, China's policy priorities change over time in response to domestic politics and external environment.[3]

Altogether, these materials promote better scrutiny of Beijing's maritime activities, not least the use of coercion against rivals in such disputes. This allows concerned policymakers to craft better responses to gray zone activities. In particular, it helps navies that grapple with how best to cope with adversarial techniques short of war, especially when the lines between a fisherman and a combatant are blurred.

This commentary does not seek to rehash the existing literature, which is easily accessed. Moreover, there is a rich trove of Chinese-language materials that deal with China's maritime militia—for instance the People's Liberation Army–run magazines *National Defense* and *China's Militia*.[4]

Interesting foreseeable trends, however, do raise questions regarding the future trajectory of China's gray zone activities. In particular, what will be the future of China's fishery focus, and how will that affect the role of its maritime militia? Equally

CHART 1

China Fishery Production

■ Freshwater farming ■ Mariculture ■ Marine capture ■ Freshwater capture

MILLIONS OF TONS OF FISH
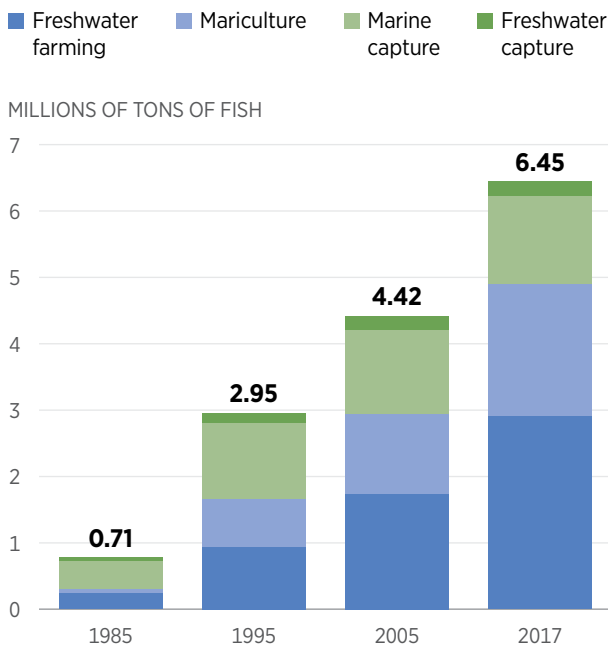
SOURCE: Lu Quan and Chen Xinjun, "Development of Chinese Fishery Industry in the Past 40 Years of Reform and Opening Up, Production Forecast in the 14th Five-Year Plan," pp. 339–347, *Journal of Shanghai Ocean University*, Vol. 30, No. 2 (March 2021).

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important, is this future undermined by the rapid expansion of the PLA Navy and China Coast Guard and by recent developments such as the promulgation of a new Coast Guard Law?

Transforming China's Fisheries

Fisheries constitute a major facet of China's marine economy and contribute to Beijing's quest to become a maritime great power. Traditional fisheries (marine capture)[5] have focused on China's near seas—the East and South China Seas, Yellow Sea, and Bohai Gulf—for decades, contributing immensely to the country's total fishery production. However, these fishing grounds have been suffering in recent years from overexploitation and are near the brink of potential future collapse.

Of the 7.05 million tons of total fishery production in 1985, marine capture constituted about 4.2

million tons. In the course of a full decade, fishery production rose to 29.53 million tons, with marine capture accounting for 11.4 million tons of the total. By 2005, fishery production had ballooned to 44.2 million tons, with marine capture accounting for 12.55 million tons of total production.

Chinese scholarship recognizes some of the key challenges faced by China's fisheries, chiefly the depletion of coastal fishery resources in the near seas, caused by overfishing and marine environmental pollution, and an excessively large and mostly antiquated fishing fleet manned by an aging pool of fishermen.[6] There has been a gradual shift toward greater government investments in aquaculture and mariculture, as well as the development of distant fishing operations as one of the strategic emerging industries, and controls on overfishing to promote sustainable development.[7]

With an eye to shifting from quantitative growth to improvements in quality and efficiency, a series of reform actions have been taken to push the institutional change to better defined rights-based fisheries management.[8] The 13th Five-Year Plan (2016–2020) focused on implementing structural reforms and promoting the transformation and upgrading of the fisheries industries, building on the 12th Five-Year Plan (2011–2015), which promulgated several new fishery policies.[9] With respect to the South China Sea, where overexploitation of fish stocks has been a concern, the Hainan authorities revised eight provincial laws after the Permanent Court of Arbitration handed down its arbitration award on July 12, 2016,[10] either adding the new components of "marine environment" established in the award to their laws or adopting new methods and stricter enforcement mechanisms to prevent environmentally harmful fishing.[11]

Beijing had lately claimed some success for its fishery policies. In its 2020 work report on the fisheries industry and administration, the Ministry of Agriculture and Rural Affairs stated that within the 13th Five-Year Plan period, it had reduced the near-seas fishing fleet by more than 45,000 vessels—not just the targeted 20,000 vessels—and refurbished over 16,000 existing vessels to meet better safety and environmental requirements.[12] By 2025, under the new 14th Five-Year Plan, China's total fishery production is projected to

reach 70.95 million tons, including 32.54 million tons of freshwater farmed products, 23.64 million tons from mariculture, and just 10.04 million tons from marine capture.[13]

Despite concerns about the long-term sustainability of the fisheries stock in China's near seas, the South China Sea in particular is seen to possess the greatest potential for its fishery development.[14] Beijing's policy governing fishery operations in the disputed Spratly waters is based on the belief that Chinese fishermen have a right to operate there and that it is in China's national interest that they do so.[15] Fishing, an economic activity, has political value. As Ryan Martinson has pointed out, just by being present in disputed space and showing the national flag, Chinese fishermen represent China and demonstrate Chinese ownership.[16]

Even if there could be a gradual reduction of wild catch fishing in the South China Sea, China's fishery activities would not be irrelevant. Marine ranching or mariculture in the near seas merely represents a transformation of the methods by which fishery resources in the area are harvested. These activities would still take place in politically contentious areas. So far, Mischief Reef, Subi Reef, and Fiery Cross Reef, all of which Beijing has transformed into artificial island outposts, have been identified as possessing the basic environmental conditions for mariculture, and Chinese authorities have been conducting initial tests in Mischief Reef since 2007 with some notable successes.[17]

Reinvigorating for Relevance

With near-seas Chinese fishery activities—a mixture of wild catch or mariculture—persisting even under current transformation and reform processes, it is clear that Beijing would still have immense stakes in contested maritime areas, not least the South China Sea. The maritime militia will continue to be an important part of China's campaign to safeguard its maritime sovereignty and rights, notwithstanding the rapid buildup of uniformed services such as the PLA Navy and China Coast Guard.

