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CHINA: THE CIVIL-MILITARY CHALLENGE

Volume One of A Graphic Net Assessment

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Introduction

There is no simple way to address the complex changes that China's growing strategic presence and military capabilities pose in competing with the United States and other states. It is clear, however, that China's capabilities to compete have increased radically in virtually every civil and military area since 1980, and that China has set broad goals for achieving strategic parity and superiority in the future – although its timeframes and definitions of such goals are vague.

The end result is that the United States adopted a new National Security Strategy in 2017 and a new National Defense Strategy in 2018 that both focused on China as an emerging peer threat to the U.S. and as a central focus of its strategy. The Biden administration has not issued revised versions of these documents, but its FY2021 budget submission as well as the testimony of senior U.S. officials to Congress on U.S. strategy and force plans make it clear that China is now a central focus of the Biden administration's national security planning efforts.

This report is Volume One of a two-part e-book that helps to explain these shifts in China's strategic position and the reasons why major changes are needed in U.S. strategy. It is entitled, *China's Growing Military Power: Volume One of a Graphic Net Assessment* and is available for download on the CSIS website.

Volume One focuses on the civil-military dimensions of the changes in China's capabilities and on the fact that China – unlike the U.S. and most other states – integrates its civil and military strategy and development plans. It shows how China's civil development has greatly increased its capability to compete on a global level in both civil and military terms and to conduct what might be called “white area warfare”: China's ability to achieve major strategic gains through purely civil means and without the use of force.

The Focus of the Analysis

This Volume serves as a critical introduction to the more conventional analysis of China's military development in Volume Two. It draws on excerpts from official U.S. and strategic partner studies to provide a broad overview of China's growing civil-military capabilities to compete with the United States and other powers. It also provides a wide range of summary data on the trends in China's development and future plans to show how China's civil strategy, politics, economics, research activities, manufacturing base, and global role have evolved in ways that interact with its military development and actions on a global level. It also shows the extent to which the military trends in China's growing capabilities, that are analyzed in Volume Two, reflect the impact of an integrated civil-military strategy as well as political and economic efforts that go far beyond U.S. and allied efforts. Unlike the U.S. and most of its strategic partners – whose concepts of strategy focus on combat in Clausewitzian terms, China focuses on Sun Tzu's emphasis of winning without fighting where possible and “battles” where civil maneuvers and the use of military forces with limited or no combat produce a lasting form of victory.

Both volumes provide a wide range of graphs, maps, and tables that show how different the various views are of the key data on a wide range of China's evolving civil-military capabilities. This volume provides an updated graphic overview of the key developments in China's growing civil capabilities to compete with the United States and other powers. This volume also warns how quickly China has progressed at the civil level since 1990, and that its civil capabilities should have at least as much attention as its military ones.

Important as recent military developments are, there is an acute danger in focusing on China's progress in nuclear, missile, and other areas of military technology or the near-term threat in the Taiwan Straits and South China Sea. Planning for the longer-term impact of China's civil development and finding ways to shape some future structure of international competition at the diplomatic and economic levels that can limit competition, minimize confrontation, avoid war, and create new forms of cooperation is at least – and probably more – important.

Equally important, both Volume One and Volume Two show just how complex the trends in China's evolving civil-military challenge are. They show how difficult it is to compare them with the trends in the U.S. and other states on a global level, how many different ways these trends can be estimated and compared, and how many conflicting views and uncertainties exist in virtually every key area.

Relying on Official Sources and the *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2021*

The goals behind developing these volumes are different from most unclassified research efforts. One key goal is to provide some elements of a net assessment that focuses on official U.S. views. Where possible, the graphics, maps, and trends in each Volume rely on official U.S. and Chinese reporting and official reporting by international sources – including the UN, World Bank, and IMF. At the same time, they draw upon sources like the Congressional Research Service; official reporting by other countries like China, Japan, Taiwan, and South Korea; and work by RAND, other think tanks, and expert sources to illustrate the range of different official and expert estimates.

It should be stressed that the narrative text in both Volumes does not represent the authors' views. It instead highlights official U.S. unclassified reporting as of late 2021. It is designed to give the reader as clear of an unclassified picture as possible of how the U.S. government assesses developments in China. Most excerpts come from the narratives in the declassified U.S. studies and intelligence data provided in the *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2021* that was issued in early November 2021.

This annual report is now issued by the U.S. Secretary of Defense as a report to Congress, but it began as an annual report on *Chinese Military Power* issued by the U.S. Defense Intelligence Agency. It has evolved into a document that comes as close to an authoritative set of judgments by the U.S. intelligence community as an unclassified report can. It provides the user with exceptional insights into how the U.S. judged developments in China from sources with all of the resources and special access of the U.S. intelligence community.

Other Key Goals

Another key goal has been to illustrate the sheer complexity of the various ways in which China and the U.S. compete. The maps and graphics in this volume show that China's civil and military activity are becoming increasingly global and are not centered in the area of Taiwan or the South China Sea. China increasingly emphasizes military capabilities in all of Asia and the capability to project political, economic, and military power on a global level. At the same time, radical changes are taking

place in military technology, in all domain warfare, tactics, strike range and precision strike capabilities, reaction times, and the use of artificial intelligence and autonomous systems. The strategic competition between the U.S. and China has become so complex that it is the equivalent of a game of three-dimensional chess where there are no fixed rules, no limit to the number of boards where the game is played, and no clear limits to the number of state and non-state actors that can join the game and move independently.

A third goal is to show that the competition to build-up the forces of each side has become the kind of competition where there are strong incentives to limit the level of actual conflict if actual fighting does begin. China and the U.S. compete in a world where they have strong economic, political, and strategic incentives to cooperate as well as to confront each other. U.S. official sources make this clear. Even “winning” a war over an objective as limited as Taiwan can mean human and economic costs for both sides that exceed any military benefits. The end result of such a war is also unlikely to be any form of real peace. It may well make Chinese and U.S. military competition even more costly and intense and could increase the risk that a future war will escalate to catastrophic levels. To paraphrase *War Games*, the only way that China and the U.S. can “win” at theater levels of conflict and above is to not to fight.

A fourth goal has been to present a range of metrics that illustrate the many uncertainties involved in estimates of how China is competing and its relative level of success. The graphics show just the rapid rate of change in many key areas of China’s military forces. They also show how different some estimates of the trends and rate of change are. They show that experts are often forced to speculate as to how China will progress over the coming years and decades.

Cautions in Interpreting the Data

It should be stressed that the data presented often differ even when they come from the same country and source. Accordingly, the original source must be carefully consulted to fully understand the definition and source of the data presented or – as is all too common – the lack of any clear explanation of the data. The reader should also be aware that many of the summary graphics and other data drawn from official sources as well as the work of other experts and think tanks can only highlight given aspects of competition. Most have to be presented out of context or without the narratives in the original source that show the uncertainties in such data and the effort to put them in context, which is presented in the full text of the document from which they are drawn. This is why sources are shown in detail, and excerpts are provided within the constraints imposed by the need to limit its length.

Five other cautions need to be kept in mind in interpreting these estimates and data.

- *First, China emphasizes the integrated use of political, economic, and military power as well as the use of both civil and military power in ways that achieve its goals without fighting a serious war, particularly with major powers like the United States.* China also has a potential advantage in integrating its civil and military efforts because a unified authoritarian state can use centralized state planning to commit resources and compete at the civil as well as at the military level. The U.S. and other Western states have attempted to respond by using tools like sanctions and trade barriers, but they do not have political and economic systems that allow the state to directly integrate civil and military operations. This may explain why much of the U.S. and Western analytic effort that addresses Chinese military dynamics and warfighting capability does not fully address the diplomatic, civil, and economic aspects of Chinese competition – issues addressed in the other e-book in this series, which is entitled called *China: The Civil-Military Challenge: Volume Two of A Graphic Net Assessment*, available for download on the CSIS website.

- *Second, the nature of warfare is changing rapidly both in terms of irregular warfare and in every aspect of major conflict.* Many of the changes involve high levels of future uncertainty and are taking place at highly classified levels. Cyber conflict, space, “informatization,” joint all-domain operations, precision conventional strike, use of artificial intelligence, and use of third-party state and non-state actors are only a few of the changes involved. These do not lend themselves to the broad trend data used in this analysis, but the shifts in Chinese resources and improvements in its technology base have already sharply shaped the ability to influence, intimidate, deter, and actually fight. China’s comparative success in these areas – many of which are cutting edge aspects of civil technology and manufacturing – may dominate the future of military competition over the coming decades in ways that no one can now credibly predict and assess.
- *Third, parts of this analysis reflect the fact that the U.S. has heavily emphasized competition with China in the Pacific.* This is particularly true of the competition in the South China Sea; in dealing with Taiwan; and in U.S. efforts to counter China’s growing pressure on South Korea, Japan, and in the Indian Ocean region. The data in this analysis show that this focus is all too justified by the growth of Chinese military power in each region. However, the U.S. focus on military developments has led it to understate the importance of China’s ability to use its economic power on a global basis. The same is true of China’s capability to conduct the equivalent of gray and white area warfare, its growing capability to put pressure on Central Asian and Indian Ocean states, its growing links to Russia, and its role as a truly global power where its economic strength may compensate for its current lack of military power projection capability. The U.S. has so far focused on improving its capability to fight a major war against China – improvements that are necessary but no substitute for effective civil-military competition on a global basis.
- *Fourth, international statistics always present major challenges in comparability, and countries differ radically in the reliability of the data they report.* However, the problems in comparing given sets of data are generally far greater when they involve radically different political, military, and economic systems. The data in this brief are unclassified, and most are rounded or adjusted. Few come from sources that make any attempt to estimate uncertainty or provide parametric analysis, and their full definition and the methodology used are rarely described in the original source. Given sources and experts often disagree, and most tend to focus on different metrics, time periods, and methods of comparison. There also are many important areas where current unclassified estimates are lacking or do not seem credible.

Finally, the data in both Volumes show that China and the U.S. are now competing in ways which could lead to serious conflicts. These same data also, however, warn that both states have strong economic and political incentives to place serious limits on any level of actual conflict. The rising levels of forces, advanced weapons, and potential scale of any conflict warn both sides that “winning” even a relatively limited war can mean human and economic costs to both sides that vastly exceed any military benefits, and it may simply end in making future military competition more costly and intense. It is also all too clear from the rising levels of strike forces and nuclear forces in Volume Two that any major war presents the risk that a future war will escalate to catastrophic levels.

To again paraphrase *War Games*, the only way that China and the U.S. can “win” a war at theater levels of conflict and above is not to play. Success means avoiding conflicts that can weaken or destroy key elements of the economy; relying on diplomatic maneuver, economic influence, and use of force that pressures the other side rather than directly defeating it in battle; and strengthening deterrence and the control of escalation. Fortunately, at least so far, both China and the U.S. seem to realize that this means they need to play with all the caution advocated by Sun Tzu’s rules and to avoid any actions that could ignore Clausewitz’s warning that “ideal” war should remain a “logical fantasy” and that the purpose of war is not to defeat the enemy but to achieve a victory that produces lasting strategic gains.

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China's Evolving National Strategy

DIA on China's Pre-2015 Strategy

- **A “period of strategic opportunity” in the international environment that allows China to focus on building “comprehensive national power.”**
- **The CCP's contemporary strategic objectives are to:**
 - **Perpetuate CCP rule.**
 - **Maintain domestic stability.**
 - **Sustain economic growth and development.**
 - **Defend national sovereignty and territorial integrity.**
 - **Secure China's status as a great power.**

Civil-Military Strategy and the 13th Five Year Plan

Five Year Plans (FYPs), serve as the CCP's principal planning mechanism for steering the PRC's economic, social, and military development in line with the CCP's long-term strategy and milestones of national rejuvenation. FYPs serve as guideposts, and the end of a FYP period prompts Beijing to evaluate progress and reflect on what to emphasize for the next FYP. As the 13th FYP (2015-2020) ended in 2020, the CCP Central Committee convened in the Fifth Plenum in October 2020 to evaluate its successes and failures and deliberate the 14th FYP (2021-2025). The evaluation of the PRC's FYP is an important messaging tool for the CCP to a domestic audience which aims to validate the Party's leadership and legitimize the trajectory of the PRC's national development. While the PRC acknowledged shortfalls, the 13th FYP set a baseline for future research and development that will inform the PRC's science and technology milestones. The PRC's confidence in the progress made during the 13th FYP has compounding effects, reflected in the ambitious goals set in the 14th FYP, with a vision to achieve their objectives out to 2035.

Throughout 2020, key Party and military leaders assessed the PLA's progress in implementing the various reforms and modernization goals formulated at the start of the 13th FYP. In line with the priorities listed in 2015 and 2017 reforms, Party evaluations of PLA progress centered on strengthening Party loyalty, implementing doctrinal reforms, accelerating military modernization, and improving warfighting readiness.

The PLA also noted progress in increasing its warfighting readiness. Party publications often state that preparing for winning wars is the logical starting point of the PLA's reforms, and they praised the PLA for strengthening troop training and preparations. They cited improvements in key competencies such as mobilizing to support China's responses to the COVID-19 outbreak and floods in central China, and successes in military-civil fusion, particularly in delivering logistics during mobilization and deterrence exercises along the Indian border in 2020. It is important to note the emphasis on military-civil fusion, the implementation of which was a key priority of the 13th FYP.

While Party outlets had much to praise at the conclusion of the 13th FYP, Party and military leadership also reflected on what remains to be addressed in the 14th FYP. As elucidated after the fifth Plenum of the 19th Party Congress in October 2020, the PLA hopes to continue its emphasis on "adhering to the party's absolute leadership over the people's army," and accelerating "informatization" and "intelligentization." Of note, PLA planners will likely seek to further implement Military-Civil Fusion, as PLA mouthpieces emphasized that the "development of strength of national defense and economy should go together."

Examining the PLA's progress in implementing the 13th FYP in the context of its ambitious goals set out for the 14th FYP, it is clear that the 13th FYP will have served as an important stepping stone. As the PLA embarks on a quest to modernize its military in the "new era" and strives to achieve its long-term 2035 and 2049 goals, the completion of the 13th FYP at the very least set a baseline for the development of a highly informatized, battle-ready, and increasingly global military.

DoD Summary of Chinese National Strategy 2021 – I

The PRC has long viewed the United States as a competitor and has characterized its view of strategic competition in terms of a rivalry among powerful nation states, as well as a clash of opposing systems. As expressed in the Interim National Security Strategic Guidance, the PRC is the only competitor capable of combining its economic, diplomatic, military, and technological power to mount a sustained challenge to a stable and open international system. The PRC is increasingly clear in its ambitions and intentions. Beijing seeks to reshape the international order to better align with its authoritarian system and national interests, as a vital component of its strategy to achieve the “great rejuvenation of the Chinese nation.” According to this worldview, the accrual of the PRC’s comprehensive national power, including military power, is necessary to set the conditions for Beijing to assert its preferences on a global scale.

...The PRC’s national strategy to achieve “the great rejuvenation of the Chinese nation” by 2049 is deeply integrated with its ambitions to strengthen the PLA. In 2017, General Secretary Xi Jinping laid out two PLA modernization goals during his speech to the 19th Party Congress: to “basically complete” PLA modernization by 2035 and to transform the PLA into a “world class” military by 2049. Throughout 2020, the PLA continued to pursue its ambitious modernization objectives, refine major organizational reforms, and improve its combat readiness in line with those goals. This includes the PLA developing the capabilities to conduct joint long-range precision strikes across domains, increasingly sophisticated space, counterspace, and cyber capabilities, and accelerating the large-scale expansion of its nuclear forces. In 2020, the Chinese Communist Party (CCP) announced a new milestone for PLA modernization in 2027 broadly understood as the modernization of the PLA’s capabilities to be networked into a system of systems for “intelligentized” warfare. If realized, the PLA’s 2027 modernization goals could provide Beijing with more credible military options in a Taiwan contingency.

...As the PRC continues to marshal all elements of its national power toward its centenary goals in 2049, DoD’s annual report strives to provide an authoritative assessment of the PRC’s strategic objectives. ...The PLA’s modernization serves as a crucial component of a national system galvanized to achieve the PRC’s national strategy. The PRC’s strategy to achieve “national rejuvenation” is not limited to domestic efforts. This strategy entails efforts to change international conditions to suit the CCP’s concept of a “community of common destiny.” This report illustrates the importance of meeting the pacing challenge presented by the PRC’s increasingly capable military and its global ambitions...

... China’s National Strategy

- The PRC’s strategy aims to achieve “the great rejuvenation of the Chinese nation” by 2049 to match or surpass U.S. global influence and power, displace U.S. alliances and security partnerships in the Indo-Pacific region, and revise the international order to be more advantageous to Beijing’s authoritarian system and national interests. This strategy can be characterized as a determined pursuit of far-ranging efforts to expand the PRC’s national power.

DoD Summary of Chinese National Strategy 2021 – II

- Despite challenges posed by the COVID-19 pandemic, Beijing continued its efforts to advance its overall development including steadying its economic growth, strengthening its armed forces, and taking a more assertive role in global affairs. In response to both long and short-term economic trends, the CCP unveiled a new economic strategic task, or a new “development pattern,” called “dual circulation (双循环).”
- The PRC has characterized China’s view of strategic competition in terms of a rivalry among powerful nation states, as well as a clash of opposing ideological systems. Beijing views the United States as increasingly determined to contain the PRC, creating potential obstacles to its strategy. Additionally, the PRC’s leaders are increasingly willing to confront the United States and other countries in areas where interest diverge.

Foreign Policy

- The PRC’s foreign policy seeks to build a “community of common destiny” that supports its strategy to realize “the great rejuvenation of the Chinese nation.” Beijing’s revisionist ambition for the international order derives from the objectives of its national strategy and the Party’s political and governing systems.
- In 2019, the PRC recognized that its armed forces should take a more active role in advancing its foreign policy, highlighting the increasingly global character that Beijing ascribes to its military power.
- In 2020, the COVID-19 pandemic was a driving force behind the PRC’s foreign policy efforts, as Beijing sought to deflect any culpability for the virus and its initial spread, and to capitalize on its narrative of domestic success and foreign assistance.

Economic Policy

- The PRC’s military modernization objectives are commensurate with, and part of, Beijing’s broader national development aspirations. The PRC’s economic, technological, political, social, and security development efforts are mutually reinforcing and support Beijing’s strategy to shape international and regional environments that accept and facilitate Beijing’s interests.
- The PRC’s economic development supports its military modernization not only by providing the means for larger defense budgets, but through deliberate Party-led initiatives such as Made in China 2025 and China Standards 2035, as well as the systemic benefits of the PRC’s growing national industrial and technological base.
- In the rollout of the PRC’s 14th Five Year Plan (2021-2025), the Party announced a shift to a new “development pattern” of “dual circulation (双循环).” Dual circulation is focused on accelerating domestic consumption as a driver of economic growth, shifting to higher-end manufacturing, and creating “breakthroughs” in key technologies along critical high-end global supply chains, all while emphasizing “mutually reinforcing” foreign investment in these key technologies to provide the capital and technology necessary to advance domestic technological innovation in support of the PRC’s security and development objectives.