Publicly available Chinese literature and official publications in recent years have pointed toward a growing, not shrinking, future role for the maritime militia. According to Pan Jinkuan, a professor at the PLA Army Command College, maritime militia still has a useful role in modern warfare under "informatized conditions," undertaking such missions as reconnaissance, mine warfare, anti-submarine, deception, and small-scale combat operations.[18]

There have long been calls to revamp the maritime militia for various reasons, such as long-term manning challenges. There are full-time maritime militia units that partly alleviate the problem of manpower availability, especially during fishery moratorium periods when fishermen have to seek other livelihood opportunities that might prevent them from fulfilling their maritime militia responsibilities. However, there are longer-term concerns about the aging manpower pool, since most Chinese citizens engaged in coastal provinces' traditional fisheries activities are in their 40s–60s.[19]

In line with fishery industry reforms and transformation, the maritime militia is expected to undergo a parallel evolution to keep pace as reflected in the push to constitute a new type of maritime militia system "using fishing militia as the main body, using militia members involved in maritime industries as backbone."[20] The Hainan provincial government's 2021 work report also stressed the deepening of civil–military fusion in a nod to the maritime militia's role.[21]

These advocacies build on calls made in recent years by senior PLA officials for a new type of maritime militia fleet capable of both fishing and fighting that integrates sovereignty protection, command and control, fishing and fishery production, and logistical support.[22] Recent publications by senior PLA servicemembers stress the need to strengthen the maritime militia's ability to safeguard national sovereignty at sea by improving their technical capabilities; raising their awareness; enhancing their quality through more intensive territorial sovereignty education; and elevating realistic combat training and joint training with the PLA Navy and other maritime law enforcement agencies to improve prospects for joint operations, coordination, command, and control and prepare them for "military struggle at sea."[23]

Conclusion

It is clear that, as Beijing continues to build up its blue-water naval capabilities and commission

new classes of Coast Guard vessels, the maritime militia continues to roam the near-seas disputed waters. The most recent instance, believed by Philippine authorities to be manned by maritime militia off Julian Felipe Reef (Whitsun Reef) well within the Philippine exclusive economic zone, serves as a reminder that notwithstanding China's fishery reforms and transformation, the maritime militia will remain one of Beijing's primary tools in its efforts to expand its domination of the contested waters.

Commanding Depths: China's Bid to Dominate the Cloud—Under the Sea

DAVID FEITH AND LARA D. CROUCH

America's Undersea Blind Spot

A challenging reality of the Internet age is that human life depends so heavily on technologies and systems that are invisible or, at best, obscured from view. It is hard to understand what we cannot see. Yet to talk to family, conduct business, and protect national security, Americans and others rely on invisible data packets transmitted through telecommunications infrastructure—cell towers, data centers, the cloud—that we seldom see, and even more seldom understand.

Undersea cables are a particularly acute example of this challenge.

Most people have never seen a photograph of an undersea cable, let alone encountered one on the ocean floor or at some obscure coastal landing site. Images of satellites in space loom large in the public imagination, but undersea cables are typically out of sight and out of mind. Yet it is through undersea cables, not satellites, that more than 95 percent of global internet data now flows.[1] That is trillions of dollars daily in financial transactions, along with personal messages, video chats, business records, scientific information, and almost all government and military communications.

The United States and its allies have in recent years recognized the strategic importance of telecommunications infrastructure, prompted by

China's ambitions to build and exploit it for global intelligence collection, commercial influence, and coercive leverage. Washington has paid much justified attention to whether other countries choose to build fifth-generation (5G) wireless networks with untrusted Chinese vendors (such as Huawei and ZTE) or trusted non-Chinese vendors (such as Nokia, Ericsson, and Samsung). But this attention has been selective, confined largely to terrestrial telecom networks, stopping at the water's edge. Far less attention has been paid to the competition to develop undersea cable networks, even though they pose the same economic and national security risks as terrestrial networks.

China exploits this attention deficit. Beijing clearly considers undersea cables central to its ambitions to capture the commanding heights (or in this case, commanding depths) of the future global economy. China's One Belt, One Road infrastructure strategy includes a Digital Silk Road initiative that uses subsidies, diplomacy, and other state tools to promote Chinese construction of undersea cables globally.[2] Beijing's Made in China 2025 plan seeks to capture 60 percent of the global market for fiber-optic communications,[3] and its state-backed champion Huawei Marine Networks (recently rebranded HMN Tech) is bidding to break into the top tier of global undersea cable vendors.

Constructing and operating undersea cables is sensitive work that can give companies—and their state sponsors—opportunities to steal information; invade privacy; divert data flows; harvest commercially and strategically significant big-data pools; cut off communications in a crisis; manipulate data; install subsea surveillance equipment; or otherwise make mischief. As one Chinese industry publication described in especially candid terms, "Although undersea cable laying is a business, it can also be described as a battlefield where information can be obtained."[4]

It is vital, therefore, that U.S. policymakers gain a more transparent understanding of undersea cables, China's ambitions, and how to counter them. Future plans for automated vehicles, advanced robotics, and 5G networks—plus bringing the Internet to the roughly 40 percent of the world that is not online—will require many more undersea cables, and further increase U.S. and allied reliance on this overlooked technology.

There is good news on at least two fronts: First, the U.S. government has paid significantly greater attention to the strategic importance of undersea cable networks since early 2020. Second, the United States and its allies retain significant commercial advantages in undersea cables, unlike those that the United States forfeited over the past two decades in terrestrial 5G hardware. The trick in this portion of the telecommunications competition is to maintain that lead, which should be achievable through modest sharpening of strategy, policy, and diplomacy.

Strategic Transparency

Until early 2020, Washington was slow even to notice that China's undersea cable moves posed a challenge. The U.S. government has long worked on undersea cables (President James Buchanan sent America's first transatlantic cable message, to Queen Victoria, in 1858). But in recent decades U.S. officials had focused mostly on protecting cables from adversary militaries, which might try to cut them or tap them. Other concerns included natural disasters (earthquakes and tsunamis) and accidents (such as collisions with fishing trawlers or container ships). Mercantilist commercial competition from a rival state was not among the recognized concerns.