DoD Summary of Chinese National Civil-Military Strategy: 2021 – III

Military-Civil Fusion Development Strategy

- The PRC pursues its Military-Civil Fusion (MCF; 军民融合) Development Strategy to fuse its economic, social, and security development strategies to build an integrated national strategic system and capabilities in support of the PRC's national rejuvenation goals.
- Beijing's MCF strategy includes objectives to develop and acquire advanced dual-use technology for military purposes and deepen reform of the national defense science and technology industries and serves a broader purpose to strengthen all of the PRC's instruments of national power.
- The PRC's MCF development strategy encompasses six interrelated efforts: (1) fusing China's defense industrial base and its civilian technology and industrial base; (2) integrating and leveraging science and technology innovations across military and civilian sectors; (3) cultivating talent and blending military and civilian expertise and knowledge; (4) building military requirements into civilian infrastructure and leveraging civilian construction for military purposes; (5) leveraging civilian service and logistics capabilities for military purposes; and, (6) expanding and deepening China's national defense mobilization system to include all relevant aspects of its society and economy for use in competition and war.

Defense Policy and Military Strategy

- The PRC has stated its defense policy aims to safeguard its sovereignty, security, and development interests. The PRC's military strategy remains based on the concept of "active defense."
- The PRC's leaders stress the imperative of strengthening the PLA into a "world-class" military by the end of 2049 as an essential element of its strategy to rejuvenate the PRC into a "great modern socialist country." In 2020, the PLA added a new milestone for modernization in 2027, to accelerate the integrated development of mechanization, informatization, and intelligentization of the PRC's armed forces, which if realized would provide Beijing with more credible military options in a Taiwan contingency.
- In November 2020, the CMC issued the "Chinese People's Liberation Army Joint Operations Outline (trial) (中国人民解放军联合作战纲要(试行))" described as the "top-level law" of the PLA's combat doctrine system in the "new era" that would strengthen the requirements and procedures for joint operations, combat support, national defense mobilization, and political work, among others.
- In 2020, the PLA remained primarily oriented toward "safeguarding" its perceived "sovereignty and security" interests in the region, while emphasizing a greater global role for itself, such as through delivering COVID-19 aid abroad and the pursuit of overseas military facilities, in accordance with the PRC's defense policy and military strategy.

Non-War Military Activities (NWMA)

PLA writings divide military operations into two categories: war and non-war. The PLA's concept of non-war military activities (NWMA) is an expansive and diverse set of military operations ranging from humanitarian assistance and disaster relief (HA/DR) to suppressing domestic unrest to maritime rights protection. PLA writings describe NWMA as serving a variety of political purposes, occurring at varying intensities and durations, *and may include the threat of violence or the use of violence from low levels to levels approaching war.*

According to PLA writings, NWMA are an important “strategic means” for the military to serve the national political interest. Additionally, the PLA views NWMA as an effective way for it to support and safeguard China's development, as a means to expand the PRC's global interests, and an opportunity to gain valuable operational experience.

NWMA can be conducted internationally or domestically and encompass activities in multiple domains. NWMA can notably include operations in which the PLA uses coercive threats and/or violence below the level of armed conflict against states and other actors to safeguard the PRC's sovereignty and national interests.

NWMA can also blend military and law enforcement activities including for maritime rights protection, border and coastal defense, air and sea control, deterrence operations, suppression of domestic unrest, and other forms of stability maintenance operations. NWMA also includes military diplomacy, HA/DR, counterterrorism, counterpiracy, counterdrug, peacekeeping, and noncombatant evacuation operations.

In the past, PRC official writings have described aspects of NWMA as military operations other than war (MOOTW).

Japanese NIDS on Evolution of China's Strategy – I

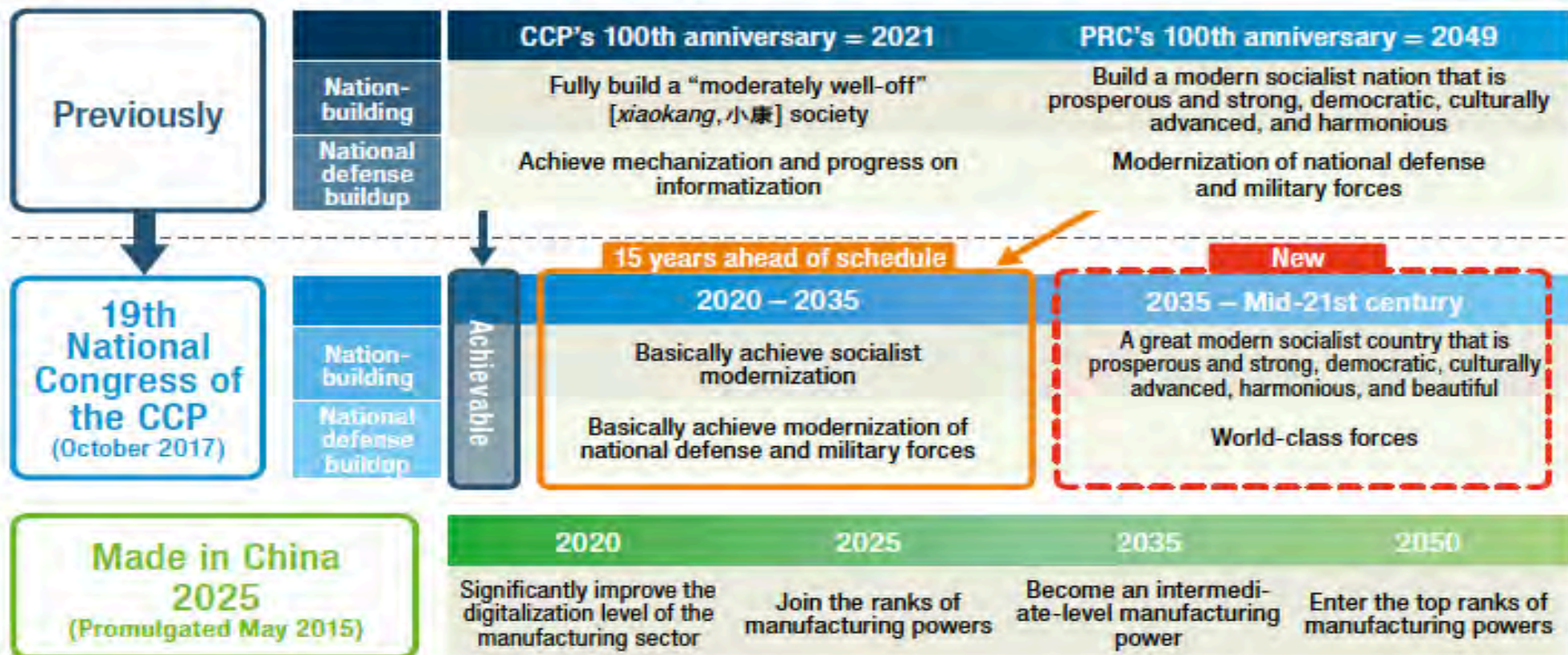
Figure 1.2 Evolution of China's Military Strategy



Source: Compiled by the author, based on 建国以来毛泽东军事文稿 中卷 [*Mao Zedong's Military Manuscripts since the Founding of the PRC, Vol. II*] (Beijing: 军事科学出版社 [Military Science Publishing House] and 中央文献出版社 [Central Party Literature Press], 2010).

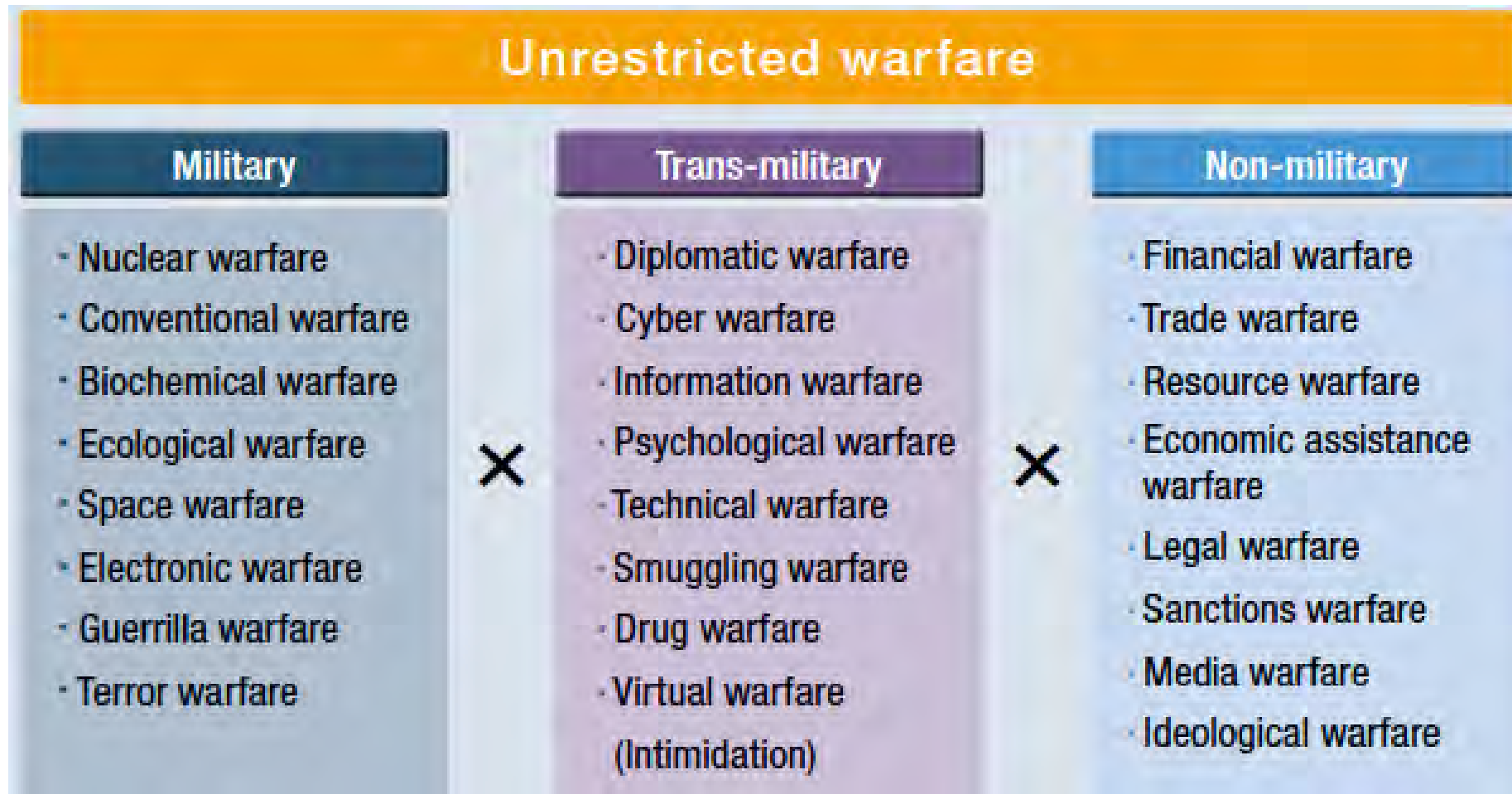
Japanese NIDS on Evolution of China's Strategy – II

Figure 4.2 China's Goals for Becoming a Great Power



Sources: Compiled by the author, based on 人民日报 [People's Daily], November 18, 2012, May 20, 2015, and October 28, 2017.

Japanese NIDS on Evolution of China's Strategy – III



Japanese NIDS on China's Leaders and Military Strategy

Past and Present Leaders, the Science and Technologies Emphasized by the PLA, and Military Strategy

Leader	Science, technologies, and weapons emphasized by the PLA	Military strategy that was adopted (besides active defense which has been adopted throughout)
Mao Zedong	Atomic bomb, hydrogen bomb	People's war (while its content has changed, the term itself has survived in succeeding eras)
Deng Xiaoping	Advanced conventional weapons	Local wars under modern conditions
Jiang Zemin	High tech, high-tech weapons	Local wars under high-tech conditions
Hu Jintao	Information and weapons operated based on information	Local wars under the conditions of informatization
Xi Jinping	Information, intelligence, and weapons operated on their basis	Informatized warfare (shift to intelligentized warfare)

Source: Compiled by the author, based on 建国以来毛泽东军事文稿 中卷 [*Mao Zedong's Military Manuscripts since the Founding of the PRC, Vol. II*] (Beijing: 军事科学出版社 [Military Science Publishing House] and 中央文献出版社 [Central Party Literature Press], 2010).

RAND Estimate of China's Dream International End State by 2050

Domain	Sample Objectives
Major powers	China is the global leader with the largest network of client states and predominant international influence; major powers maintain stable, cooperative ties with China under a permeable spheres-of-influence-type arrangement. Major powers manage their differences according to norms established by China, but all respect the primacy of China's interests and authority worldwide.
Periphery	China has become the predominant economic, political, and security power in the Indo-Pacific while coexisting with major powers, such as Japan and India. China leads a network of client states based primarily among developing countries in South, Southeast, and Central Asia.
Developing world	China has developed a political and security constituency of developing countries around the world, based mainly along the BRI routes in Eurasia, the Middle East, and Africa. Most of the developing world is integrated into BRI-related trade, investment, and infrastructure architecture led by China. China maintains clients, primarily along the BRI routes and into Latin America, that help protect Chinese interests and promote its authority.
Multilateral	The United Nations remains a key institution, but it has been renovated to uphold principles, norms, and values favored by China; established and newer Chinese-led regional and global multilateral relationships generally reflect Beijing's preferred norms, values, and clients.
Global governance/ domains	Chinese discourse is dominant in Asia and widely understood globally; Chinese norms, values, and preferences are predominant in the global management of space, cyber, law, and maritime domains. China acts as a provider of global goods, principally in collaboration with its clients.

RAND Estimate of Chinese “Victory” Condition in U.S.-China Relations

Condition	Explanation
United States and China avoid war	China and the United States maintain peaceful, stable relations despite the persistence of friction points and disputes. This does not preclude crises, proxy conflicts, and confrontations of a more limited scope, however, so long as these are deescalated effectively.
United States accepts Chinese international leadership	The United States defers to Chinese international leadership and behaves in a manner consistent with a position of inferiority. The United States agrees to support the norms and values upheld by China as the informal basis for international relations. The United States largely accepts China’s leadership role in multilateral organizations.
United States refrains from harming Chinese interests	The United States agrees to revise policies to accommodate Chinese preferences on Taiwan and other core interests. The United States refrains from interfering in China’s internal affairs. U.S. involvement in confrontations between China and U.S. allies and partners in Asia is limited at most to symbolic gestures. The United States respects the interests of China’s client states and generally refrains from policies that antagonize Beijing.
China has gained primacy in Eurasia, Middle East, and Africa	China’s network of client states predominates in Eurasia, the Middle East, and Africa. The United States participates in the economic and political life of those areas on terms acceptable to China. Chinese success in leading integration along BRI routes leaves the United States in a position of disadvantage, which Washington has little ability to reverse.
U.S. primacy reduced to Americas	China defers to the United States in its leadership in the Americas, although it expects the United States to respect Chinese interests and authority and avoid harming the interests of Chinese client states in that region.
Differences managed according to Chinese norms	The United States and China manage their differences in bilateral and multilateral institutions and venues in accordance with norms of diplomatic relations upheld by China.
Cooperation on shared concerns	Despite differences and disagreements, the two countries cooperate on shared concerns and coordinate with one another in bilateral and multilateral institutions and venues approved by China.

Key Open Source Chinese Sources for Understanding Chinese Strategy

Unlike the United States, China does not publicize a single document that might be referred to as a national military strategy. China's most important strategic military document is the **military strategic guideline**, which is not publicly available, although major contours of these guidelines can be identified from other documents and speeches. The CMC has updated the military strategic guideline nine times since 1949, most recently in 2014.

Publicly-available documents that explain China's military strategy, organization, and activities include:

Defense white papers: Published by China's State Council Information Office and largely intended for international audiences, defense white papers contain information about China's national security interests and military activities. They do not follow a particular format or consistently cover the same themes or topics. The most recent defense white papers were published in 2015 and 2019.

***Science of Military Strategy*:** This product is authored by the Academy of Military Science, a PLA-affiliated research center. It is not an official PRC government or PLA document, but it "represents the apex of the PLA's professional military literature on the study of war" and "highlights the views of many of the PLA's leading strategists, some of whom are involved in the formulation of strategy or operational doctrine," according to one U.S. scholar of the PLA. PLA scholars consider the *Science of Military Strategy* to be authoritative. The most recent *Science of Military Strategy* is from 2013 (with previous editions in 1987 and 2001), so its insights may be dated. China's National Defense University, a PLA academic organization, also publishes its own *Science of Military Strategy* (with editions or revisions issued in 1999, 2015, 2017, and 2020). References in this report are to the Academy of Military Science's *Science of Military Strategy*.

***Science of Campaigns*:** According to the U.S. Air University's China Aerospace Studies Institute, the *Science of Campaigns* is "a core document for Chinese military officer education" and describes the "thoughts, principles, and fighting methods" for 17 different military campaigns, among other things. It was last published in 2006 by China's National Defense University. Like the *Science of Military Strategy*, it is considered authoritative but is not published by the Chinese government or PLA.

Plans, speeches, and other documents: In addition to these core documents, details of China's military strategy and activities can be found in five-year plans and other plans, major speeches (such as by leaders to Party Congresses), as well as statements by PLA and Ministry of National Defense officials.

Comprehensive National Security Concept: Introduced by Xi in 2014 and issued internally in 2015, this document refers to China's national security strategy, broadly defined (rather than military strategy). It is viewed by some as China's first national security strategy, and indicative of a new grand strategy for China, as envisioned by Xi.

China's Strategy of Military-Civil Fusion (MCF)

Chinese Civil-Military Fusion Development Strategy – I

Key Takeaways

- The PRC pursues its Military-Civil Fusion (MCF) Development Strategy to “fuse” its economic and social development strategies with its security strategies to build an integrated national strategic system and capabilities in support of China’s national rejuvenation goals.
- Although China’s MCF strategy includes objectives to develop and acquire advanced dual-use technology for military purposes and deepen reform of the national defense science and technology industries, its broader purpose is to strengthen all of China’s instruments of national power by “fusing” aspects of its economic, military, and social governance.
- China’s MCF development strategy encompasses six interrelated efforts: (1) fusing the China’s defense industrial base and its civilian technology and industrial base; (2) integrating and leveraging science and technology innovations across military and civilian sectors; (3) cultivating talent and blending military and civilian expertise and knowledge; (4) building military requirements into civilian infrastructure and leveraging civilian construction for military purposes; (5) leveraging civilian service and logistics capabilities for military purposes; and, (6) expanding and deepening China’s national defense mobilization system to include all relevant aspects of its society and economy for use in competition and war.
- Although MCF has broader purposes than acquiring foreign technology, in practice, MCF means there is not a clear line between the PRC’s civilian and military economies, raising due diligence costs for U.S. and global entities that do not desire to contribute to the PRC’s military modernization.

The PRC pursues its Military-Civil Fusion (MCF) Development Strategy as a nationwide endeavor that seeks to “fuse” its economic and social development strategies with its security strategies to build an integrated national strategic system and capabilities in support of China’s national rejuvenation goals. The Party’s leaders view MCF as a critical element of their strategy for the PRC to become a “great modern socialist country” which includes becoming a world leader in science and technology (S&T) and developing a “world-class” military. Although China’s MCF strategy includes objectives to develop and acquire advanced dual-use technology for military purposes and deepen reform of the national defense S&T industries, its broader purpose is to strengthen all of China’s instruments of national power by “fusing” aspects of its economic, military, and social governance.