This dynamic was seen in the late Obama Administration, when interest in undersea cables spiked in the context of military tensions with Russia. The New York Times reported in October 2015 that "Russian submarines and spy ships are aggressively operating near the vital undersea cables that carry almost all global Internet communications, raising concerns among some American military and intelligence officials that the Russians might be planning to attack those lines in times of tension or conflict."[5] American officials focused intensely on the Russian military threat to undersea cables—but not on the threat of state-backed commercial competition from China.[6]

A 2017 report from the British think tank Policy Exchange similarly focused on the Russian military threat, along with the general precariousness of a global Internet that relies on as few as 200-some cables criss-crossing a small number of well-known geographic chokepoints, such as the English Channel, the Suez Canal, the Strait of Malacca, and the Luzon Strait.[7] The report, written by British parliamentarian (and now Chancellor of the Exchequer) Rishi Sunak, with a foreword by retired U.S. Admiral James Stavridis, offered many thoughtful insights, but it cited China only once, as a possible military threat, alongside Iran. There was no mention of Beijing's world-spanning plans to build cables and insinuate the Chinese Communist Party (CCP) into global digital infrastructure. Indeed there was no mention at all of who builds the world's cables, or of the risk of their being built by competitors or adversaries.

The U.S. and allied failure to recognize the threat of China's commercial undersea cable ambitions reflected a complacency characteristic of the democratic West's former approach to China. Across many market sectors and technology fields—and for decades—the West overestimated its strengths while underestimating China's.

It was especially easy to do this in undersea cables because China was historically out of the picture, while three firms from democratic nations came to dominate the global market: (1) U.S. firm Subcom (once known as TE Subcom and AT&T Submarine Systems), (2) French–Finnish firm Alcatel Submarine Networks, and (3) Japanese firm NEC. Such private competition among firms from friendly, rule-of-law countries is highly

desirable. Yet, it also seems to have caused policymakers to assume—even if unconsciously—that this free-world dominance in undersea cable construction is a given, and that the ambitions of a Chinese upstart like Huawei Marine Networks do not warrant concern. This was a mistake.

Know Thy Competitor

Huawei Marine Networks was formed in 2008 as a joint venture between China's Huawei Technologies and Britain's Global Marine Systems (successor to the British firm that laid the first undersea telegraph cable in 1850). Huawei Technologies was the controlling shareholder, with 51 percent, and used the tie-up to elevate its undersea strategy, from mostly installing equipment on cables built by others, to winning contracts to build cables of its own. Soon Huawei Marine had a global footprint, especially in Southeast Asia, Africa, the Middle East, and Europe. It even won a $250 million contract in 2011 to land the "Project Express" cable in New York for finance industry clients (more on this later).

In its earlier years, Huawei Marine focused mostly on "short-haul" cables that were modest in technical and commercial terms, as it was unable to compete with Subcom, Alcatel, and NEC for long-haul, higher-value projects (typically more than 4,000 kilometers in length). This kept Huawei Marine's commercial market share below 10 percent, according to industry estimates, but it allowed the company to develop its technology and establish relationships with telecom companies and governments around the world. In 2019, research firm TeleGeography assessed that Huawei Marine was on pace to complete 28 cables in the five years to 2020, nearly 25 percent of all cables built globally.[8]

Huawei Marine's ultimate purpose was not simply to rack up short-haul contracts, however, but to rival and eventually displace the dominant Western players in this strategically critical industry.

Thus Beijing financed Huawei Marine's first long-haul contract in 2015, to build the "South Atlantic Inter Link (SAIL)" cable across the Atlantic from Cameroon to Brazil, which was completed in 2018.[9] Beijing financed a more significant long-haul contract in 2017, for Huawei Marine to build its flagship "Pakistan and East Africa Connecting

Europe (PEACE)" cable from Pakistan to East Africa and onward to France—landing in the heart of the North Atlantic Treaty Organization (NATO) and Western Europe, and in partnership with French telecom giant Orange. As Orange executive Jean-Luc Vuillemin explained, "This is a plan to project power beyond China toward Europe and Africa."[10] PEACE is set to connect to a companion overland cable from Pakistan to China, and its backers have signaled plans to extend the undersea portion of the project via further connections into Southeast and Northeast Asia.[11]

Yet there are limits to how much China can accomplish with purely state-financed projects, which are more expensive for Beijing and carry at least some stigma of advancing Chinese foreign policy interests, making it harder for these cables to earn landing rights in certain countries and to sell bandwidth to certain would-be buyers. So Beijing increasingly wants to help Huawei Marine get business from the ostensibly private commercial consortiums of international telecom firms that build many of the world's long-haul cables, especially those that run across Eurasia and Africa.

Chinese state telecom giants China Mobile, China Telecom, and China Unicom are significant investors in many such consortiums, giving these Beijing-owned firms significant voting power in awarding construction contracts. And whereas Huawei Marine was long excluded from these bids for lack of experience in building advanced long-haul cables, China's telecom companies have begun encouraging more flexible standards and insisting that Huawei Marine be invited to compete. Once in the mix, Huawei Marine can offer substantially lower prices than its Western rivals, which are not state-backed.

Huawei Marine also benefits from branding sleight of hand. Indeed, the company no longer technically goes by "Huawei Marine," having been rebranded as "HMN Tech" in late 2020. That followed its spin-off from Huawei Technologies in 2019, soon after Huawei became subject to U.S. sanctions and diplomatic pressure about its status as a proxy for the CCP.[12]

Huawei Marine's new parent, Hengtong Group, is China's largest optical fiber and power cable manufacturer and claims to hold a 15 percent global market share for these products.[13] Like

Huawei, Hengtong is close to the Chinese government. Its founder is a People's Liberation Army (PLA) veteran and National People's Congress deputy, and in 2016, it worked with the PLA Naval University of Engineering to form an Underwater Optical Network Joint Laboratory.[14] Its Chinese-language website trumpets the company's commitment to "offer powerful support for the modernization of our country's national defense."[15] The PLA, which first laid indigenously produced undersea cables in 2002, has significant interest in undersea networks, such as those connecting to its bases in the South China Sea.[16]

Hengtong is also a joint-venture partner of Hong Kong-based telecom services firm LightHash, which will operate the PEACE cable and manage its data flows. LightHash advertises links to cable projects worldwide, including in the United States, and is affiliated with NASDAQ-listed Chinese Internet service provider 21vianet, a major partner of U.S. firms operating in China.[17]

Consistent with China's style, Hengtong is state-backed but not allowed to dominate its market alone. Another Chinese player being groomed by Beijing is FiberHome, which boasts of cable product sales around the world.[18] The company has supplied 30,000 kilometers of optical cables to Deutsche Telekom in Germany and sold cable solutions to major local operators in Ecuador.[19] "What HMN Tech is today, FiberHome could be in three years," one industry source says.[20] As of last year, Fiberhome is also on the U.S. export-control Entity List for links to the CCP's surveillance and repression of Uyghur Muslims in Xinjiang.[21]

This web of related firms with nominally private ownership, deep connections to the state, and deep connections to international markets is typical of China's advanced technology ecosystem, in which the CCP pushes companies both to serve its strategic ends and to maximize global market share. This is why Beijing's ambitions in the international undersea cable market pose such serious risks to other countries. In telecommunications systems, data integrity and privacy are significantly a matter of trust, transparency, and rule of law. Beijing's way of doing business undermines faith that systems built and operated by Chinese firms can stay independent of Beijing's widely demonstrated desire to surveil, steal, and coerce.[22]

Hence the need to establish better policies for reckoning with the Chinese undersea cable challenge at home and abroad.

Transparency in U.S. Policy

A first basic question of U.S. policy is what sort of cables to allow to connect to U.S. shores. A partial answer emerged quietly from Washington in 2013, when U.S. officials reportedly blocked Huawei Marine from implementing its contract to land the "Project Express" cable in New York from London.[23] This was before Washington's general awakening to threats from China, but it followed a prescient 2012 report from the House Intelligence Committee raising sharp national-security concerns about Huawei.[24] Since then, Huawei Marine has never earned another contract to connect a cable to the United States.

This suggests that U.S. policy effectively bars Huawei Marine from landing cables on U.S. shores, but it is not clear that U.S. officials have ever said so publicly. Instead, the policy position of banning Huawei Marine is associated chiefly with Australia, where the government in 2018 blocked a Huawei Marine cable from connecting to Sydney from the Solomon Islands. Australia's move brought welcome U.S. and global attention to undersea cable concerns, setting a visible standard for countries to protect their domestic systems from compromise by untrusted Beijing-backed vendors.

A related but separate U.S. policy question is whether to allow cables to connect directly from the United States to China, regardless of who builds them. On this, Washington has tightened policy considerably in recent years.

As recently as January 2017, the Federal Communications Commission (FCC) gave a license for a cable to connect directly to Shanghai from a landing site in Oregon.[25] This "New Cross-Pacific" cable—owned by a consortium including Microsoft, China Mobile, China Telecom, and China Unicom, and built by Subcom—became the fourth cable to connect the United States and China directly.[26] It might also be the last.

In 2018, the Trump Administration formalized the role of Team Telecom, an interagency group that advises the FCC on the national-security implications of telecom licensing decisions, with input from the Departments of Justice, Defense,

and Homeland Security, among others.[27] In June 2020, Team Telecom made its first recommendation that the FCC block a landing license for a cable directly connecting the United States and China.[28] This prevented the "Pacific Light Cable Network" (owned by Facebook, Google, and Chinese telecom firm Dr. Peng, and built by Subcom) from connecting Los Angeles to Hong Kong, forcing it to terminate instead in Taiwan and the Philippines. Within months, seeing the writing on the wall, two other consortiums seeking to build U.S.-to-Hong Kong cables (including Facebook, Amazon, China Mobile, China Telecom, and China Unicom, with neither project using Huawei Marine) withdrew their applications from the FCC.[29]

The FCC may soon go a step further and re-examine existing cable links to China. As FCC Commissioner Geoffrey Starks testified last year, "We must take a closer look at cables with landing locations in adversary countries. This includes the four existing submarine cables connecting the US and China, most of which are partially owned by Chinese state-owned companies."[30] Starks added that U.S.–China cable connections are "appropriate" so long as U.S. communications are "secure."[31] But it is unclear how security can be established to U.S. satisfaction given current law and policy on both sides of the Pacific.

As Washington adopts a more restrictive posture, it should provide greater transparency into how the U.S. government defines a "secure" system. There is reason for concern about any data that touches China or Chinese firms, given Beijing's 2017 National Intelligence Law requiring that all entities in China cooperate with its intelligence services. But China is not disconnecting from the global Internet, so which risks are acceptable? Clarifying this question will be crucial both to organizing the executive branch around a shared understanding of the challenge and to securing support for U.S. policy from Congress, the private sector, U.S. allies and partners, and others.[32]

An additional policy question is whether the United States is sufficiently protecting sensitive technologies related to undersea cables. An important starting point is Huawei Marine, which was added to the Commerce Department's export-control Entity List in August 2019, along with other affiliates of parent company Huawei Technologies,

due to concerns that U.S. exports to these companies would harm U.S. national security.[33] Today, however, it appears that Huawei Marine may be able to access U.S. exports because its new parent, Hengtong Group, is not on the Entity List.[34] Such shell games undermine U.S. technology controls.

Academic partnerships can also pose concerns. Many such partnerships are positive and mutually beneficial, but many others have proven to be conduits for illicit or otherwise unwelcome technology transfers.[35] As policymakers recognize the strategic significance of undersea cables, it would be prudent to examine how advanced academic programs manage export-control compliance and related risks. (Virginia Tech's Center for Power Electronics Systems, for example, has long collaborated with Chinese tech firms including Huawei, ZTE, Powerland, and others on cable power-feed equipment and other fiber-optic technology.[36])

U.S. policy will also be strengthened to the degree that U.S. officials are well connected to relevant private-sector actors, which has not been the case in the past. Just as Washington has in recent years deepened its interest in engaging with U.S. and allied firms that specialize in 5G hardware, semiconductors, advanced robotics, and the like, so too should the U.S. government become more familiar with the players in undersea cables. These would include not just Subcom (rarely has a company enjoyed so much strategic importance paired with so much obscurity), NEC, and Alcatel. Also important are producers of fiber-optic technology, data-center operators, and cable developers, from the tech giants that produce so much data and fund a growing share of new cable projects worldwide (Facebook, Google, Amazon) to smaller, local players in strategic areas such as the Indian Ocean or Pacific Islands.