China pursues MCF through six interrelated efforts. Each effort overlaps with the others and has both domestic and international components. The Party seeks to implement the MCF Development Strategy across every level of China’s party-state from the highest national-level organs down to provinces and township. China refers to these six aspects as “systems,” which may also be understood as mutually supporting lines of effort or components. The six systems in the MCF Development Strategy are:

The Advanced Defense Science, Technology, and Industrial System. This system focuses on fusing China’s defense industrial base and its civilian technology and industrial base. This includes expanding the private sector’s participation in China’s defense industrial base and supply chains as well as improving the efficiency, capacity, and flexibility of defense and civilian industrial and manufacturing processes. This broader participation seeks to transfer mature technologies both ways across military and civilian sectors, with the goal to produce outsized benefits for both sectors. This also aims to increase the competitiveness within the PRC’s defense industrial base in which one or two defense SOEs dominate an entire sector. This MCF system also seeks to advance China’s self-reliance in manufacturing key industrial technologies, equipment, and materials to reduce its dependence on imports, including those with dual-uses. The PRC’s MCF-influenced industrial and technology endeavors include *Made in China 2025* that sets targets for China to achieve greater self-sufficiency in key industrial areas such as aerospace, communications, and transportation.

The Military-Civil Coordinated Technology Innovation System. This MCF system seeks to maximize the full benefits and potential of the country’s S&T development. Consistent with the CCP leadership’s view that high technology and innovation are critical to strengthening China’s composite national power, this system develops and integrates advanced technologies across civilian and military entities, projects and initiatives—with benefits flowing in both directions. This includes using cutting-edge civilian technology for military applications or to more broadly advance military S&T as well as using military advancements to push civilian economic development. Although related to the Advanced Defense Science, Technology, and Industrial System, this system largely focuses on

Chinese Civil-Military Fusion Development Strategy – II

fusing innovations and advance in basic and applied research. Specific efforts in this MCF system include strengthening and promoting civilian and military R&D in advanced dual-use technologies and cross- pollinating military and civilian basic research. Additional efforts include promoting the sharing of scientific resources, expanding the institutions involved in defense research, and fostering greater collaboration across defense and civilian research communities. This system also seeks to foster “new- type” research institutions with mixed funding sources and lean management structures that are more dynamic, efficient, and effective than the PRC’s wholly state-owned research bodies. Examples of MCF-influenced dual-use S&T endeavors include China’s Innovation Driven Development Strategy and Artificial Intelligence National Project.

The Fundamental Domain Resource Sharing System. This system includes building military requirements into the construction of civilian infrastructure from the ground up as well as leveraging China’s civilian construction and logistics capacities and capabilities for military purposes. This includes factoring military requirements and dual-use purposes into building civilian private and public transportation infrastructure such as airports, port facilities, railways, roads, and communications networks. This also extends to infrastructure projects in dual-use domains such as space and undersea as well as mobile communications networks and topographical and meteorological systems. Another element seeks to set common military and civilian standards to make infrastructure easier to use in emergencies and wartime. This aspect of MCF has arguably the greatest reach into the PRC’s local governance systems as military requirements inform infrastructure construction at the province, county, and township levels. The influence of this aspect of MCF is visible in the PRC’s major land reclamations and military construction activities in the South China Sea, which brought together numerous government entities, the PLA, law enforcement, construction companies, and commercial entities. It may also have important implications for the PRC’s overseas infrastructure projects and investments under OBOR as the PRC seeks to establish a more robust overseas logistics and basing infrastructure to allow the PLA to project and sustain military power.

The Military Personnel (Talent) Cultivation System. This MCF system seeks to blend and cultivate military and civilian S&T expertise through education programs, personnel exchanges, and knowledge sharing. The purpose of this effort is to improve the utilization of experts able to participate in S&T projects irrespective of whether they are military or civilian (or even foreign) experts and allow expertise to flow more freely across sectors. This aspect of MCF also seeks to reform China’s talent cultivation system, which encompasses hundreds of talent recruitment plans, in order to improve China’s human capital, build a highly skilled workforce, and recruit foreign experts to provide access to know-how, expertise, and foreign technology. It takes into account all levels of education from the Party’s nationwide “patriotic education” programs for children to the matriculation of post- doctorate researchers within China and at institutions abroad. Many of the PRC’s named “talents” programs are likely influenced by MCF planning, as are reforms in its military academies, national universities, and research institutes.

The Socialized Support and Sustainment System for the PLA. This system entails two major efforts that seeks to shift the PLA away from its inefficient self-contained logistics and sustainment systems and towards modern streamlined logistics and support services. First, it seeks to harness civilian public sector and private sector resources to improve the PLA’s basic services and support functions—ranging from food, housing, and healthcare services. The concept is to gain efficiencies in costs and personnel by outsourcing non-military services previously performed by the PLA while also improving the quality of life for military personnel. Second, it seeks to further the construction of a modern military logistics system that is able to support and sustain the PLA in joint operations and for overseas operations. This system seeks to fuse the PLA Joint Logistic Support Force’s (JLSF) efforts to integrate the military’s joint logistics functions with the PRC’s advanced civilian logistics, infrastructure, and delivery service companies and networks. These arrangements seek to provide the PLA with modern transportation and distribution, warehousing, information sharing, and other types of support in peacetime and wartime. This fusion also seeks to provide the PLA with a logistics system that is more efficient, higher capacity, higher quality, and global in reach.

The National Defense Mobilization System. This MCF system binds the other systems as it seeks to mobilize China’s military, economic, and social resources to defend or advance China’s sovereignty, security and development interests. The Party views China’s growing strength as only useful to the extent that the party-state can mobilize it. China views mobilization as the ability to use precisely the instrument, capability, or resource needed, when needed, for the duration needed. Within the PLA, the reforms in 2015-16 elevated defense mobilization to a department called the National Defense Mobilization Department (NDMD), which reports directly to the Central Military Commission (CMC). The NDMD plays an important role in this system by organizing and overseeing the PLA’s reserve forces, militia, and provincial military districts and below. This system also seeks to integrate the state emergency management system into the national defense mobilization system in order to achieve a coordinated military-civilian response during a crisis. Consistent with the Party’s view of international competition, many MCF mobilization initiatives not only seek to reform how China mobilizes for war and responds to emergencies, but how the economy and society can be leveraged to support China’s strategic needs for international competition.

Chinese Civil-Military Fusion Development Strategy – III

Development and Significance. The Party has explored the concept of leveraging or integrating the combined contributions of the military and civilian sectors since the PRC's founding. The current MCF concept initially took root in the early 2000s as the Party sought methods to enhance China's overall development. This led Party leaders to call for improving "military-civilian integration" that echoed the collaboration between the defense and civilian sectors that China observed in the United States and other developed countries. Implementation of these efforts stalled due to a lack of centralized government control and the organizational barriers that exist across the party-state. Coinciding with the 11th Five Year Plan (FYP) (2006-2010), China began replacing "military-civilian integration" with "military-civilian fusion." In 2007, Party officials publicly noted the change from "integration" to "fusion" was not merely cosmetic but represented a "theoretical 'great leap' following a long period of trial and error."

Since that time, MCF's ambitions have grown in scope and scale as the Party has come to view it as a means to bridge China's economic and social development with its security development in support of the PRC's national strategy to renew China. As such, the Party has continued to elevate MCF's importance. In 2015, the CCP Central Committee elevated the MCF Development Strategy to a national-level strategy to serve as a "bridge" between the PRC's national development strategy and its national security strategy that seeks to build an "integrated national strategic system and capabilities," all of which support the PRC's goal of national rejuvenation.

Management and Implementation. The overall management and implementation of the MCF Development Strategy involves the most powerful organs in the party-state: the Politburo, the State Council (notably the National Development and Reform Commission), and the CMC. In addition to signifying its importance, the CCP Central Committee's elevation of the MCF Development Strategy to a national-level strategy also intended to overcome obstacles to implementation across the party- state.

This elevation also led to the establishment of the Central Commission for Military Civilian Fusion Development (CCMCFD) in 2017, chaired by General Secretary Xi Jinping, Premier Li Keqiang, several other members of the Politburo Standing Committee, two State Councilors, both CMC Vice Chairmen, 12 Ministry-level leaders, and others. The stated objective of the CCMCFD is to build China's "national strategic system and capabilities." This commission works to improve the "top-level design" of MCF and overcome impediments to implementation. The elevation of the MCF Development Strategy and the creation of the CCMCFD signals the importance that Party leaders place on MCF and the scope and scale of the strategy's ambitions.

MCF Linkages. Each MCF system entails linkages between dozens of organizations and government entities, including:

- *Ministry-level organizations from the State Council:* Examples include the National Development and Reform Commission, Ministry of Foreign Affairs, Ministry of Industry and Information Technology, Ministry of Education, and key state entities such as the State Administration of Science and Technology in National Defense and others.
- *Lead military organs subordinate to the Central Military Commission:* CMC Strategic Planning Office, Joint Political, Logistics, and Equipment Development Departments, as well as operational units and the regional military structure at the Military District and Sub-District levels; military universities *Other SOEs and quasi-private companies:* high profile examples include PRC high-tech corporations and important SOEs like China Ocean Shipping Company (COSCO), China National Offshore Oil Company, and major construction companies that have roles in OBOR projects as well as helping the PRC build out occupied terrain features in the South China Sea.
- *Provincial governments:* In practice, many MCF efforts involve partnerships between provincial or city government entities and military district departments and PLA departments.

Chinese Civil-Military Fusion Development Strategy – IV

The PRC's long-term goal is to create an entirely self-reliant defense-industrial sector—fused with a strong civilian industrial and technology sector—that can meet the PLA's needs for modern military capabilities.

- The PRC has mobilized vast resources in support of its defense modernization, including the implementation of its Military-Civil Fusion (MCF) Development Strategy, as well as espionage activities to acquire sensitive, dual-use, and military-grade equipment. The PRC has substantially reorganized its defense-industrial sector to improve weapon system research, development, acquisition, testing, evaluation, and production.
- In 2021, the PRC announced its annual military budget would increase by 6.8 percent, continuing more than 20 years of annual defense spending increases and sustaining its position as the second-largest military spender in the world. The PRC's published military budget omits several major categories of expenditures and its actual military-related spending is higher than what it states in its official budget.

Science and Technology Goals Supporting Military Modernization

- The PRC has continued its aggressive, top-level push to master advanced technologies and become a global innovation superpower. The PRC seeks to dominate technologies associated with the Fourth Industrial Revolution; this push directly supports the PLA's ambitious modernization efforts and its goal of becoming a “world-class” military capable of “intelligentized” warfare.
- The PRC continues its pursuit of leadership in key technologies with significant military potential, such as AI, autonomous systems, advanced computing, quantum information sciences, biotechnology, and advanced materials and manufacturing. As evidenced by the country's recent accomplishments in space exploration and other fields, China stands at, or near, the frontier of numerous advanced technologies.
- The 14th Five-Year Plan maintains the PRC's focus on technological independence and indigenous innovation in fields associated with the Fourth Industrial Revolution.
- As of 2020, the PLA has funded multiple AI projects that focus on applications including machine learning for strategic and tactical recommendations, AI-enabled wargaming for training, and social media analysis

Foreign Technology Acquisition

- The PRC uses imports, foreign investments, commercial joint ventures, mergers and acquisitions, and industrial and technical espionage to help achieve its military modernization goals.
- The PRC is investing in and seeking to acquire technologies that will be foundational for future commercial and military innovations including AI, robotics, autonomous vehicles, quantum information sciences, augmented and virtual reality, financial technology, and biotechnology. These technologies blur the line demarcating commercial versus military use.

Japanese NIDS on Chinese View of Technology and Military-Civil Fusion (MCF) – I

Under the Xi Jinping administration, the modernization of military capabilities in China has been advanced through a policy of military-civil fusion (MCF). This MCF strategy, simply put, aims to strengthen military capabilities and promote the nation by tying together the military and socioeconomy.

Specifically, China utilizes the market economy principle to advance modernization of the military in a wide range of fields, including goods, technologies, industries, and human resources development. The “military” in military-civil fusion refers to the military force itself and the munitions companies in charge of the production and research of weapons and equipment, while the “civil” refers to non-military entities such as state-owned enterprises, private companies, educational institutions, and research institutes.

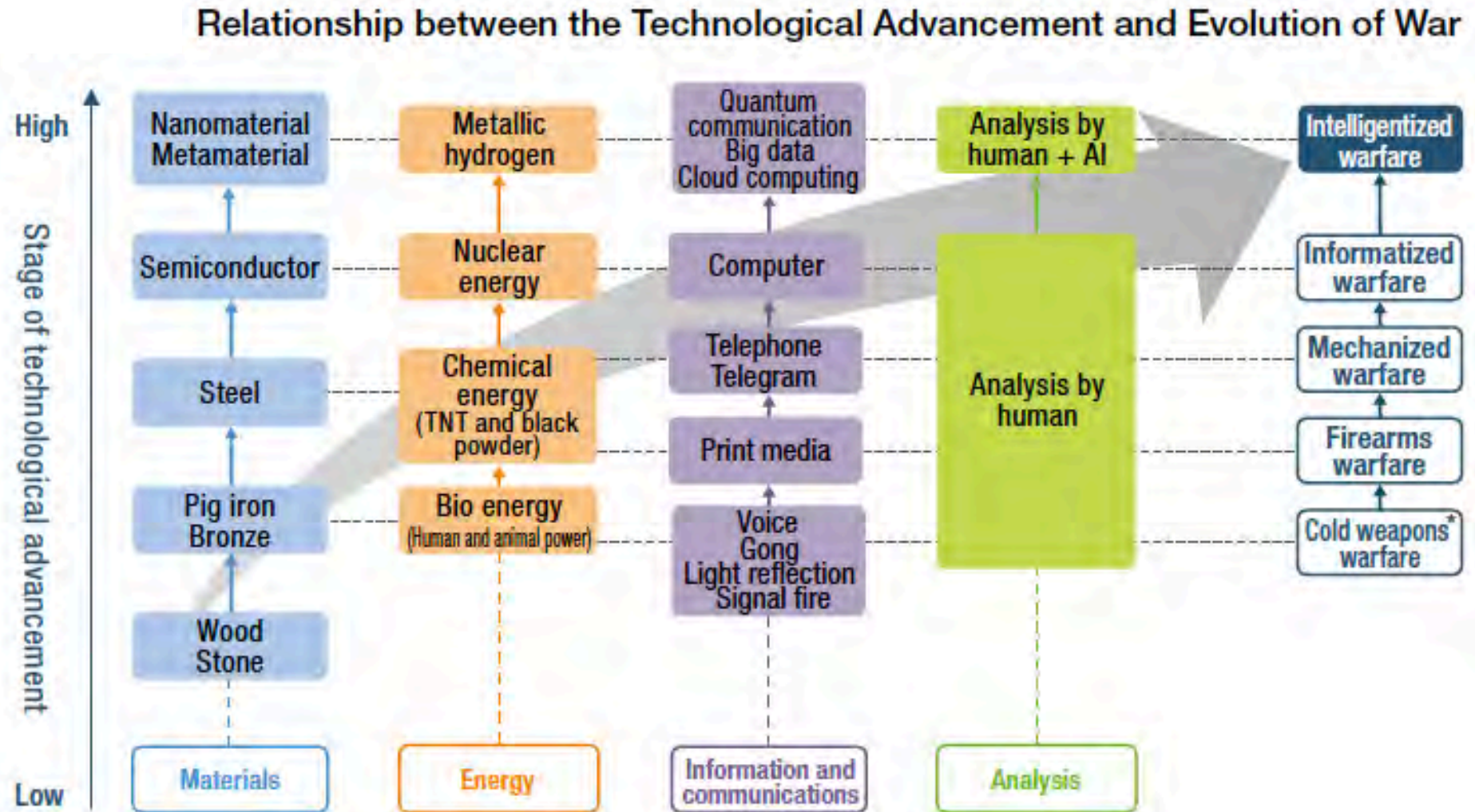
The two main means of promoting MCF are “eliminating barriers to defense conversion” [jun zhuan min] and “civilian participation in the defense industries” [min can jun].

“Eliminating barriers to defense conversion” refers to encouraging efficient modernization and market revitalization by outsourcing the production of military supplies to private companies and other civilian entities and transferring the outcomes of military research to civilian products. In contrast, “civilian participation in the defense industries” refers to the participation of private companies and others in the production and research of military supplies with the approval of the authorities.

...there are changes in the form of warfare.²⁴ NDWP 2019 states that “War is evolving in form towards informationized warfare, and intelligent warfare is on the horizon,” and that in the process of the transition to intelligentized warfare, “Driven by the new round of technological and industrial revolution, the application of cutting-edge technologies such as artificial intelligence (AI),

quantum information, big data, cloud computing and the Internet of Things is gathering pace in the military field.” In order to apply these highly-versatile cutting-edge technologies to the military field, it will be important to build a structure of “civilian participation in the defense industries” to flexibly divert to military use the technological innovations of a broader range of the private sector, including start-up companies and research institutes that conduct research on the latest technologies.