These various U.S. policy concerns are important for securing U.S. domestic networks, but also as the foundation for important diplomatic work. Securing data flows from adversary compromise and abuse is a necessarily global challenge.

Transparency in U.S. Diplomacy

As with 5G and telecommunications issues generally, securing U.S. interests and U.S. networks will depend in large part on coordination with allies and partners. Huawei Marine and

other Chinese players are seeking market share all around the world, with significant potential to undermine Western rivals and abuse access to vast amounts of data, including sensitive U.S. military and other transmissions to allied and partner countries. The Trump Administration came to recognize the need to elevate undersea cables in its diplomacy in 2020, setting out a range of initiatives that provide a foundation for important diplomatic efforts going forward.

The most visible Trump Administration move was the August 2020 announcement by Secretary of State Mike Pompeo of the Clean Cable initiative. This was part of a broader suite of Clean Network efforts designed to discourage allies from collaborating with untrusted Beijing-backed firms across the digital economy, from 5G to cloud services to mobile-phone apps. The purpose of Clean Cable, as Secretary Pompeo put it, was "to ensure that the [CCP] cannot compromise information carried by the undersea cables that connect our country and others to the global Internet." He added, "Huawei Marine significantly underbids other companies on multiple procurements to connect Asia, the Pacific, Africa, and Europe using Chinese state-backed underseas technology. We can't allow that to continue."[37]

Clean Cable gave a name to a series of diplomatic campaigns by U.S. officials, some of which had quietly gotten started in the prior year or two. In one, U.S. officials raised concerns about a World Bank plan to have Huawei Marine build a cable (at a reported 20 percent discount) among the Pacific Island nations of Micronesia, Kirabati, and Nauru; the World Bank formally unwound this plan in early 2021 by seeking new bids from all players.[38] In another case, U.S. officials encouraged Chile's July 2020 decision to build a trans-Pacific cable to Australia and New Zealand, effectively excluding Huawei Marine from the competition given Australian restrictions. Chile made this decision despite conducting an initial 2017 study, in partnership with Huawei, that recommended building the cable to Shanghai.[39]

In many such cases, Australian and Japanese officials played a significant role alongside U.S. diplomats. Such was the case in 2018, when U.S. officials tried to discourage Papua New Guinea from using Huawei Marine to build its domestic undersea network. But those efforts came too late. Papua New Guinea had contracted with Huawei Marine back in 2015, and by 2018 construction was already underway.[40] This experience helped to encourage U.S. officials to get better organized on undersea cable issues.

U.S. and allied officials also improved coordination on providing countries alternatives to China's undersea-cable offerings. In November 2019, the United States announced $190 million in development financing for the construction and operation of a new cable from California to Indonesia and Singapore.[41] The cable, to be built by Japan's NEC, boosts U.S. connectivity with fast-growing Southeast Asia, while avoiding South China Sea waters, where Beijing seeks to interfere with and thwart economic activity by its neighbors. Thanks to an October 2020 announcement of financial support from the U.S., Japanese, and Australian governments, the cable will also include a spur to the Pacific Island nation of Palau, providing Palau its second undersea link to the global Internet.[42] The Palau spur funding was the first fruit of the Trilateral Partnership for Infrastructure Investment in the Indo-Pacific among the United States, Australia and Japan, which in 2019 also co-founded the Blue Dot Network to advance high-standard infrastructure development.[43]

To build on this diplomatic foundation, the U.S. government can move quickly in three areas:

1. Who Is in Charge? Though the State Department has led diplomatic initiatives related to undersea cables in recent years, there is no recognized lead office or official, nor are there clear structures of coordination with other parts of the government, where key players include the National Security Council, the Defense Department, the Commerce Department and its Foreign Commercial Service, the U.S. International Development Finance Corporation, and the U.S. Export-Import Bank. This organizational challenge extends to strategic infrastructure issues generally. The U.S. government is less aware of challenges and opportunities than it needs to be, and often not well postured to address those issues it does notice. This could be improved by strengthening interagency bodies such as the Global Infrastructure Coordinating Committee, which was established, with modest effectiveness,

during the Trump Administration. Doing so would also boost the Biden Administration's efforts to support the Blue Dot Network executive consultation group (launched in June 2021) and to focus on infrastructure at the next Quad summit meeting with Japan, Australia, and India (late 2021).[44]

2. Europe's Soft Underbelly. Thanks to the backlash from Beijing's aggressive policies of recent years, Huawei Marine will likely find it difficult or impossible to land cables in the United States, Australia, Japan, Britain, India, and other countries. This will limit Beijing's global undersea market share and data access, but only to a point. The PEACE cable shows where Beijing can still count on access—across the Indo-Pacific, Africa, the Middle East, and Europe. Latin America is a target, too. The European risk warrants particular attention by U.S. officials and NATO allies, starting with France, which has signaled shared concern with Washington about Huawei in 5G networks but apparently not regarding undersea cables. As mentioned above, Washington would benefit by providing allies with more information about U.S. risk assessments and the challenges of mitigation. Also beneficial would be greater intelligence-sharing to identify vulnerabilities and test NATO preparedness for compromises of undersea networks, as recommended in a 2020 report of the U.S. Senate Foreign Relations Committee.[45]

3. Developing-World Hubs. Outside of continental Europe, a handful of developing countries will play an outsized role in the future development of undersea cable networks given their strategic geography (Brazil, Egypt, and South Africa) and large data-producing populations (India and Indonesia). This fact should inform U.S. diplomatic engagement with these countries, much as U.S. officials have become more aware of Indonesia's centrality to global nickel supplies, or Congo's to cobalt. Though stopping every Chinese deal will not be possible, U.S. engagement can inform foreign governments of the risks they face, help to develop a common threat assessment, discourage dependence on Beijing for undersea access to the global Internet, expose systems with insufficient data protections, and highlight high-quality alternatives from trusted vendors.

Conclusion

As the Biden Administration organizes the world's "techno-democracies" against the "techno-authoritarians," undersea cables clearly deserve concerted attention from policymakers and diplomats. Beijing's ambitions in commercial undersea cable competition can no longer be overlooked in favor of the traditional threat of undersea military sabotage or espionage, important as those are. The keys to U.S. success are to sharpen U.S. policy at home, keep U.S. technology out of the hands of Chinese firms, improve coordination across the U.S. government and with the private sector, and prioritize diplomacy with NATO allies, Quad partners, and other important players.

The South China Sea: 21st-Century Fulda Gap for Major War in Asia

BRENT D. SADLER

Since the end of the Cold War, the U.S. Navy has struggled to identify a compelling and galvanizing naval challenge to inform investments in building its future fleet. In the interim, the Navy pursued a decades-long focus on power projection ashore against threats that could not contest its presence. This era has ended with the advent of modern anti-access and area denial capabilities by a host of competitors, most notably China, yet there has been little focus on the most likely and most decisive maritime theater, the Indo-Pacific region. Instead, traditional naval generalist approaches have held sway. This blinkered approach must end if the Navy is to field the forces needed for today's great-power competitions and war.

At the end of the Second World War, Stalin lamented that Berlin was not incorporated in its entirety into Soviet-controlled East Germany. In time, West Berlin would grow into a bastion of freedom and an example of capitalist success nestled deep behind the Iron Curtain. Stalin went so far as to instigate a crisis that resulted in the 1948 Berlin Airlift and 1949 establishment of the North Atlantic Treaty Organization (NATO). Stalin and subsequent Soviet leaders failed in their aspirations for global Communism—a failure vividly demonstrated by the fall of the Berlin Wall in 1989—but the peaceful conclusion of the Cold War was never certain.

This was reflected in the planning for the defense of the Fulda Gap in West Germany, which came to symbolize the broader East–West military confrontation. Located in southern Germany, the Fulda Gap would be the site of the "first battle" in the event of a Soviet invasion of Western Europe. As such, it played an immense role in military planning, as well as investments in future capability, and even made the case for effective sea control of the North Atlantic to ensure that critical reinforcements would arrive in time.

Today, with the acceleration of great-power competition with China, where is today's Fulda Gap?

The Spectrum of Conflict: Taiwan

Not unlike the ideological and military competition with the Soviets, the competition with China spans a spectrum of conflict ranging from peacetime competition through potential high-intensity warfare. Taiwan, protected by 90 miles of ocean, is a vibrant democracy and successful capitalist market. To the Chinese Communist Party (CCP), however, it is their modern Berlin, and the most likely trigger for major war today would be an attempt by Beijing to reintegrate Taiwan into the mainland by force.

Regaining control of Taiwan is a stated CCP core national interest and principal strategic direction. It was also a major inspiration for 2015's wide-ranging military reforms.[1] In recent years, the danger of conflict has taken on added urgency as the Peoples Liberation Army (PLA) has outpaced the capacity of U.S. and allied conventional deterrence. However, success in such a conflict is far from certain, and an apparently incremental strategy is being perused at minimum risk to the survival of the CCP.[2] Control of the South China Sea plays a key strategic role in this approach.

In a prolonged battle over Taiwan, PLA control of the surrounding waters and airspace would be needed to secure the landings and win the subsequent land campaign. This makes controlling the East and South China Seas critical to Chinese military planners. Without logistical support, PLA forces fighting in Taiwan would eventually succumb. The shallow waters and proximity of key U.S. ally Japan's military forces in the nearby Ryukyu Islands mitigate the opportunity value of the East China Sea in an incremental peacetime contest, given the limited military and diplomatic avenues that such a geopolitical setting affords the CCP. This relatively fixed tactical and strategic dynamic presents a straightforward setting for force-on-force calculation and attrition warfare.

The Spectrum of Conflict: The South China Sea

More interesting to the CCP, however, is the South China Sea with its wide-open maritime space and deep waters surrounded by nations with various allegiances. Such a key strategic theater provides the potential for incremental Chinese peacetime successes in undermining U.S. partnerships and credibility while being a favorable setting for a major naval showdown.

Like the Fulda Gap in the Cold War era, peacetime and wartime operations conducted on the South China Sea will be a key factor in determining the fate of Taiwan. The PLA Navy (PLAN) and CCP have invested tremendous resources in this key strategic maritime theater. The most advanced Chinese naval platforms are based there, leading-edge joint operations are practiced there, and PLAN senior leaders have served there. In fact, both of the last two PLA Navy

(PLAN) commanders, stretching back 15 years, served previously as commanders of the South Seas Fleet based in Zhanjiang on the China mainland's southern coast.

While the PLAN would be responsible for securing the waters around Taiwan in a conflict, the uncertain geostrategic landscape of the South China Sea also compels the PLA to assume a very active military and diplomatic role there. In what Major General Zhang Zhaozhong of the PLA once called a "cabbage" strategy, the PLAN, in concert with the Chinese Coast Guard (CCG) and maritime militia, has had great success in edging out regional claimants.[3] To bolster this echelon maritime approach in which the maritime militia backed by the CCG and PLAN "peacefully" seize various maritime features, the PLA has established an archipelago of manmade island military garrisons to sustain a persistent maritime presence across the South China Sea.

Avoiding the uncertainty of war is clearly in the CCP's best interest. Consequently, Beijing has made substantial investments in pocketbook diplomacy and influence peddling throughout Southeast Asia in order to buy acquiescence. In the most notable example, Beijing attempted to use co-development and infrastructure investments to lure Manila into relinquishing its legal rights in its economic exclusive zone (EEZ).[4] Failing this, the PLAN has backed more coercive approaches to expanding its military footprint in the region at the added expense of U.S. regional credibility. As of this writing, an all too familiar scenario was playing out at Whitsun Reef, where Chinese Coast Guard, maritime militia, and fishermen had massed within the Philippines' EEZ. However, instead of typical "cabbage" strategies leveraging the maritime militia and CCG, a more forceful PLAN presence was on display.