Japanese NIDS on Chinese View of Technology and Military-Civil Fusion (MCF) – II



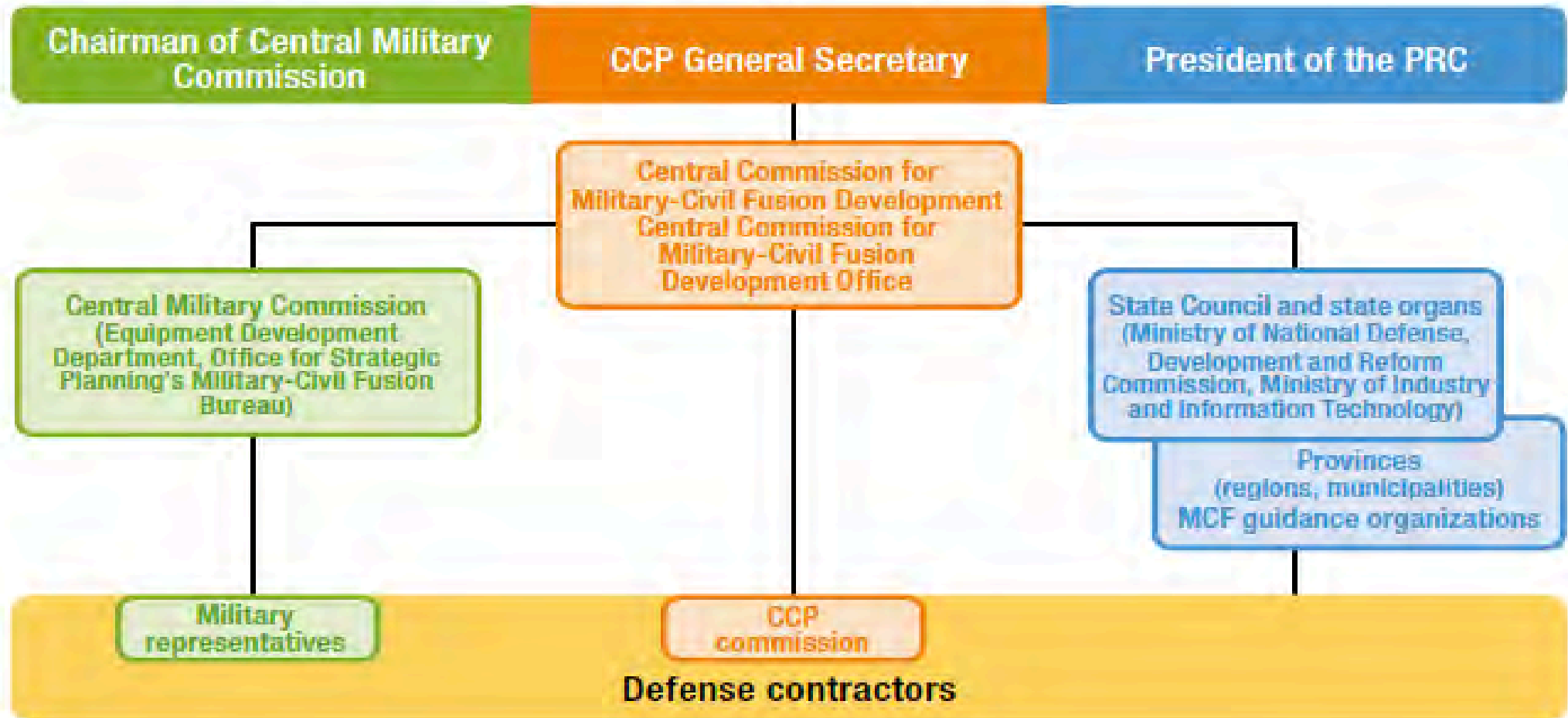
Japanese NIDS on Chinese View of Technology and Military-Civil Fusion (MCF) – III

Priority Areas of Science, Technology, and Industry for National Defense Indicated by the State Council

Space	<ul style="list-style-type: none">● Major projects including large carrier rockets, nuclear power facilities, deep-space exploration, in-orbit servicing, and maintenance systems● Yaogan [遥感] data policy; sharing of satellite resources and data between the military and civilian sectors● Research on construction of launch sites and measuring systems
Cyber	<ul style="list-style-type: none">● Building communications satellites and other communications infrastructure● Improving cybersecurity as well as electromagnetic management technology and equipment● Promoting the space-terrestrial integration information network project● Establishing and constructing testing grounds for military electronic intelligence; researching and producing weapons and equipment and contributing them to the civil sector
Maritime	<ul style="list-style-type: none">● Coordinating testing needs of military and civilian sectors and testing facilities in the ocean and accelerating construction of deep/far sea testing sites● Improving technologies for underwater measurements, data transmission, and security; enhancing comprehensive detection capabilities in the ocean● Promoting construction of deep-sea stations, nuclear power offshore platforms, and deep ocean monitoring and measuring equipment● Actively developing high-performance icebreakers, polar icebreaking research vessels, polar rescue vessels, polar semi-submersible transport vessels, polar resource exploration vessels, and core parts and materials for use in polar regions; and supporting major projects in the ocean

Japanese NIDS on Chinese View of Technology and Military-Civil Fusion (MCF) – IV

Organizational Relationship Chart of MCF



Japanese NIDS on Chinese View of Technology and Military-Civil Fusion (MCF) – V

Ten Major Outcomes of MCF Identified by the Xinhua News Agency

Item	Description
Tianhe-2	Ranked the world's fastest supercomputer for six consecutive times
Laser gyro	Can be applied to the Long March launch vehicles
BeiDou	Navigation system
Gaofen-2	Earth observation satellite
Hualong-1	Nuclear reactor
Demolition equipment for civilian use and demolition integration platform	Applicable to infrastructure construction and ore mining
Unmanned aerial vehicle	Can be used for distribution in civilian sectors as well as for military purposes
Intelligent robot	Can be applied to lethal autonomous weapons systems (LAWS)
Driverless vehicle	Applicable to military vehicles
Caterpillar-tracked small unmanned platform	Firearm-mounted, night reconnaissance function

China's Linkage of Civil and Military Development

Linkage of Civil-Military Development: 2021 – I

Key Takeaways

- The PRC's military modernization objectives are commensurate with, and part of, Beijing's broader national development aspirations. The PRC's economic, technological, political, social, and security development efforts are mutually reinforcing and support Beijing's strategy to shape international and regional environments that accept and facilitate Beijing's interests.
- The PRC's economic development supports its military modernization not only by providing the means for larger defense budgets, but through deliberate Party-led initiatives such as Made in China 2025 and China Standards 2035, as well as the systemic benefits of the PRC's growing national industrial and technological base.
- In the rollout of the PRC's 14th Five Year Plan (2021-2025), the Party announced a shift to a new "development pattern" of "dual circulation (双循环)." Dual circulation is focused on accelerating domestic consumption as a driver of economic growth, shifting to higher-end manufacturing, and creating "breakthroughs" in key technologies along critical high-end global supply chains, all while emphasizing "mutually reinforcing" foreign investment in these key technologies to provide the capital and technology necessary to advance domestic technological innovation in support of the PRC's security and development objectives.

The PRC's military modernization objectives are commensurate with and part of the PRC's broader national development aspirations and work in coordination with Beijing's economic policies and systems. Beijing gives priority to the PRC's economic development as the "central task" and frames its economic system as the means of advancing the nation's overall political and social modernity. In particular, the PRC's economic statecraft focuses intensely on advancing what the Party calls the country's "productive forces" (e.g., industry, technology, infrastructure, and human capital) which it views as the means to achieve the country's political and social modernity—including building a "world-class" military. The PRC's relentless efforts to grow and mature China's national industrial and technological base has significant implications for the PRC's military modernization, as well as for the PRC's global economic partners.

PRC leadership has cast the PRC's partial adoption of market features—implemented as part of its "reform and opening up" that began in the late 1970s, and subsequently led to an economic transformation—as evidence that their strategy to modernize the PRC has been succeeding, rather than viewing the market feature adoption as a repudiation of the Party's fundamental economic ideals. PRC leaders since Deng Xiaoping have consistently rationalized the PRC's market-oriented economic reforms as a necessary regression from socialism needed to account for China's historical circumstances, which left it significantly underdeveloped. According to the Party, contemporary China remains at the beginning stage or the "primary stage of socialism," with a long process of socialist modernization ahead.

Basic Economic System. The Party conceives of China's economy as constituting the "basic economic system" in which public ownership is dominant and state, collective, and private forms of ownership develop side by side. The basic economic system comprises the PRC's public ownership economy and the multi-ownership economy

Linkage of Civil-Military Development: 2021 – II

Economic Development Goals. Despite slowing economic growth in recent years and during the COVID-19 outbreak, the PRC will continue to pursue the economic policy objectives determined by the CCP Central Committee and set forth in the recently released 14th Five-Year Plan. According to Xi's 19th Party Congress report, the PRC's economic goals are: (1) furthering supply-side structural reform; (2) making China a country of innovators; (3) pursuing a rural vitalization strategy; (4) implementing the coordinated regional development strategy; (4) accelerating efforts to improve the socialist market economy; and, (5) making new ground in pursuing opening up on all fronts. The CCP sets more specific development goals in its Five-Year Plans (FYPs). The priorities and goals in the FYPs not only apply to the government and the public ownership economy, but also serve as implicit guidance from the Party to the multi-ownership economy.

Economic Conditions. Even before COVID-19, China's economic growth had slowed because of decreases in state-led infrastructure investment and urbanization, as well as China's decision since 2016 to increase oversight on the financial sector and risky lending. The PRC's efforts in early 2020 to contain the COVID-19 outbreak with government lockdowns and strict control measures exacerbated this slowdown in its economy. In March 2021, the PRC announced an annual growth target of six percent, but economic forecasters project 2021 growth of about nine percent.

Economic Policies & Practices. The PRC has ensured greater state control over the development of its economy by selectively introducing market economy features within the "basic economic system," while avoiding a full transition to free and open markets. This has allowed the PRC to maintain laws, regulations, and policies that generally disadvantage foreign firms vis-à-vis their PRC counterparts in terms of tradable goods, services sectors, market access, and foreign direct investment. Examples of the PRC's unfair economic policies and trade practices include its support to domestic industries at the expense of foreign counterparts, commercial joint venture requirements, technology transfer requirements, subsidies to lower the cost of inputs, sustaining excess capacity in multiple industries, sector-specific limits on foreign direct investment, foreign ownership caps, data localization requirements, discriminatory cybersecurity and data transfer rules, insufficient intellectual property rights enforcement, inadequate transparency, and lack of market access—particularly in the information and communications technology (ICT), agriculture, and service sectors.

In March 2018, an investigation by the Office of the U.S. Trade Representative (USTR) under Section 301 of the Trade Act of 1974 determined that the acts, policies, and practices of the PRC government related to technology transfer, intellectual property, and innovation were unreasonable or discriminatory and burden or restrict U.S. commerce, resulting in harm to the U.S. economy of at least \$50 billion per year. Additionally, the USTR's annual Special 301 Report, which identifies trading partners that do not adequately or effectively protect and enforce intellectual property rights and the findings of its Review of Notorious Markets for

Counterfeiting and Piracy, has repeatedly identified China as a country that has serious intellectual property rights deficiencies. These reports have repeatedly identified the PRC as the world's leading source of counterfeit and pirated goods. The USTR's 2020 Special 301 Report states: "China's placement on the Priority Watch List reflects U.S. concerns with China's system of pressuring and coercing technology transfer, and the continued need for fundamental structural changes to strengthen intellectual property protection and enforcement, including to trade secret theft, obstacles to protecting trademarks, online piracy and counterfeiting, the high-volume manufacturing and export of counterfeit goods, and impediments to pharmaceutical innovation."

Linkage of Civil-Military Development: 2021 – III

Apart from the Section 301 investigation, the United States has placed sanctions on specific Chinese firms for violating U.S. sanctions against other states, stealing U.S. intellectual property, having ties to the PLA in dual-use sectors, and providing surveillance technology to PRC authorities engaged in widespread suppression of ethnic and religious minorities in Xinjiang. In 2019, the Chinese telecommunications firm Huawei came under greater scrutiny due to its close links with the PRC government, involvement in intellectual property theft, and its evasion of sanctions on Iran.

A substantial portion of China's economic output results from government and policy-directed investments rather than market-based forces. While the PRC pursues state-directed investment overseas and encourages mergers and acquisitions, direct state-led investments abroad have fallen sharply since 2017 in response to changing global market conditions and a desire for the PRC to reduce overseas market risk and exposure. Along with heavy investments in infrastructure and commodities to support its strategic firms, increase economic engagement, and improve economic security, the PRC is investing in technologies that will be foundational for future innovations with both commercial and military applications. For example, PRC planners have prioritized indigenization of key technologies such as chip manufacturing, which form the basis of advanced manufacturing.

The PRC appropriates foreign technology through foreign direct investment, overseas acquisitions, legal technology imports, the establishment of foreign research and development (R&D) centers, joint ventures, research and academic partnerships, talent recruitment, and industrial and cyber espionage and theft.

Recent legal proceedings highlight numerous cases of the PRC's efforts to obtain technology and knowledge through theft of trade secrets and economic espionage. In November 2019, a U.S. Federal grand jury indicted a PRC national who had worked as an imaging scientist on charges related to economic espionage and stealing trade secrets for the PRC. Federal officials stopped him from boarding a flight on a one-way trip to China in 2017 with a proprietary algorithm. In December 2018, the U.S. Department of Justice indicted two PRC nationals associated with a hacking group operating in the PRC, known as Advanced Persistent Threat 10 (APT10), for conspiracy to commit computer intrusions, conspiracy to commit wire fraud, and aggravated identity theft. They worked for a PRC company in association with the PRC Ministry of State Security (MSS) to conduct computer intrusions, resulting in the theft of hundreds of gigabytes of sensitive data involving aviation, space, and satellite technology, manufacturing technology, pharmaceutical technology, oil and gas exploration and production technology, communications technology, computer processor technology, and maritime technology.

The PRC's recent economic policies have promoted innovation focused on strengthening domestic industry, while placing additional restrictions on foreign firms. Foreign firms continue to face significant legal and regulatory restrictions on market access due to the PRC's management of inbound investment. The Fifth Plenary of the 19th Central Committee of the CCP articulated the acceleration of "a new development pattern with domestic circulation as the main entity and domestic and international dual circulation." The new development pattern of "dual circulation" is focused on accelerating domestic consumption as a driver of economic growth, shifting to higher-end manufacturing, and creating "breakthroughs" in key technologies along critical high-end global supply chains, all while emphasizing "mutually reinforcing" foreign investment in these key technologies.

Linkage of Civil-Military Development: 2021 – IV

a speech at a seminar on the study and implementation of the Fifth Plenary Session where he described the new development pattern as an enhancement of the PRC's "survivability, competitiveness, development capacity, and sustainability." Recognizing that some of its initiatives such as "Made in China 2025" and OBOR have sparked concerns about the PRC's intentions, China's leaders have adopted less inflammatory rhetoric when promoting these initiatives without altering their fundamental strategic goals.

- *Made in China 2025*: First announced by the PRC in May 2015, the "Made in China 2025" plan seeks to increase the PRC's domestic innovation by setting higher targets for domestic manufacturing in strategic industries such as robotics, power equipment, and next-generation information technology by 2020 and 2025. This plan seeks to strengthen the PRC's domestic enterprises through awarding subsidies and other incentives while increasing pressure on foreign firms to transfer technology in exchange for access to the PRC market. "Made in China 2025" came under criticism from advanced countries for unfairly favoring China's domestic enterprises at the expense of foreign participants in China's markets. Increasingly aware and sensitive to these concerns, by June 2018, the PRC began avoiding references to "Made in China 2025" in major policy papers. The PRC government ordered its media outlets to downplay use of the term in June 2018. Key events that PRC leaders use to set strategic directives have also avoided references to "Made in China," including the 2019 Central Economic Work Conference and the NPC. Despite the adjustments in its narrative, the PRC has largely continued implementing the policies behind "Made in China 2025."
- *One Belt, One Road (OBOR)*: Launched by the PRC in 2013, OBOR seeks to foster closer economic integration with countries along China's periphery and beyond thereby shaping these countries' interests to align with the PRC's, while promoting regional stability and dulling criticism over the PRC's approach to issues it views as sensitive. OBOR also helps PRC state-owned enterprises (SOEs) find productive uses for their excess capacity in the cement, steel and construction sectors, as well as creating investment opportunities for the PRC's large reserve of savings. Countries participating in OBOR could develop economic dependence on PRC capital and be subject to predatory lending, which the PRC could leverage to pursue its geopolitical interests.

The growth of the PRC's global economic footprint also makes its interests increasingly vulnerable to domestic political transitions in participating countries, international and regional turmoil, terrorism, piracy, and serious natural disasters and epidemics, which places new requirements on the PRC to address these threats. Some OBOR projects could create potential military advantages for the PRC, such as PLA access to selected foreign ports to pre-position the necessary logistics support to sustain naval deployments in waters as distant as the Indian Ocean, Mediterranean Sea, and Atlantic Ocean to protect its growing interests. In 2019, Beijing hosted the Second Belt and Road Forum, during which the PRC sought to address growing international skepticism stemming from concerns over corruption, indebtedness, environmental sustainability, and lack of transparency surrounding OBOR projects. Although OBOR was formally adopted into the CCP constitution in 2017 as the PRC's signature foreign policy initiative, OBOR lending has slowed down significantly since its estimated peak in 2016-2017, in part due to the PRC's gradual shift away from hard-infrastructure loans toward technology-focused investments.

- *Digital Silk Road*: The PRC's Digital Silk Road initiative, announced in 2015 as a digital subset of OBOR, seeks to build a PRC-centric digital infrastructure, export industrial overcapacity, facilitate expansion of the PRC's technology corporations, and access large repositories of data.

Linkage of Civil-Military Development: 2021 – V

- The PRC also hopes the Digital Silk Road will increase international e-commerce by reducing cross-border trade barriers and establishing regional logistics centers by promoting e-commerce through digital free trade zones. The PRC is investing in digital infrastructure abroad, including next-generation cellular networks—such as fifth-generation (5G) networks—fiber optic cables, undersea cables, and data centers. The initiative also includes developing advanced technologies including satellite navigation systems, artificial intelligence (AI), and quantum computing for domestic use and export.
- *Belt and Road Initiative Space Information Corridor*: The “Space Information Corridor” was announced in 2016 as a subset of OBOR. It contributes to the PRC’s goal to “build China into a space power in all respects,” and promotes its “strong and sustained economic and social development,” according to a 2016 White Paper. Perhaps the most important element of the “Space Information Corridor” is the PRC’s *Beidou* satellite navigation system, which is paired with infrastructure around the globe and along OBOR. Other systems, such as the *Fengyun* weather satellite constellation, and terrestrial satellite control and data relay nodes also comprise key elements of the “Space Information Corridor.”

Legal Framework. The PRC in recent years has implemented new laws that seek to place further restrictions on foreign firms while creating or strengthening the legal framework for the Party’s national security concepts and in some cases furthering its Military-Civil Fusion (MCF) Development Strategy (discussed in the next section):

- *National Defense Law*: Adopted in March 1997, the law provides legal justification to mobilize the military and civilian resources in defense of a broad range of national interests.
- *National Security Law*: Adopted in July 2015, the law limits foreign access to the information and communications technology (ICT) market in the PRC on national security grounds.
- *Counterterrorism Law*: Adopted in December 2015, among its provisions, the law requires telecommunications operators and Internet service providers to provide information, decryption, and other technical support to public and state security organizations conducting prevention and investigation of terrorist activities.
- *Cyber Security Law*: The law, which went into effect in June 2017, promotes development of indigenous technologies and restricts sales of foreign ICT in the PRC. The law also requires that foreign companies submit ICT for government-administered national security reviews, store data in the PRC, and seek government approval before transferring data outside of the PRC.
- *Intelligence Law*: Passed in June 2017, the law allows authorities to monitor and investigate foreign and domestic individuals and organizations to protect national security. Specifically, it requires PRC entities and individuals to provide PRC intelligence and security services with on-demand access to data, communication devices, vehicles, buildings, and other infrastructure or information to support intelligence collection efforts.

Linkage of Civil-Military Development: 2021 – VI

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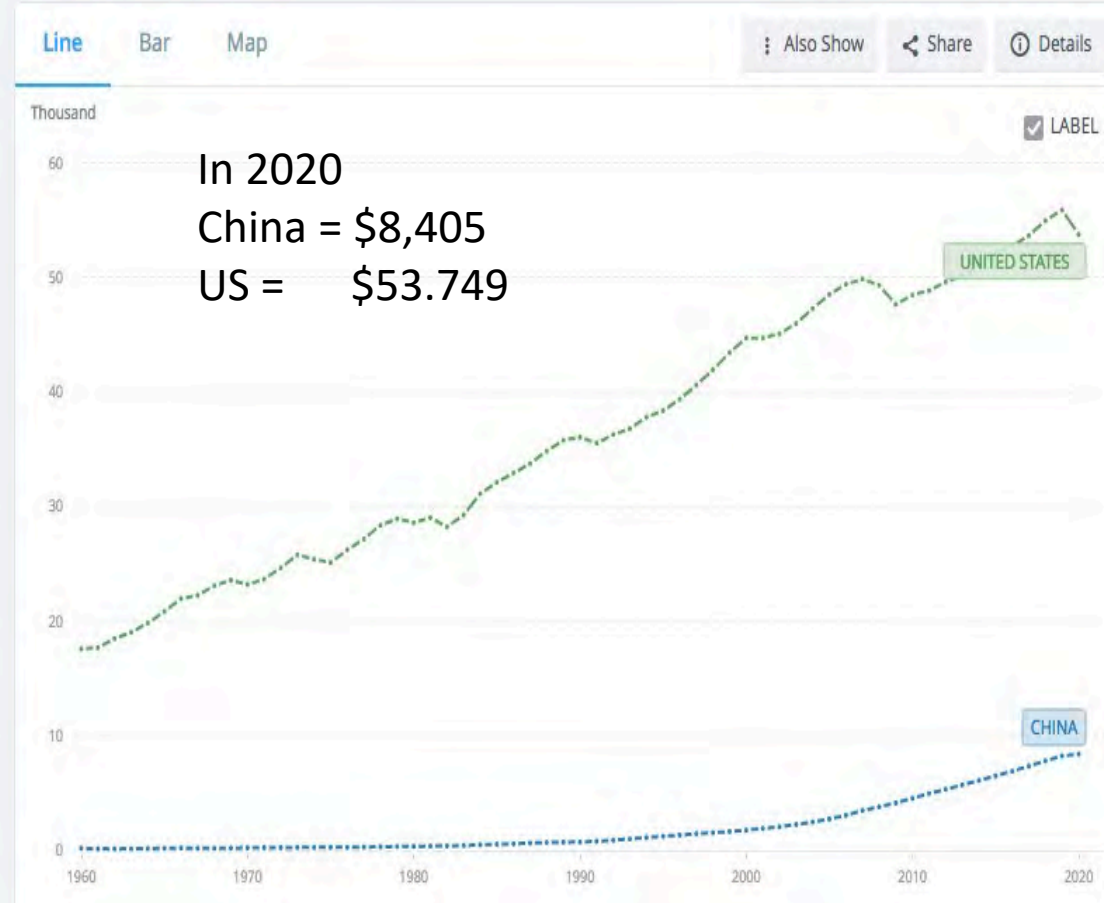
The Challenge of Poverty, Human Development, Demographics, and Debt

Comparative GDP Per Capita: 1960 vs. 2020

GDP per capita (constant 2010 US\$) - China, United States

World Bank national accounts data, and OECD National Accounts data files.

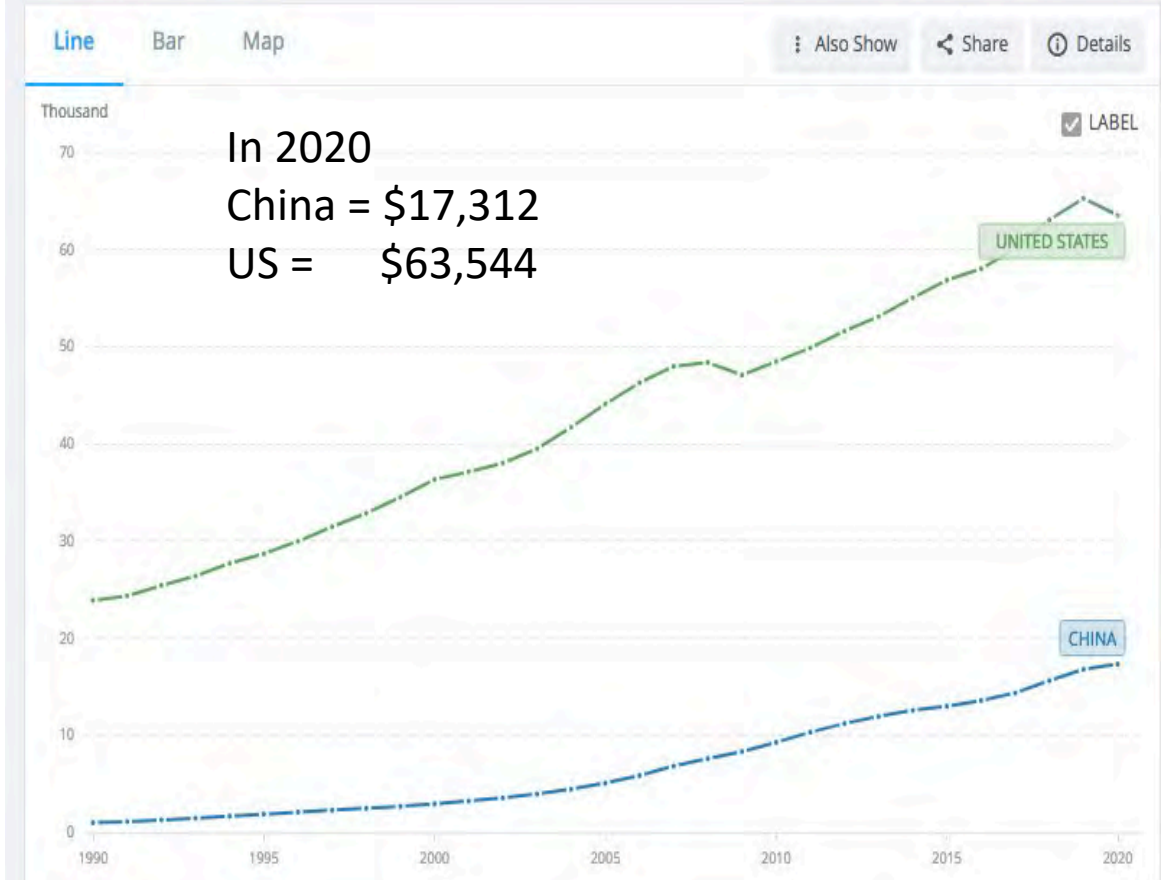
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GDP per capita, PPP (current international \$) - China, United States

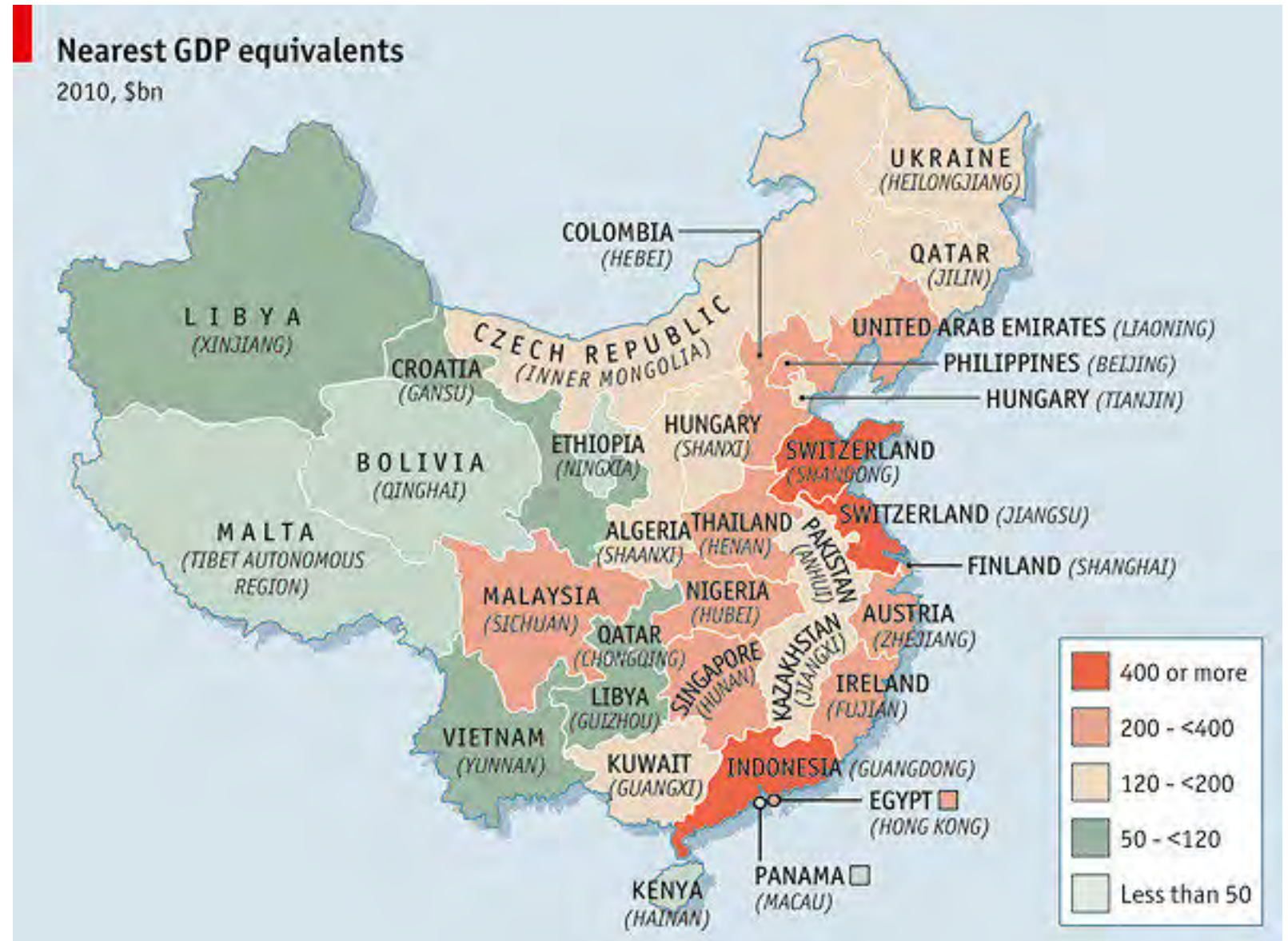
International Comparison Program, World Bank | World Development Indicators database, World Bank | Eurostat-OECD PPP Programme.

License : CC BY-4.0

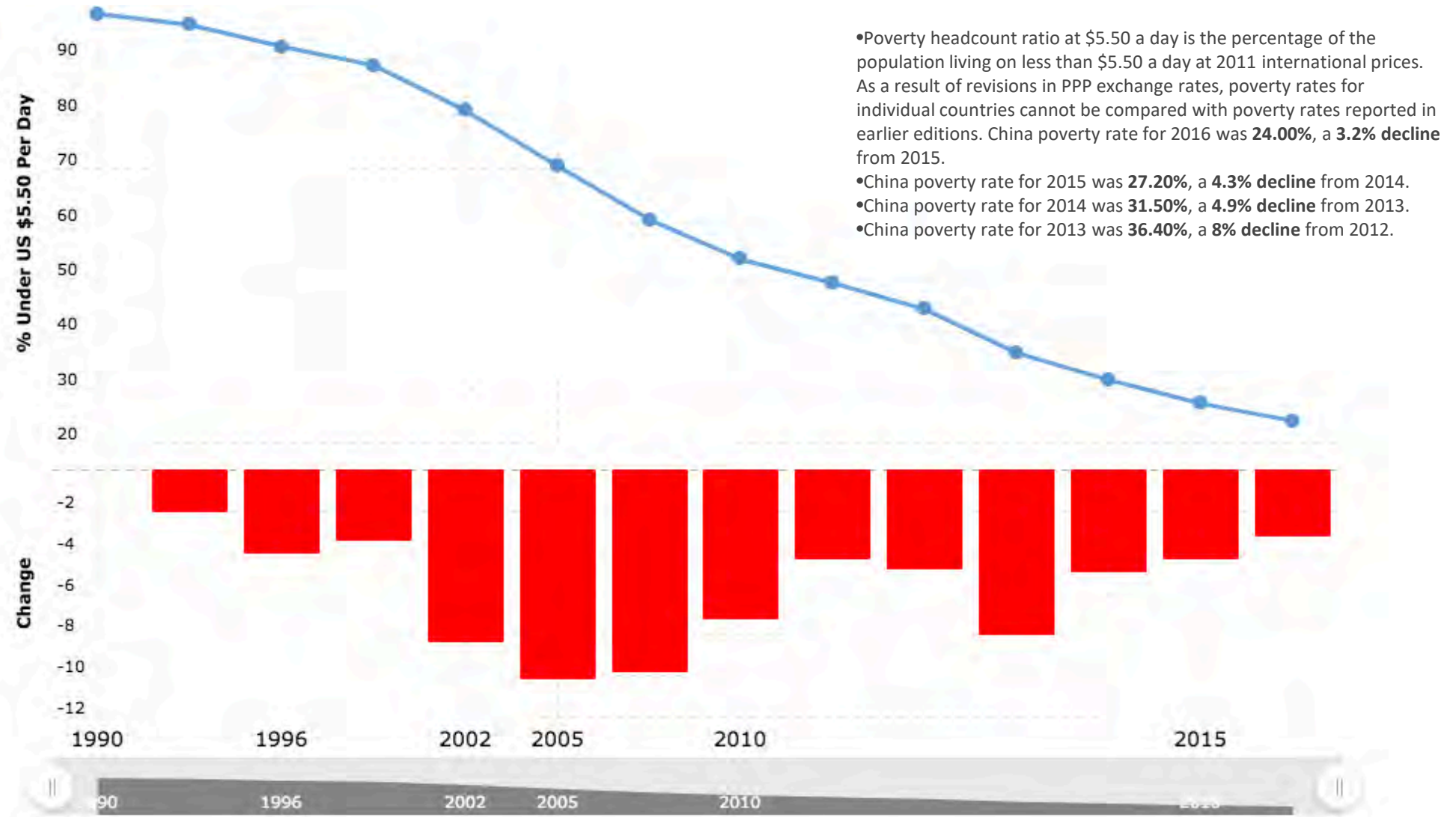


The Challenge in Putting China's Per Capita Income in Perspective – Even in 2010

Source: The Economist; Economist Intelligence Unit; CEIC; WTO.



World Bank: China's Declining Poverty Rate 1990-2018



Comparative UN Human Development Rankings in 2019

Category	U.S.	China	Russia
Overall Country Ranking	17	85	52
Human Development Index, (HDI) (Value)	0.926	0.761	0.824
Life Expectancy in Years	78.9	76.9	72.6
Expected Years of Schooling	16.3	14.0	15.0
Mean Years of Schooling	13.4	8.1	12.2
Gross National Income (GNI) Per Capita (PPP-US\$)	63,826	16,057	26,157

Source: *UN Human development Rankings 2021*, United Nations, <http://hdr.undp.org/en/content/latest-human-development-index-ranking>.

Comparative Population and Median Age: 1960 vs. 2020 – I

China and the United States are the most and 3rd most populous country in the world, respectively. China and the United States together account for about 22.7% of the total world population. China population is 4.35 times the US population, with China home to about 1.44 billion people and the United States to 331 million in 2020. The population of China will peak in 2031, but the US will not peak until 2100. China is four times denser than the US as China's population density is 153 people per square km compared to 36 of the US.

The ratio of china to the US population has increased from 3.49 in 1950 to the highest 4.69 in 1994. This ratio is expected to decline at 2.45 in 2100, as China's population growth rate is much lower than the United States.

As of period 2015-20, China's total fertility rate is 1.69 births per woman, which is lower than the US's 1.78. China's fertility rate was almost double that of the US in 1950, but it is below since 1990.

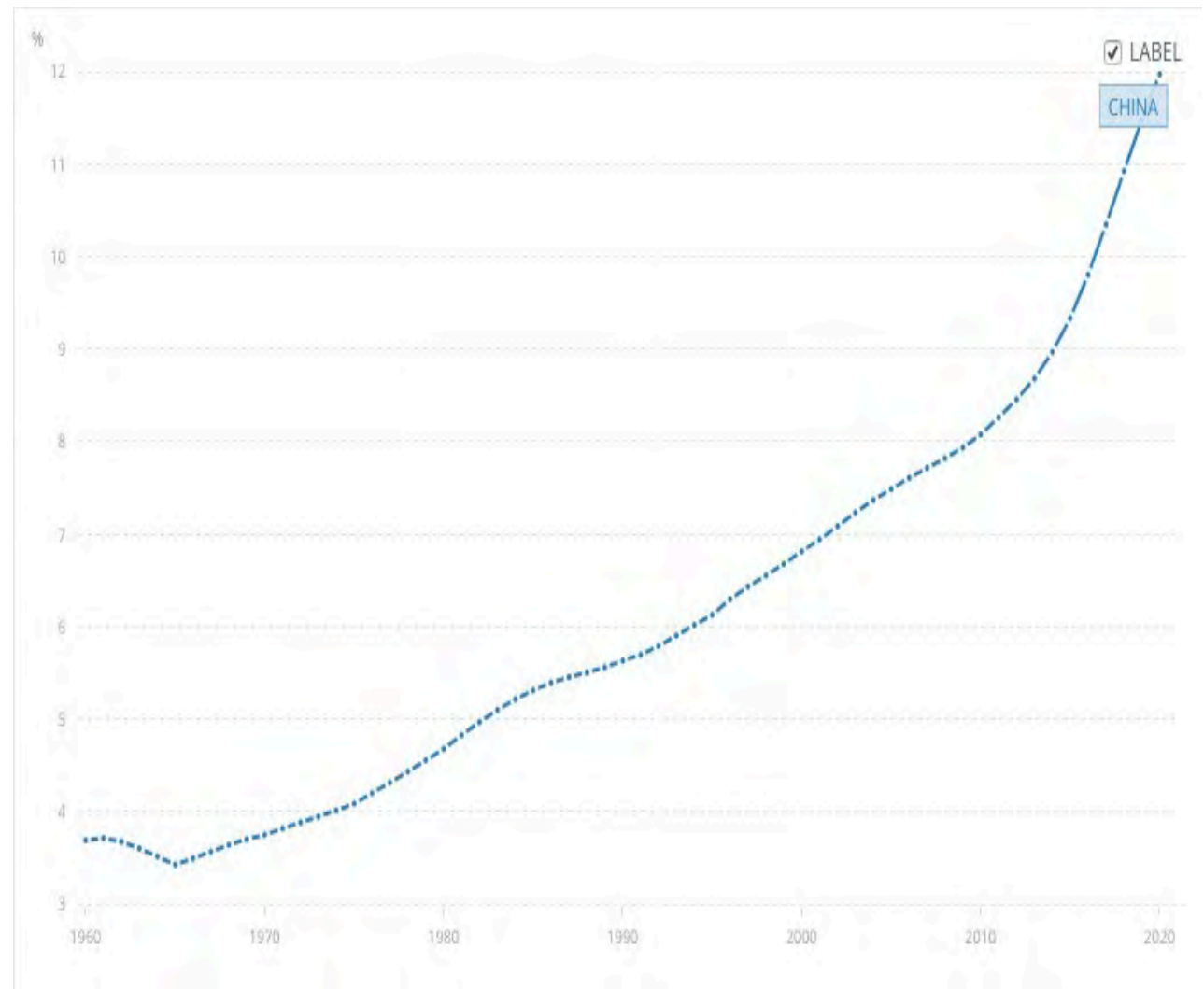
In terms of overall life expectancy, China is catching up with the United States. The margin has been reduced to 2 years, which was 25 years in 1950. The United States came 47th globally, with 78.81 years, while China is at 72th with 76.62 years. China (38.42 years) has overtaken the United States (38.31 years) in terms of median age.

The US has a higher old population share as 16.6% of the US population has age above 65 years, compared to 12% of China. The United States has more people ages above 95 years.