In peacetime confrontations, a tactic often used by the CCG is shouldering, which requires using one's ship to physically move another's. In such cases, the size of the ship matters, and the CCG has some of the largest cutters in the world. At the same time, the CCG has a huge lead over any other coast guard or maritime police force in Southeast Asia.[5]

In an unusual move, as maritime militia massed at Whitsun Reef to the south, two PLAN

MAP 2

Major Developments in Chinese Naval Expansion

China has been expanding and reinforcing its naval bases, both close to home and deep into the South China Sea.
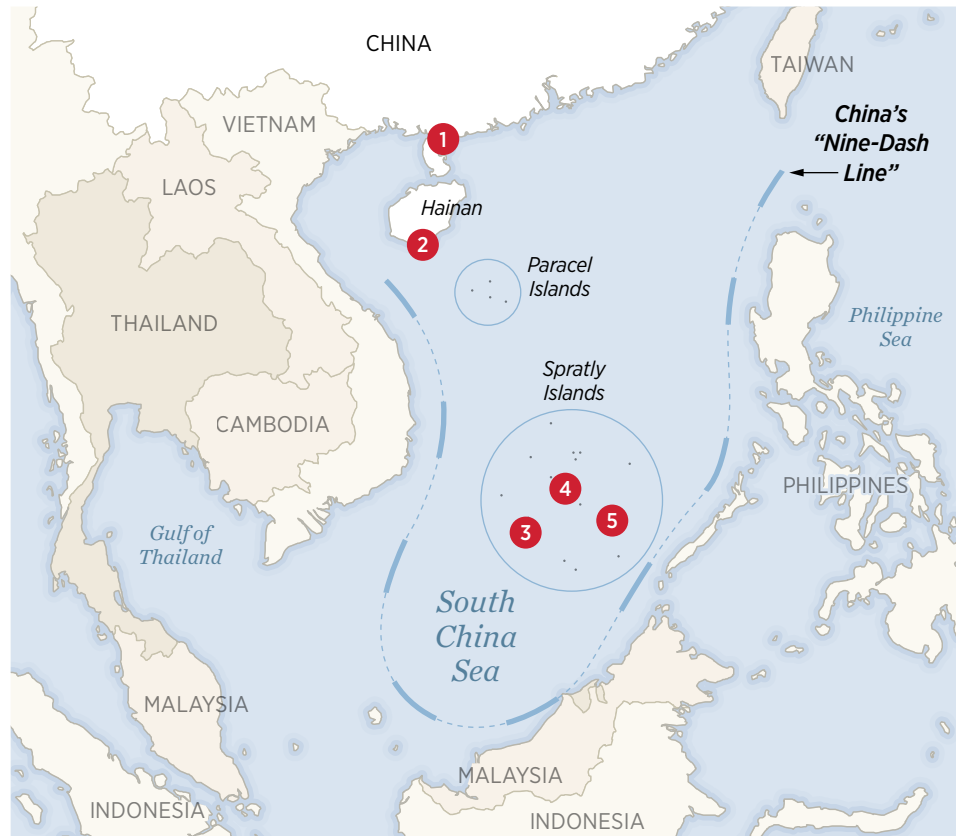
1 Zhanjiang South Sea Fleet HQ. Significant pier expansion for additional ships and shore support facilities.

2 Yulin Naval Base. Pier expansion to accommodate a carrier battle group and dry dock to accommodate next-generation Chinese super carriers.

2 Yulin Submarine Base. Pier expansion and shore facilities to accommodate additional submarines and ships of additional carrier battle groups.

3 Fiery Cross. Construction of 10,252-foot runway and port with 4,350-foot pier space; logistic support facilities added with fixed-weapon positions.

4 Subi Reef. Construction of 9,800-foot runway and port with 3,650-foot pier space; logistic support facilities added with fixed-weapon positions.

5 Mischief Reef. Construction of 8,900-foot runway and port with 6,370-foot pier space; logistic support facilities added with fixed-weapon positions.

SOURCE: Author's research.

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Houbei-class missile boats relieved CCG cutters as they drove off a commercial vessel carrying reporters in waters off Palawan in the Philippines.[6] The use of PLAN vessels in this way could be unremarkable. However, if it represents a change in Chinese tactics, it could be more of a concern. Such a change could be caused by the increased U.S. maritime presence in the region and partner nations emboldened by the successful 2020 completion of survey operations conducted by the chartered ship *West Capella* in Malaysia's EEZ.[7] It is important to note that tactics evolve constantly.

The growth of the CCG and maritime militia has been remarkable. Andrew Erickson has exposed the extent to which the Chinese maritime militia has matured operationally and grown in size, with 84 of the most modern ships based at Sansha City on Woody Island 175 miles southeast of Hainan Island.[8] The bottom line: To compete in peacetime, it is necessary for the U.S. and its allies to

CHART 2

China's Rapidly Growing Naval Fleet

China's navy is projected to grow to more than 760 ships by 2030, a daunting force compared to the 70 ships in the U.S. 7th Fleet and deployed warships that operate in the South China Sea region.

NUMBER OF SHIPS

Chinese maritime militia

Chinese coast guard

Chinese battle force

U.S. 7th Fleet and deployed warships: Appx. 50–70
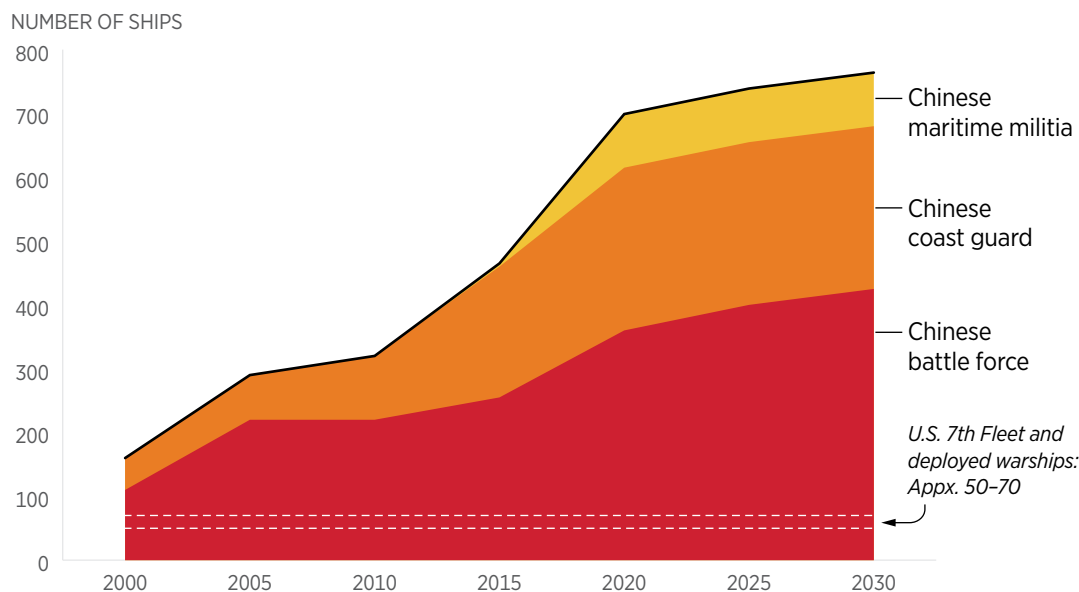
SOURCES: U.S. Department of Defense, "Advantage at Sea," December 2020, p. 4, https://media.defense.gov/2020/Dec/16/2002553074/-1/-1/0/TRISERVICESTRATEGY.PDF (accessed April 22, 2021); Congressional Research Service, "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress," CRS *Report* RL33153, p. 32, https://crsreports.congress.gov/product/pdf/RL/RL33153/248 (accessed April 21, 2021); and Commander of the U.S. 7th Fleet, https://www.c7f.navy.mil/ (accessed May 10, 2021).