China: Percent of Population Over 65: 1960-2020

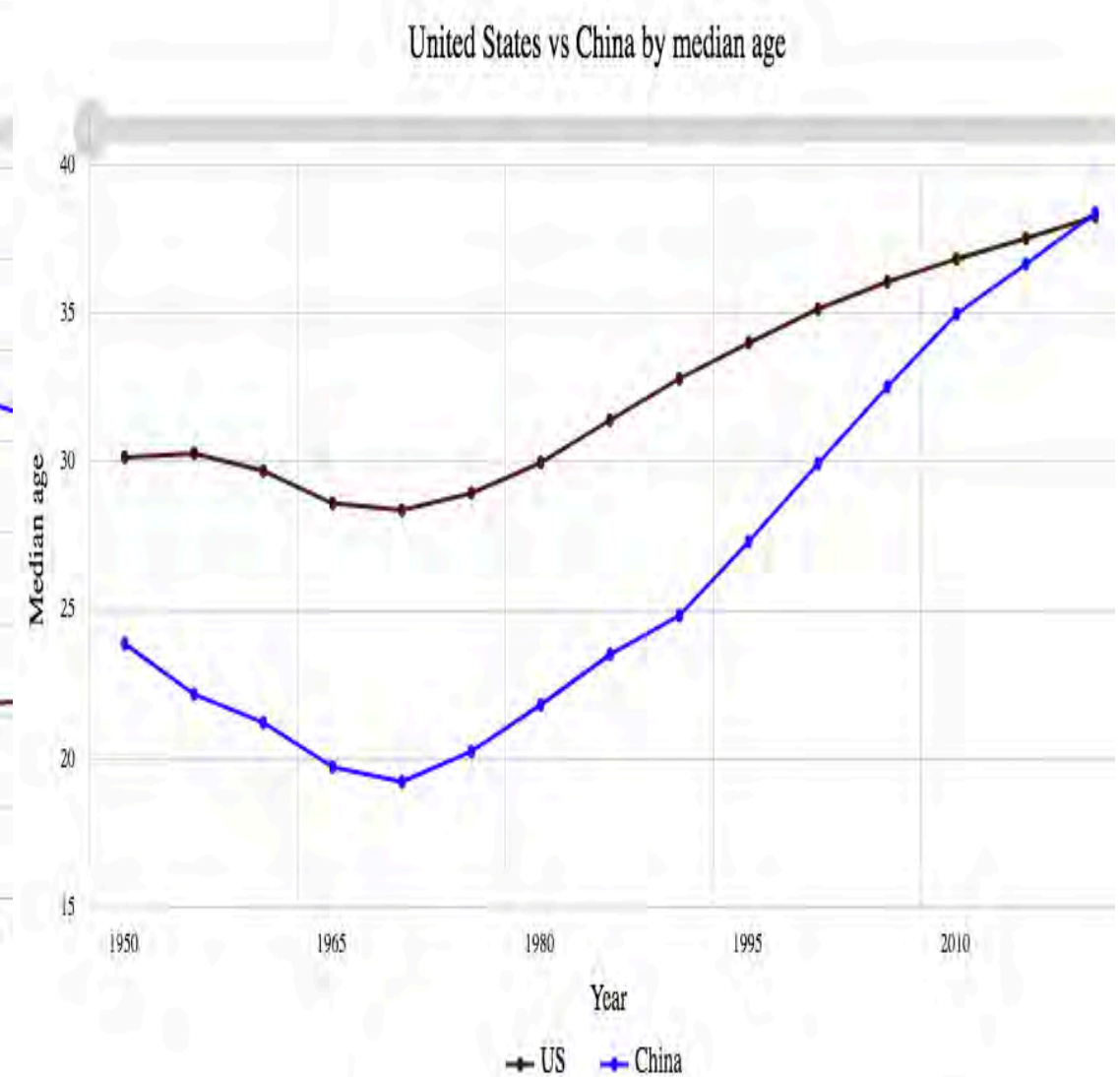
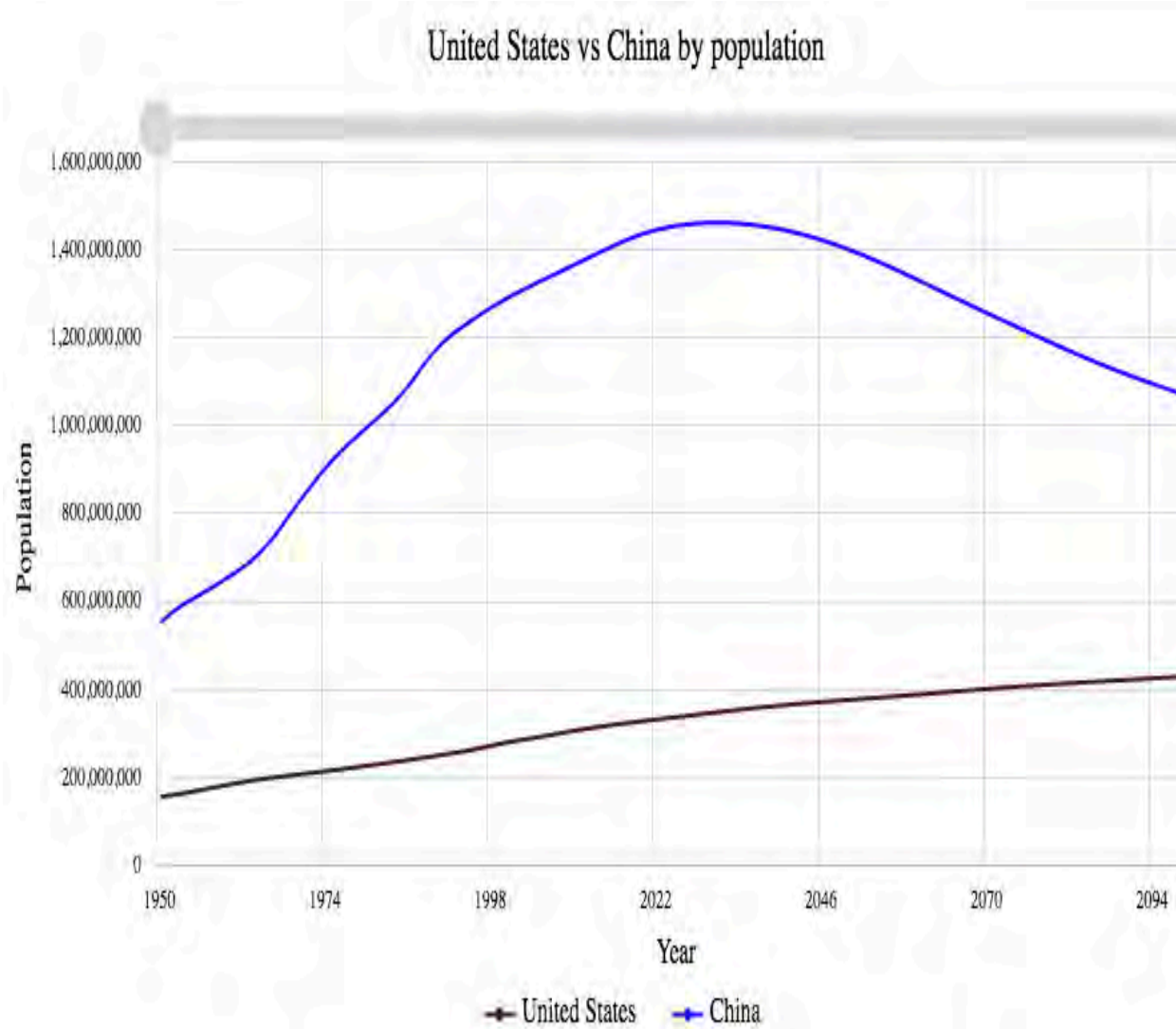
China's population is aging faster than almost all other countries in modern history. In 2050, the proportion of Chinese over retirement age will become 39 percent of the total population. China is rapidly aging at an earlier stage of its development than other countries. Current demographic trends could hinder economic growth and create challenging social problems in China.

In 1979, the Chinese government established a controversial one-child policy aimed at curbing the high fertility rate. With economic development, the provision of social services, and improved welfare conditions, life expectancy in China has also increased. These two factors have directly contributed to China's aging population, which has significant ramifications on China's society, politics, and economy. In October 2015, a two-child policy was introduced in an attempt to deal with the aging problem. In May 2021, China introduced the three-child policy in a further attempt to address the issue.



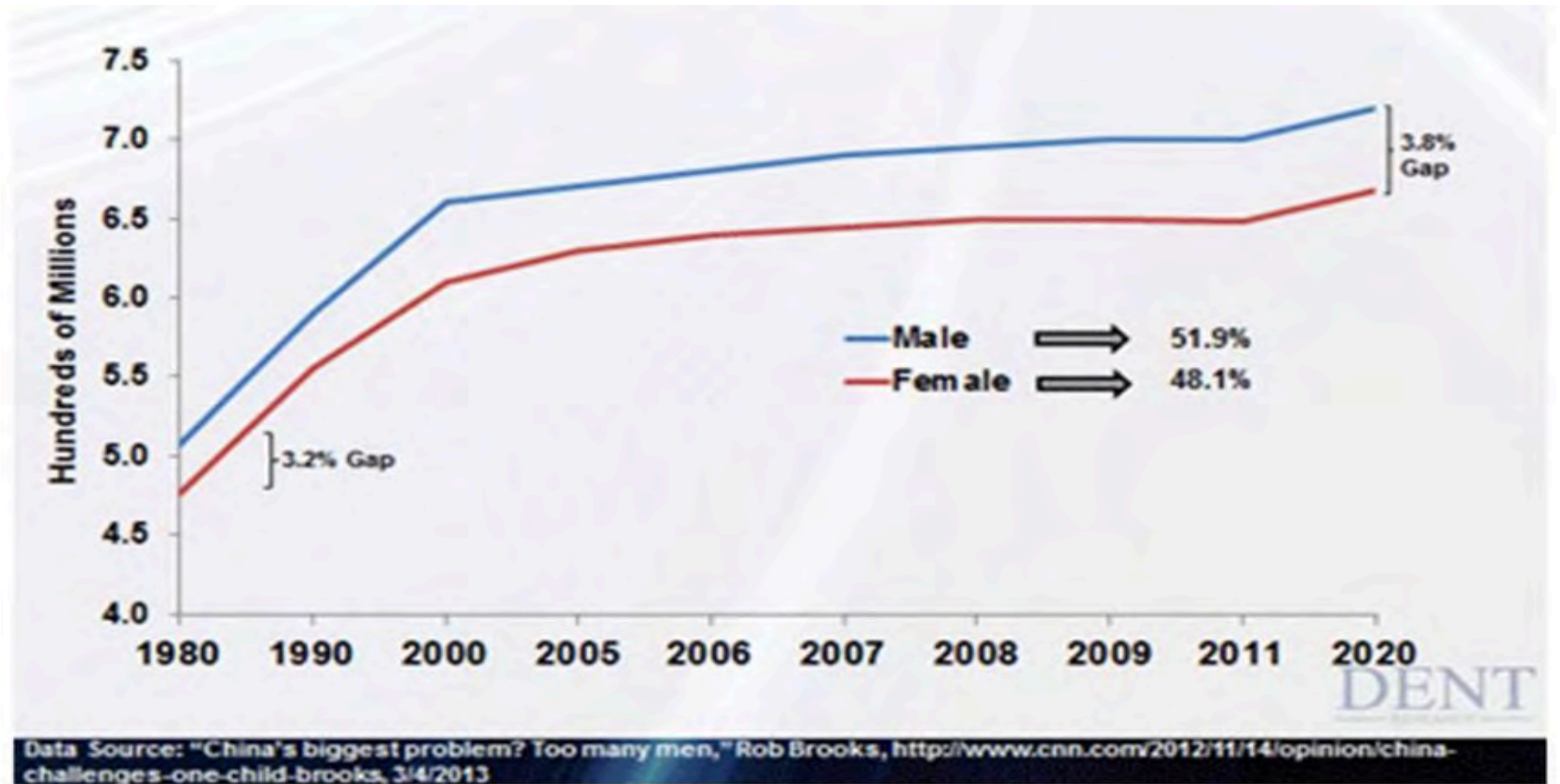
Source: World Bank, <https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS?locations=CN>; and Wikipedia, https://en.wikipedia.org/wiki/Aging_of_China. Also see *Does China Have an Aging Problem*, China Power, CSIS, <https://chinapower.csis.org/aging-problem/>.

Comparative Population and China's Rising Median Age: 1960 vs. 2020



Source: [UN \(World Population Prospects 2019\)](#); and Statistics Times, <https://statisticstimes.com/demographics/china-vs-us-population.php> and <https://statisticstimes.com/demographics/china-vs-us-population.php>.

China's Gender Gap – Males vs. Females : 1980 vs. 2020



China: Gender Imbalance

Sex ratio in China from 1953 to 2020

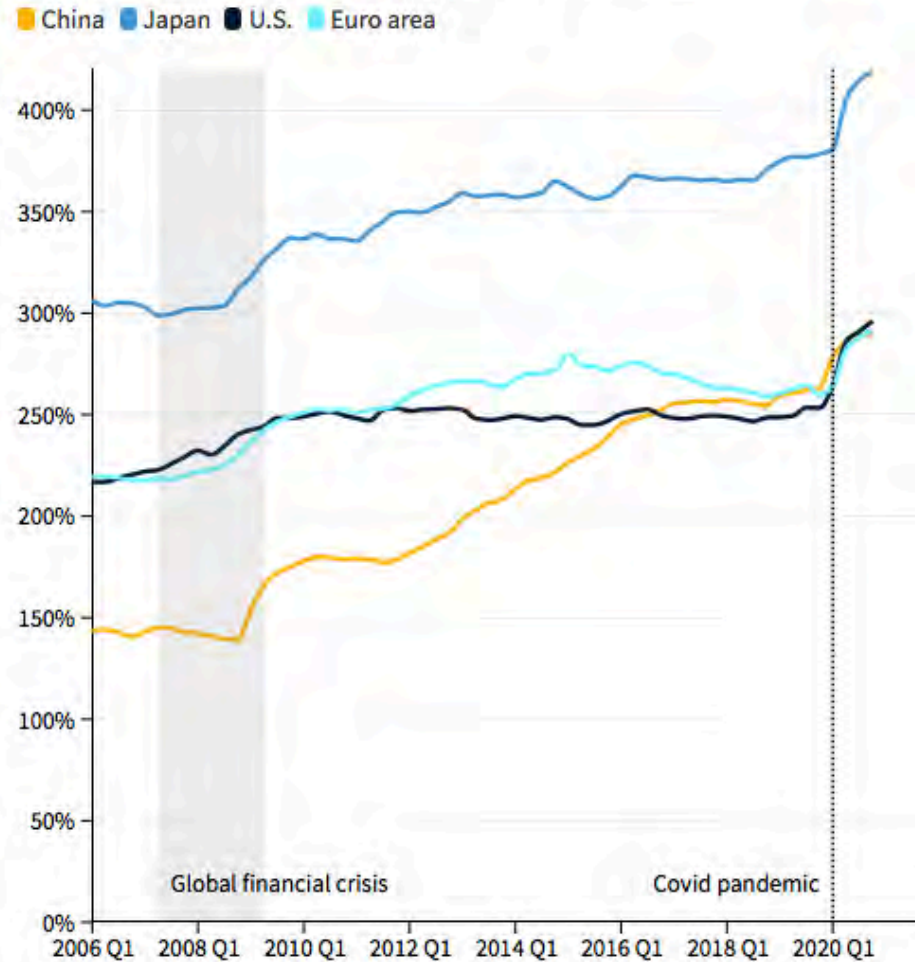
(female=100)



Source: STATISTA, 2021, <https://www.statista.com/statistics/251102/sex-ratio-in-china/>.

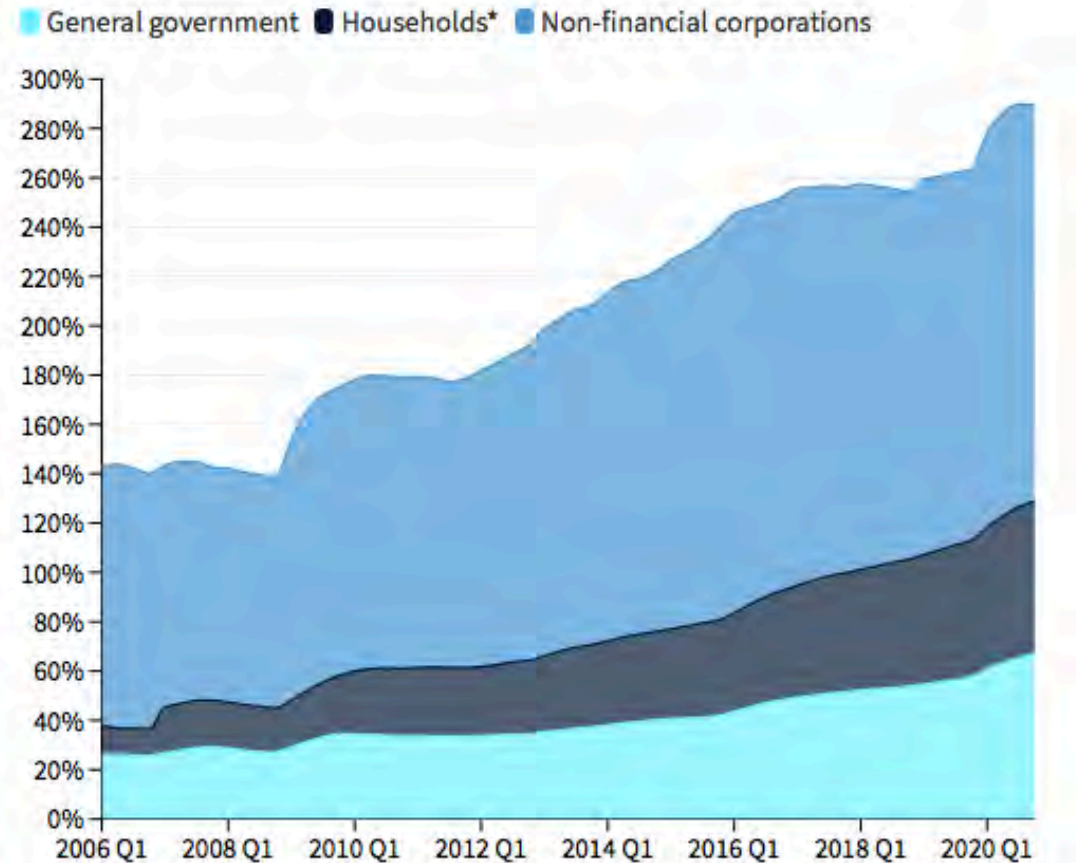
China: National Debt – I

Total debt-to-GDP ratios in major economies



China's domestic debt

Debt-to-GDP ratios of the three main components



Source: Bank of International Settlements • * Data include non-profit institutions serving households



Source: Yen Nee Lee, "These charts show the dramatic increase in China's debt" CNBC, June 28, 2019, <https://www.cnbc.com/2021/06/29/china-economy-charts-show-how-much-debt-has-grown>.

China: National Debt – II

- China's debt has grown dramatically over the past decade and is one of the biggest economic challenges confronting the ruling Chinese Communist Party, which turns 100 this week.
- Beijing has identified the ballooning debt pile as a potential threat to its economic stability, and in recent years tried to reduce the economy's reliance on debt for growth.
- That deleveraging effort came to a pause for much of last year, when China's debt — measured against the size of its — soared to record levels due to the Covid-19 pandemic.

China's debt has grown dramatically over the past decade and is one of the biggest economic challenges confronting the ruling Chinese Communist Party, which turns 100 this week.

Beijing identified the ballooning debt pile as a potential threat to economic stability, and in recent years tried to reduce the country's reliance on debt for growth. But that deleveraging effort came to a pause for much of last year due to Covid-19.

China accumulated debt rapidly in the wake of the global financial crisis in 2007 and 2008, when authorities doled out a massive stimulus package that was largely funded through bank loans.

The country's debt levels stabilized for several years before accelerating again to reach an all-time high of nearly 290% of gross domestic product in the third quarter last year, data by the Bank of International Settlements showed.

Other major economies such as the U.S., Japan and those in Europe similarly saw an uptick in debt-to-GDP ratios, BIS data showed. It occurred as governments around the world increased spending to help businesses and households tide through challenges caused by the pandemic.