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neutralize the effectiveness of coordinated PLAN, CCG, and maritime militia operations.

China's Steadily Growing Maritime Capacity

A substantial buildup of maritime capacity has unfolded in China's south, to include commercial shipping as well as military infrastructure ashore. Most notable has been the growth of commercial piers and increased numbers of ferries on Hainan Island. Thomas Shugart, an adjunct senior fellow at the Center for a New American Security, has noted the buildup of "large roll-on/roll-off" ferries that can be activated by the PLAN for military sealift.[9] Open-source satellite images clearly show a remarkable expansion of port facilities and

numbers of "large roll-on/roll-off" ferries operating out of Hainan Island and other southern ports that could just as easily support military operations on Taiwan if called into service.

Most troubling, however, have been the PLAN's annual naval and maritime joint warfare exercises in the South China Sea. In these exercises, the PLAN has increasingly worked with the PLA Air Force (PLAAF) and the PLA Rocket Force to undertake coordinated strikes on allied warships.[10] This includes the operational testing in August 2020 of anti-ship ballistic missiles against a moving naval target south of Hainan Island.[11] Such coordinated operations, which were also attempted by the Soviets in the 1980s, have the potential to overwhelm a ship or even a

battlegroup's defenses and greatly increase the chance of a kill. They also have the advantage of enhancing the lethality of shore-based Chinese assets in a naval battle.

The South Sea Fleet has seen appreciable modernization and growth in numbers. As of August 2020, this fleet included the PLAN's first operational aircraft carrier, its only four nuclear ballistic submarines, its two most modern nuclear attack submarines, its four largest and most capable amphibious transport warships, and some of the most modern escorts for a total of 118 warships.[12] This force is likely to grow with the addition of an anticipated new dry dock at the Yulin naval base on Hainan Island that will be capable of servicing the next-generation PLAN aircraft carrier, the Type 003.[13]

In addition, the completion of massive dredging operations and construction of port and airfield facilities at Fiery Cross, Mischief Reef, and Subi Reef in early 2018, enables the PLAN and CCG to sustain a greatly enlarged presence along the so-called nine-dash line demarking CCP claims to the entirety of the South China Sea.[14] The sizeable nuclear submarine presence at Yulin also indicates a strong emphasis on undersea operations in the region.

There is a strong likelihood that the PLAN could develop the South China Sea into a bastion for securing its strategic missile submarines while on patrol there. This would be similar to what the Soviets did to defend their strategic missile submarines in the Arctic and adds strategic importance to this theater of operations, as it would allow the Chinese to secure their second strike capacity and nuclear deterrent forces.[15] From such a bastion, the PLAN's Type 96 ballistic missile submarines armed with the newest JL-3 missiles could reach Alaska and the U.S. west coast.[16] Assuming that the PLAN continues to advance the range of its submarine-launched ballistic missiles, the entirety of the U.S. could be reached from a South China Sea bastion in the next few years.

Although the PLAN has demonstrably improved logistics, readiness, and command and control, it continues to manage all such deployments from PLAN headquarters in Beijing. While this enables coordination with the Ministry of Foreign Affairs and state-owned shipping company COSCO, among others, command and control that is so distant from the operational units and their support units can be problematic in a crisis.[17] In concert with recent PLA reforms that approximate U.S. combatant commands, the PLAN has refined its distant sea operations or out-of-area deployments that began in earnest in 2008 with Horn of Africa counter-piracy operations. How such a command structure performs in multiple overseas crises or in a conflict remains to be seen, and it could evolve into theater commands outside of China. One possibility would be a new theater command in the Indian Ocean centered on the naval base at Djibouti.

The Growing Danger

Overall, the speed of development and operational learning by the PLAN has caused serious concerns, notably for U.S. Indo-Pacific Commander Admiral Philip Davidson, who testified at a Senate hearing on March 9, 2021, that PLA actions point toward conflict "in the next six years."[18] In the event of war over Taiwan, the largest fleet actions would most likely be fought in the South China Sea for control of approaches to the principal southern Taiwan port of Kaohsiung.

However, winning in war is not enough; succeeding in the peacetime competition is a strategic imperative as well. Failure puts the credibility of the U.S. as a security partner at risk and would unravel the rules-based order of freedom of the seas and trade. Success on both fronts in the South China Sea is needed to ensure deterrence by complicating Chinese strategies that are intended to present a fait accompli or major war in the not too distant future.

Methodology

Of the eight categories in this report—(1) the economy, (2) energy and the environment, (3) human rights, (4) influence operations, (5) the military, (6) outbound investment, (7) politics and law, and (8) technology—there are two sets of scores for each category. Each score is rated on a 10-point scale, with a score of 1 representing "no transparency" and a score of 10 representing "complete transparency."

The first score is for transparency by the Chinese government, meaning the availability of data that are reported officially through the various Chinese government or government-backed institutions.

The second score is for overall transparency, meaning the availability of data from both the Chinese government and private data collection. This second score should provide an assessment of how far the private efforts have raised transparency and filled in the gaps in official data.

Heritage Foundation experts developed a survey that was submitted to more than 30 U.S. and international experts who have experience in collecting and tracking data across the eight categories. These experts comprised defense analysts, academics, think-tank researchers, and private-sector consultants. For each categorical survey, they were asked to break down scores, using the 10-point scale, by subcategory and to explain why they assigned those scores. The final score and reasoning are a result of averaging and compiling the received scores and responses, respectively.

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China Considers Big Data a Fundamental Strategic Resource, and Africa May Offer an Especially Valuable Trove
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