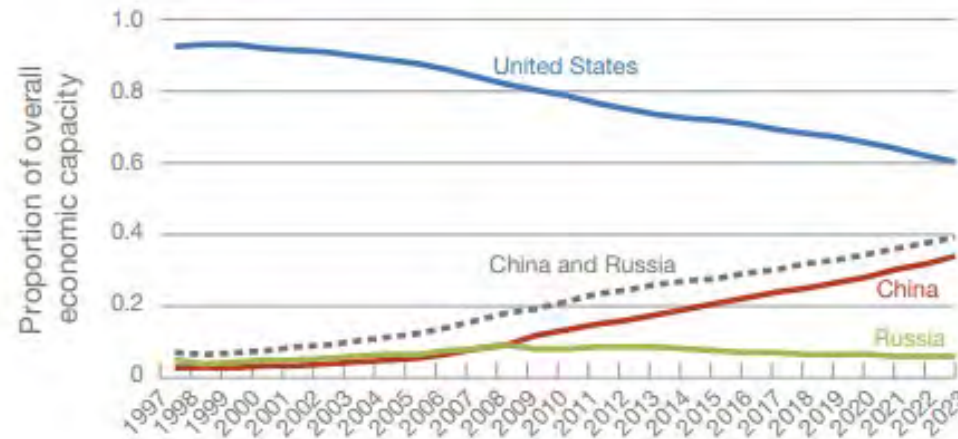
But the composition of China's debt is unlike the U.S. and Japan.

The corporate sector in China accounted for a large proportion of total debt at more than 160% of GDP, according to BIS data. Meanwhile, government debt made up the largest share of total debt in both the U.S. and Japan, the data showed.

China's Growing Economic Capability to Fund Civil- Military Competition

RAND Economic Capacity Estimates (GDP multiplied by GDP per capita)

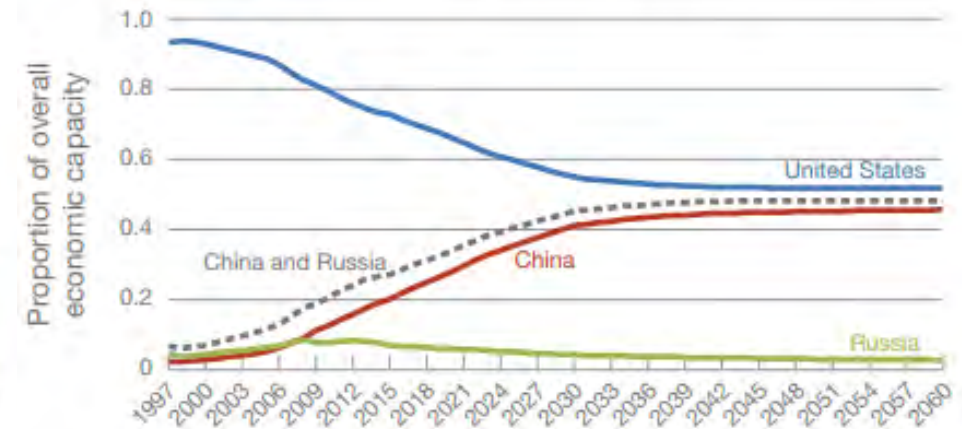
Economic Capacity Projection Through 2023 (IMF Data)



SOURCES: IMF, UN (for population data).

NOTE: Economic capacity calculated as GDP multiplied by GDP per capita, using UN medium projection.

Economic Capacity Projection Through 2060 (OECD Data)



SOURCES: Organisation for Economic Co-operation and Development (OECD), UN (for population data).

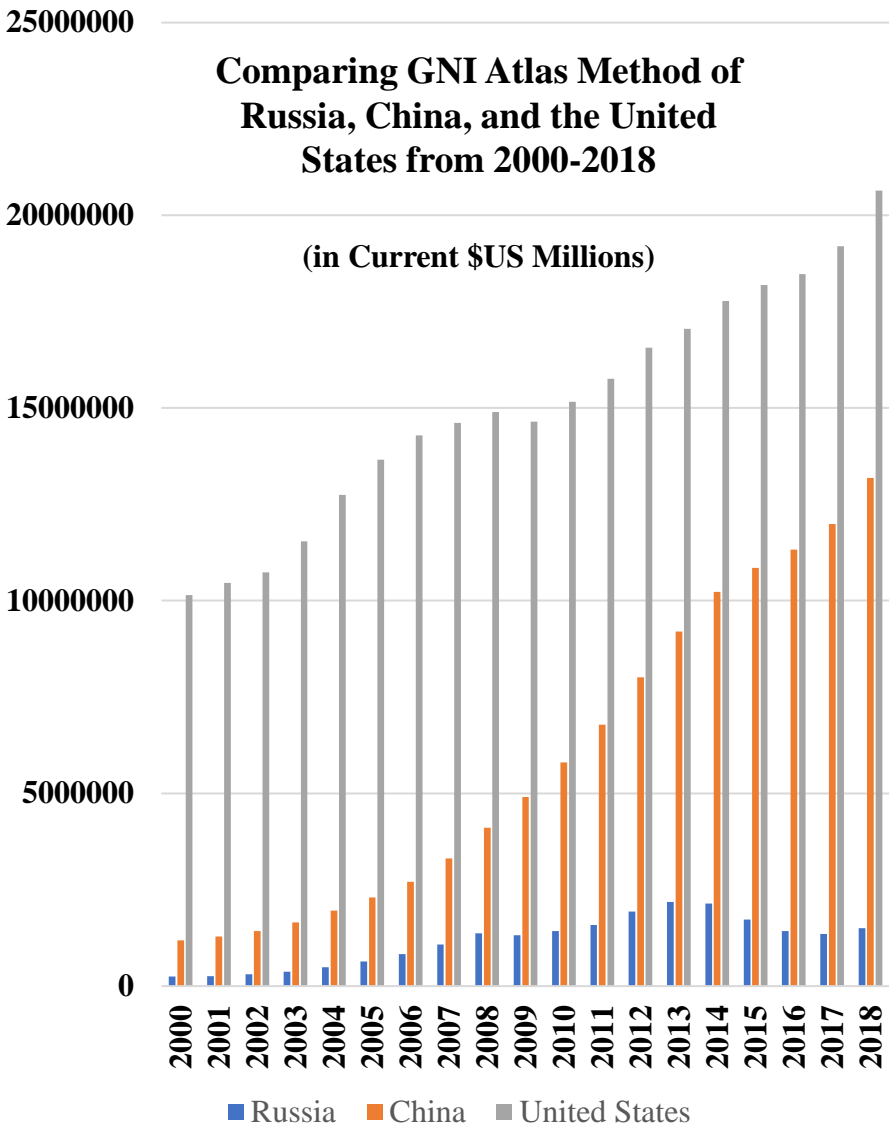
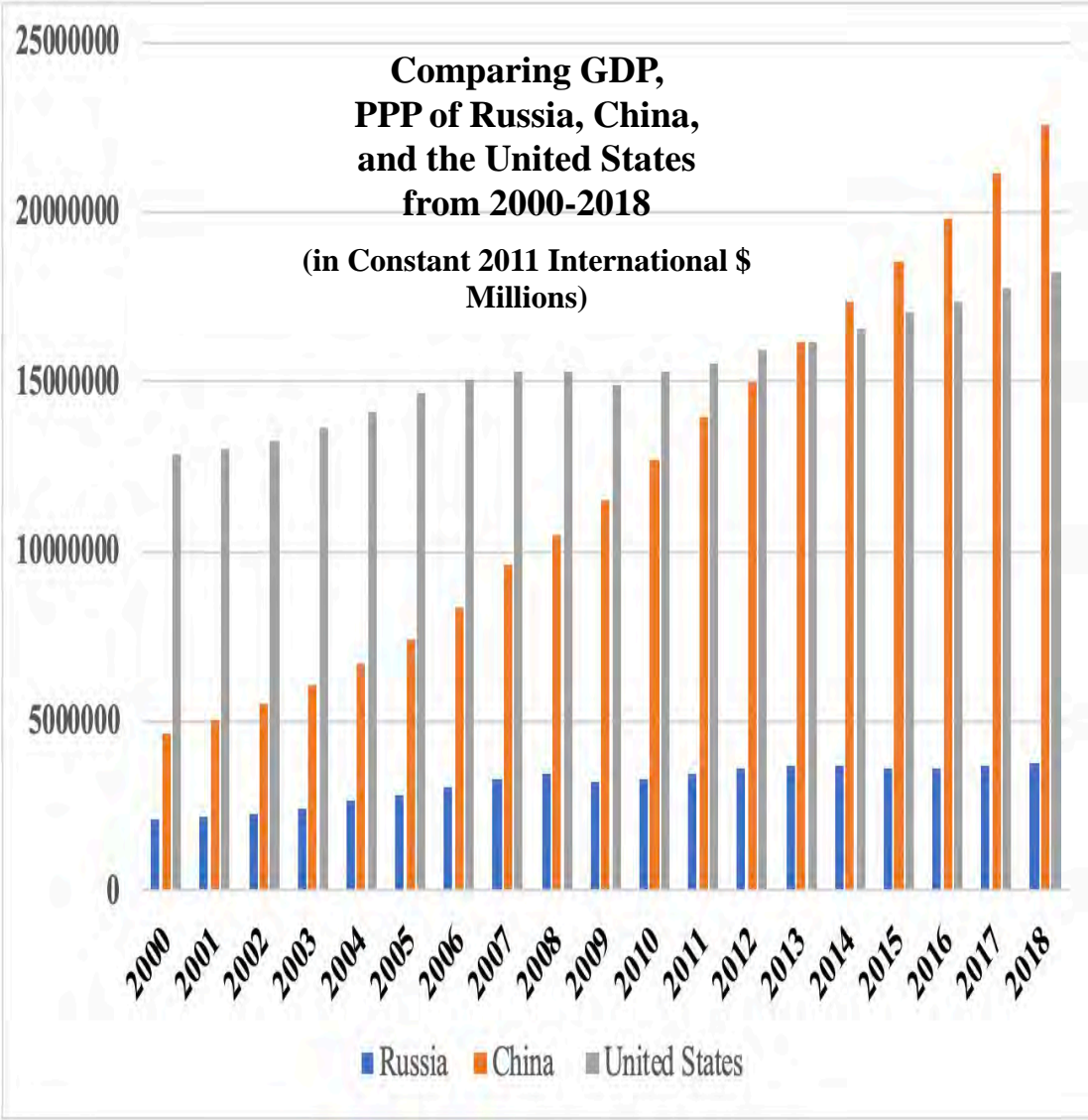
NOTE: Economic capacity calculated as GDP multiplied by GDP per capita, using UN medium projection.

... our projections show a projected increase in aggregate Chinese power and a continued decline in Russian and U.S. power.

The Chinese growth is largely based on projections of the increase in Chinese technological advantage because military capabilities are projected to remain flat. We do not attempt to project our military and technology indexes beyond 2022 because linear projections could become increasingly misleading. However, based on the longer term economic projections, we expect China's economic capacity to level out after 2030, which could mean that whatever U.S. advantage remains (if any) at that point could persist as China's economic growth slows.

Based on these observations, the balance of power theory expects that Russia and China will develop an increasingly close relationship as their aggregate power continues to approach the United States through 2022. As China's power increases, we expect it to exert greater influence abroad. But it is uncertain when China's power will exceed that of the United States, at which point China's incentive to build a closer relationship with Russia to balance the United States could diminish.

Comparative Size of Economy PPP vs. GNI: 2000 vs. 2018



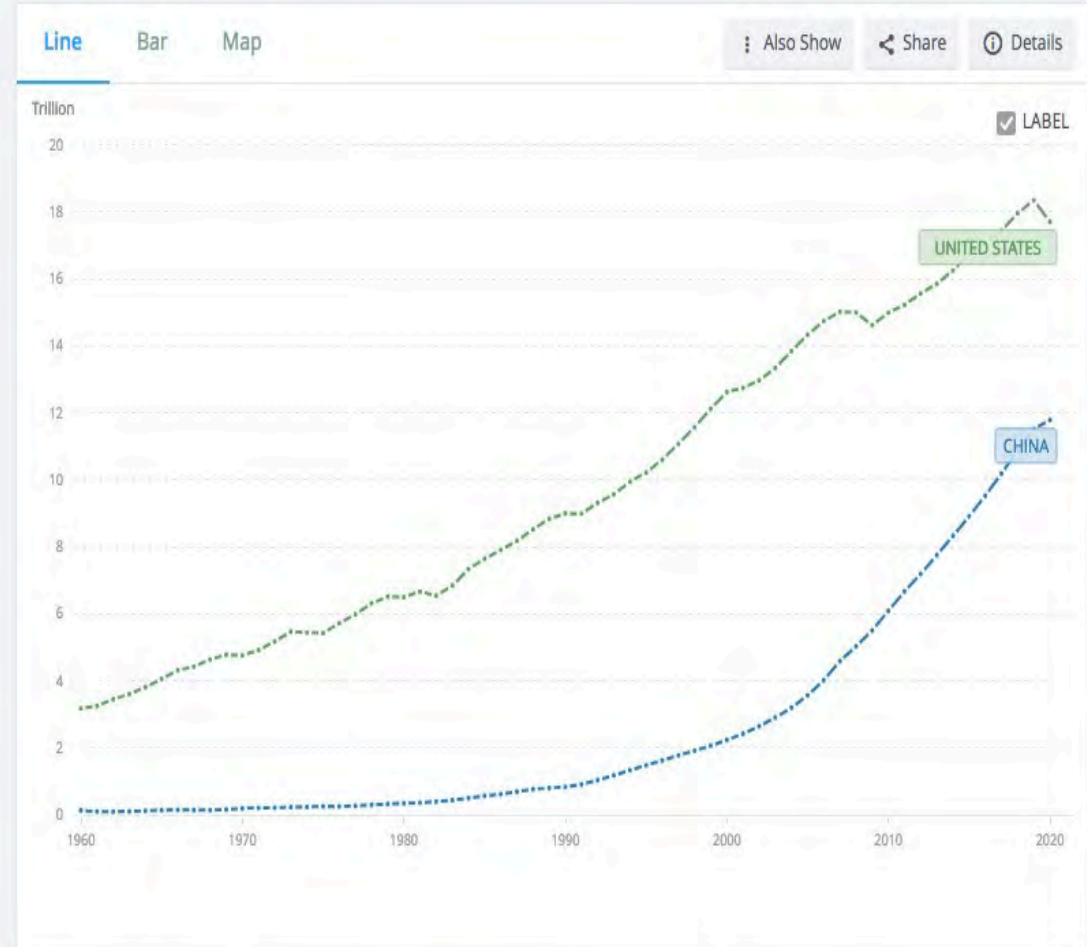
Source: World Bank, “Country Database: China,” accessed November 2020.

Comparative Size of Economy PPP: 1990 vs. 2020

GDP (constant 2010 US\$) - China, United States

World Bank national accounts data, and OECD National Accounts data files.

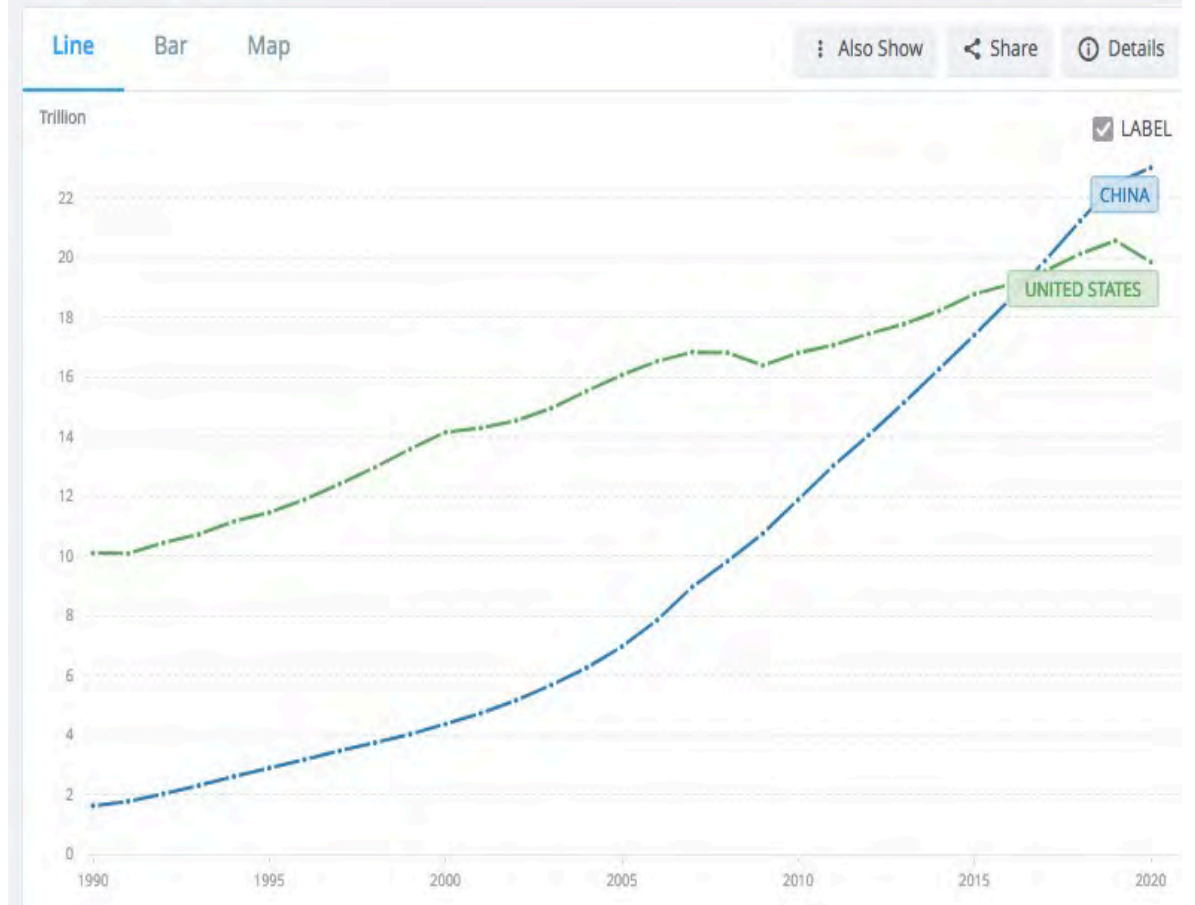
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GDP, PPP (constant 2017 international \$) - China, United States

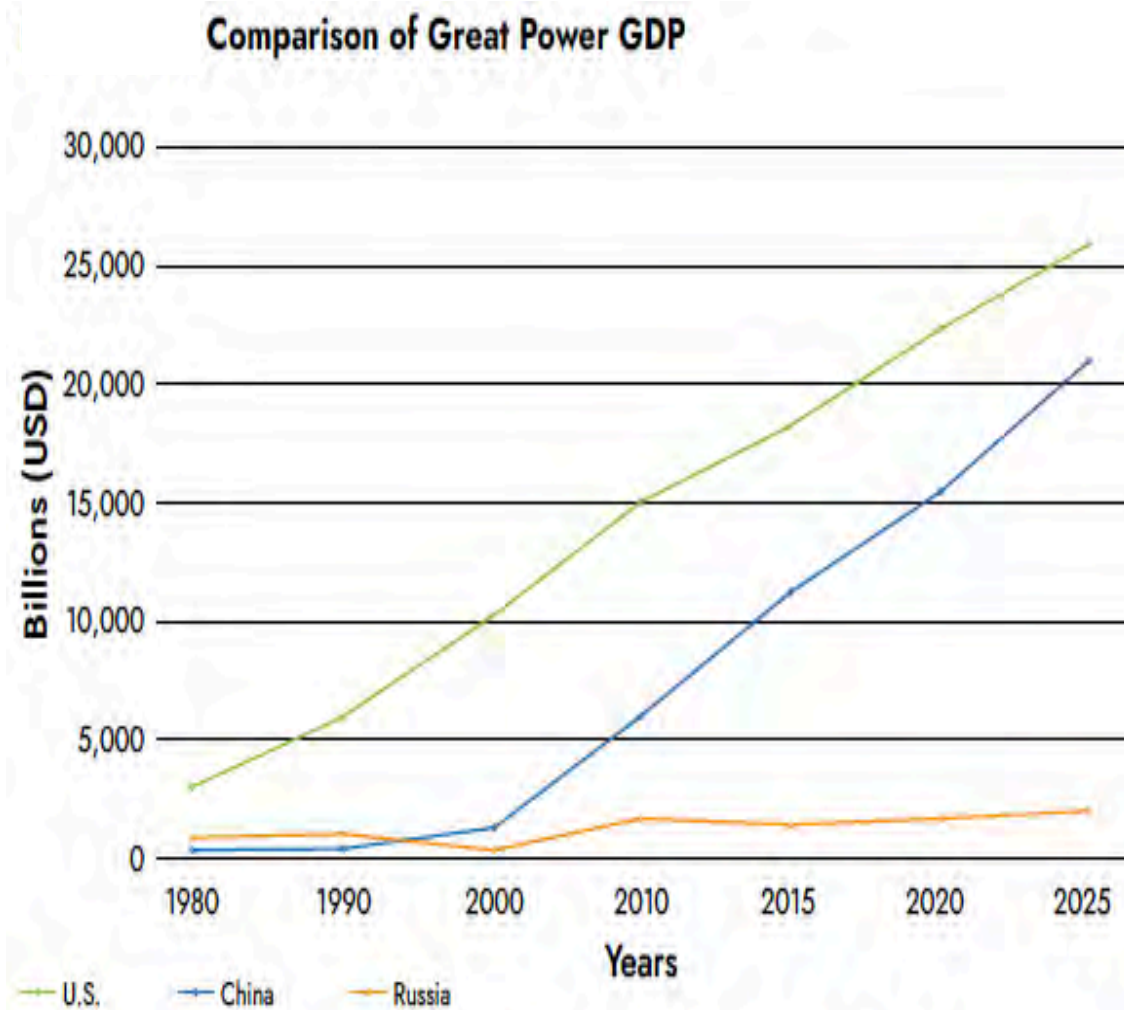
International Comparison Program, World Bank | World Development Indicators database, World Bank | Eurostat-OECD PPP Programme.

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Source: World Bank, <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?locations=CN-US> and <https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.KD?locations=CN-US>.

Lynch & Saunders: Comparative Size of Economy PPP: 1990 vs. 2020



Nominal U.S. GDP in 2019 was an estimated \$22.32 trillion, ahead of China's \$15.3 trillion and Russia's \$1.7 trillion.. America remained the world's top and most dynamic national economy, generating 23.9 percent of global GDP in 2019, far ahead of its nearest competitor, China, with 15.9 percent that year. The U.S. share of the global GDP remains in slow relative decline, but it is anticipated to generate about 21 percent of global GDP in 2035.

Given canonical projections in 2020, China's nominal GDP would be about 25 percent of the global total in 2035, surpassing that of the United States in about 2030.

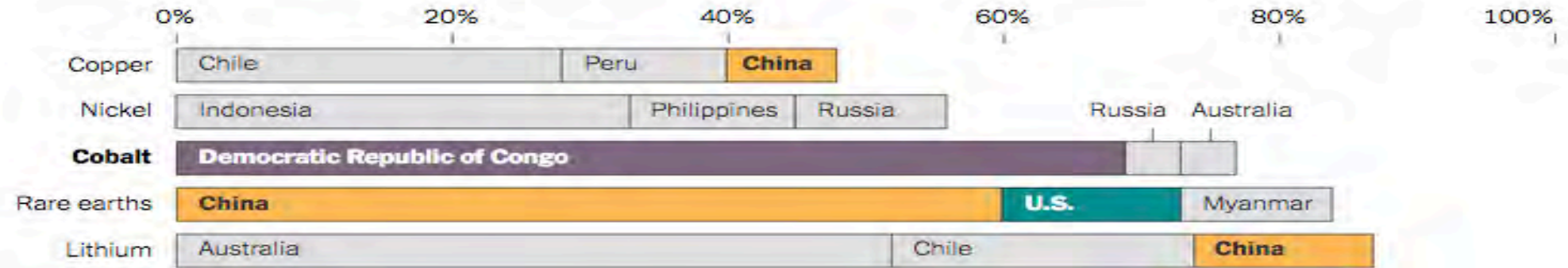
The United States is not an export-dependent economy, but about 10 percent of its nominal GDP in 2018 was goods exports (\$2.5 trillion). America also is the world's leader in services exports, with \$828 billion in 2018 nominal value led by audiovisual technology, banking services, energy, express delivery, information technology, insurance, and telecommunications service industries.

Top U.S. export customers in the 2010s were China, Canada, and Mexico, all of which were linked into complex regional and global supply chains accounting for a high percentage of U.S. manufactured exports. Almost 19 percent of American manufactured exports were in the high-technology category in 2018, lower than the 31 percent of China's exports in 2017 but near the global average of 18 percent for 2018.

Case Study in Selective Competition: Production and Processing of Clean Energy Materials

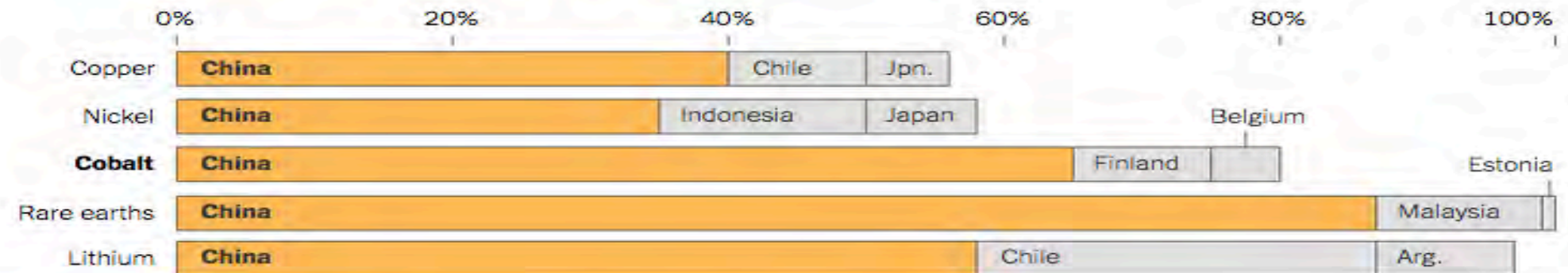
Where Clean Energy Metals Are Produced

Production of key resources is highly concentrated today. Charts show the top three producers.



And Where They Are Processed

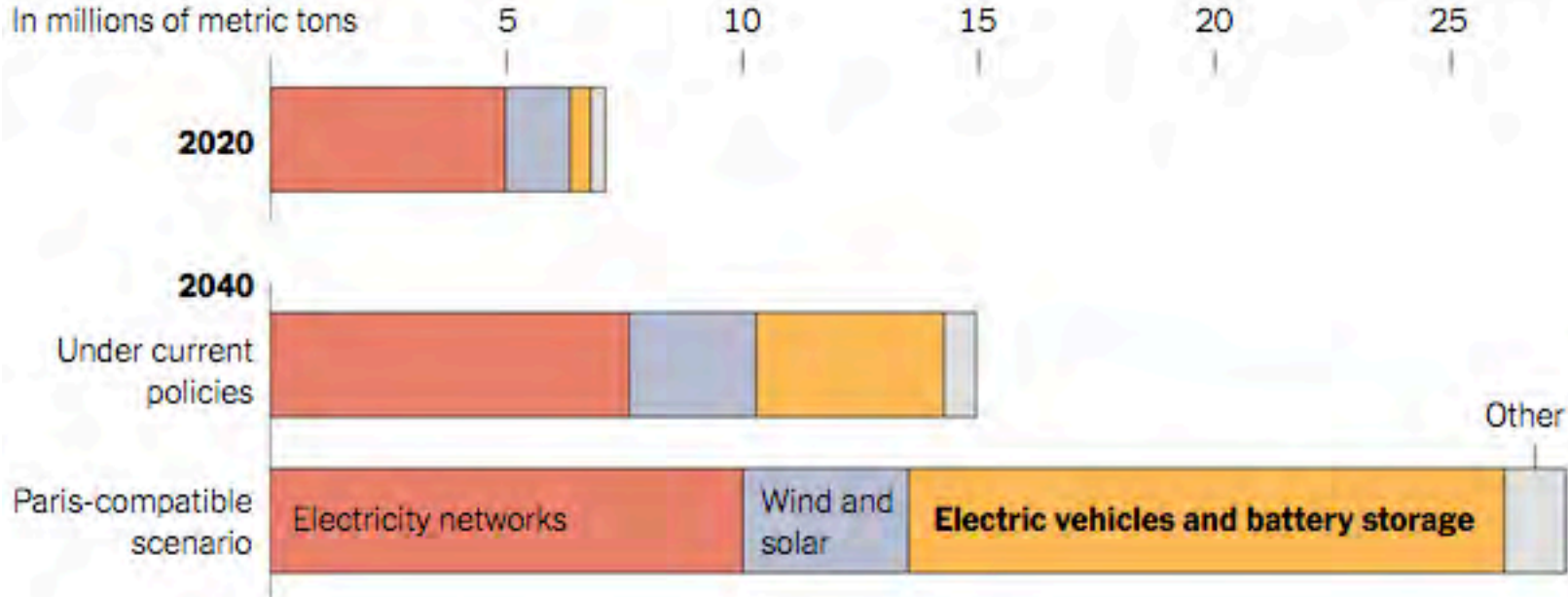
China dominates the refining and processing of key metals.



Source: International Energy Agency By The New York Times

Case Study in Selective Competition: Global Demand for Cobalt

Demand is expected to double by 2040 based on today's policies. It could quadruple if countries meet their climate goals under the Paris Agreement. Chart shows projected growth by sector.

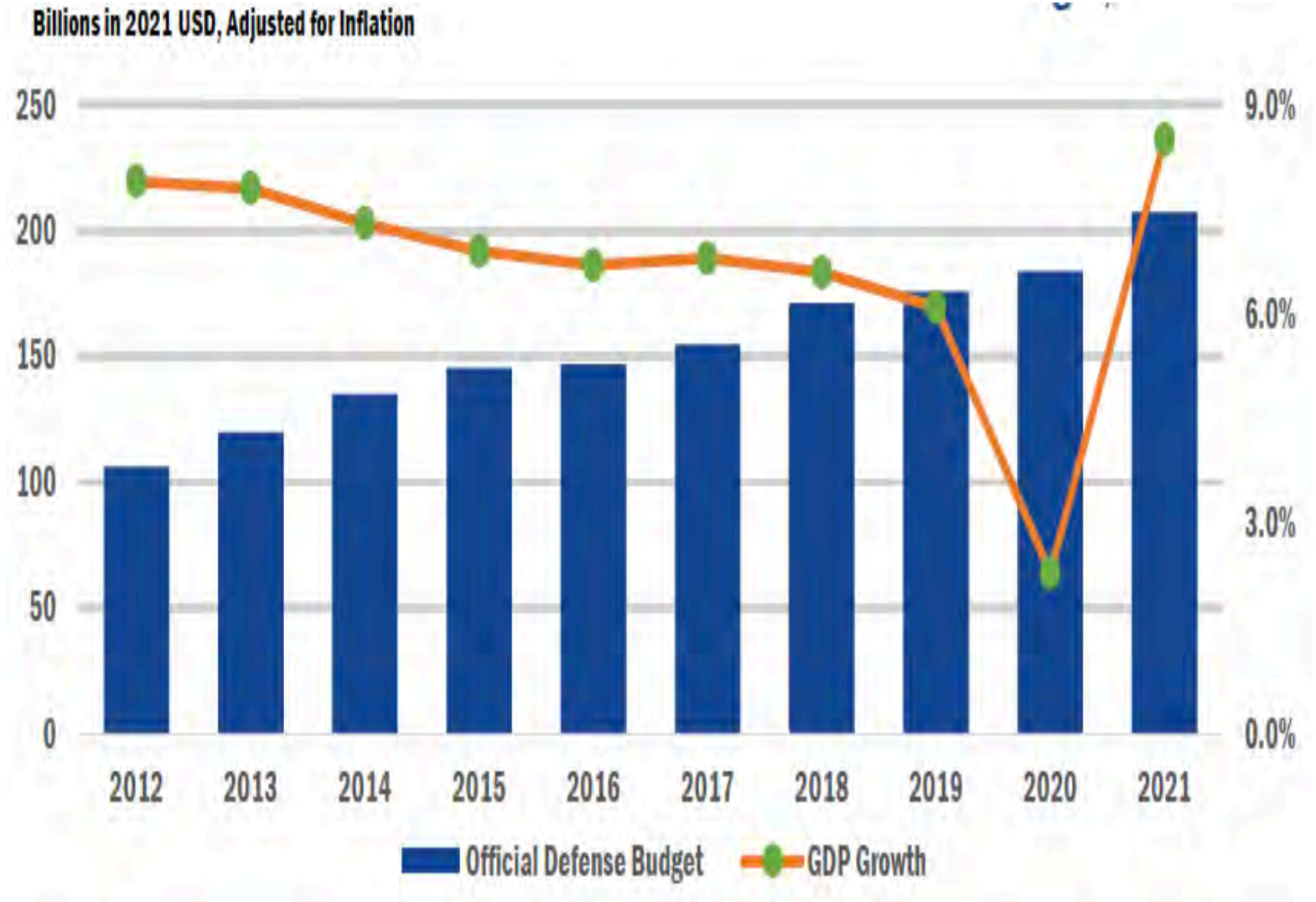


Source: International Energy Agency | Note: The Paris-compatible scenario assumes countries meet their emissions-reduction goals under the Paris Agreement in full, including stated net-zero targets as of mid-2020. It also assumes countries meet other U.N. Sustainable Development Goals, including improving air quality and providing access to modern energy. By The New York Times

Impact of China's Economic Growth on Its Military Spending

DoD: China's Official Military Spending 2012-2021 – I

Regional Comparison of Official 2021 Defense Budgets	
	Defense Budget (In Billions, USD)
PRC (Official Defense Budget)	\$209
India	\$64.8
Japan	\$55
Russia (National Defense Budget)	\$66.8
South Korea	\$48
Taiwan	\$15.4



Source: Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2021*, November 3, 2021, p. x and 142.

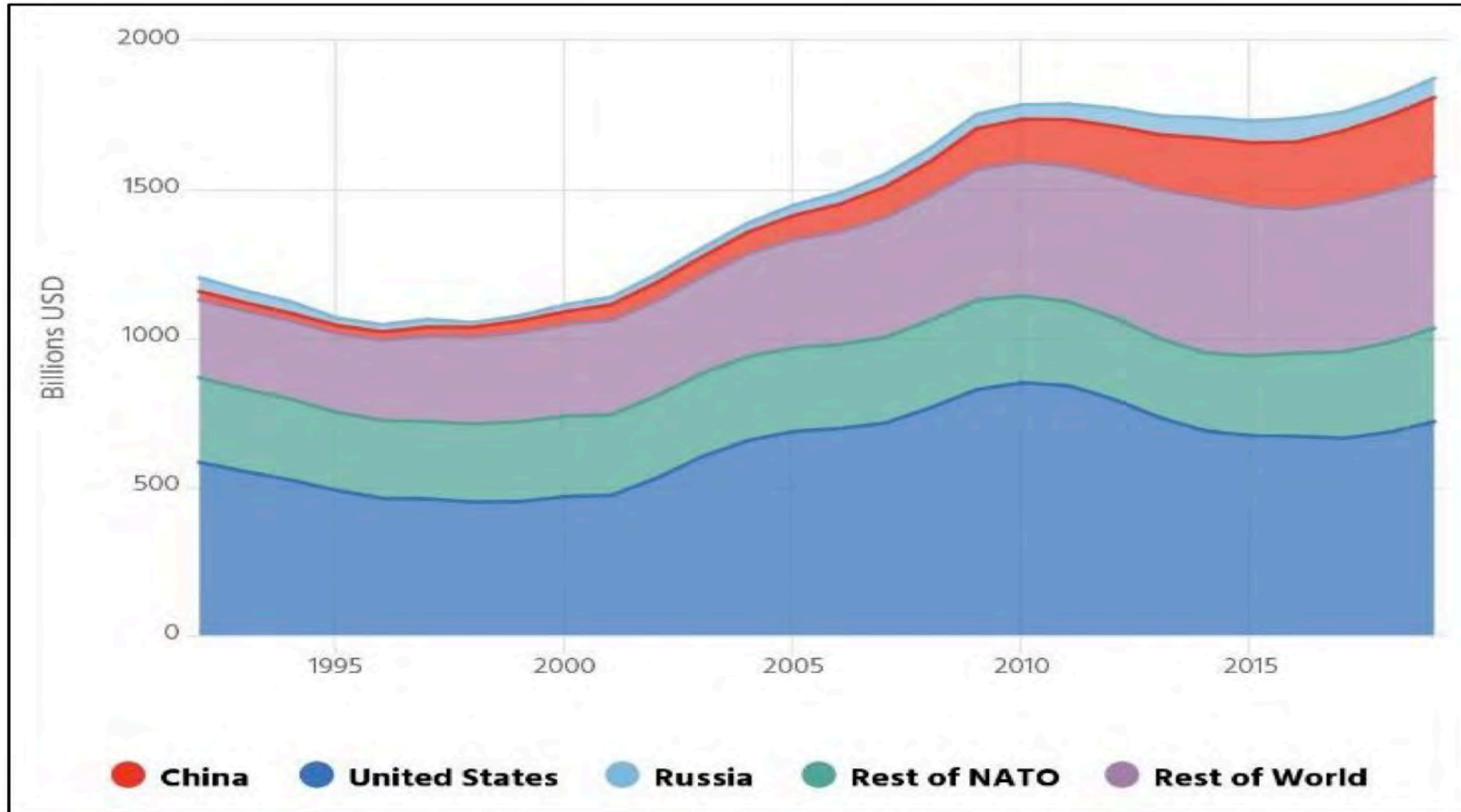
DoD: China's Official Military Spending 2012-2021 – II

In 2021, the PRC announced a 6.8 percent annual military budget increase to \$209 billion, which is approximately 1.3 percent of gross domestic product. This year's budget continues more than 20 years of annual defense spending increases and sustains the PRC's position as the second-largest military spender in the world after the United States. The PRC's defense budget has nearly doubled during the past 10 years—data from 2012 through 2021 indicates the PRC's official military budget grew 7 percent annually. Based on its official defense spending figures, which omit several major categories of expenditures, the PRC can support continued growth in defense spending for at least the next five to ten years, based on economic data and growth projections.

The PRC's Estimated Military Expenditures. The PRC's published military budget omits several major categories of expenditures, including R&D and foreign weapons procurement. In 2021, according to public research institutions, the PRC's actual military-related spending could be 1.1 to 2 times higher than stated in its official budget. However, actual military expenses are difficult to calculate, largely because of the PRC's lack of transparency.

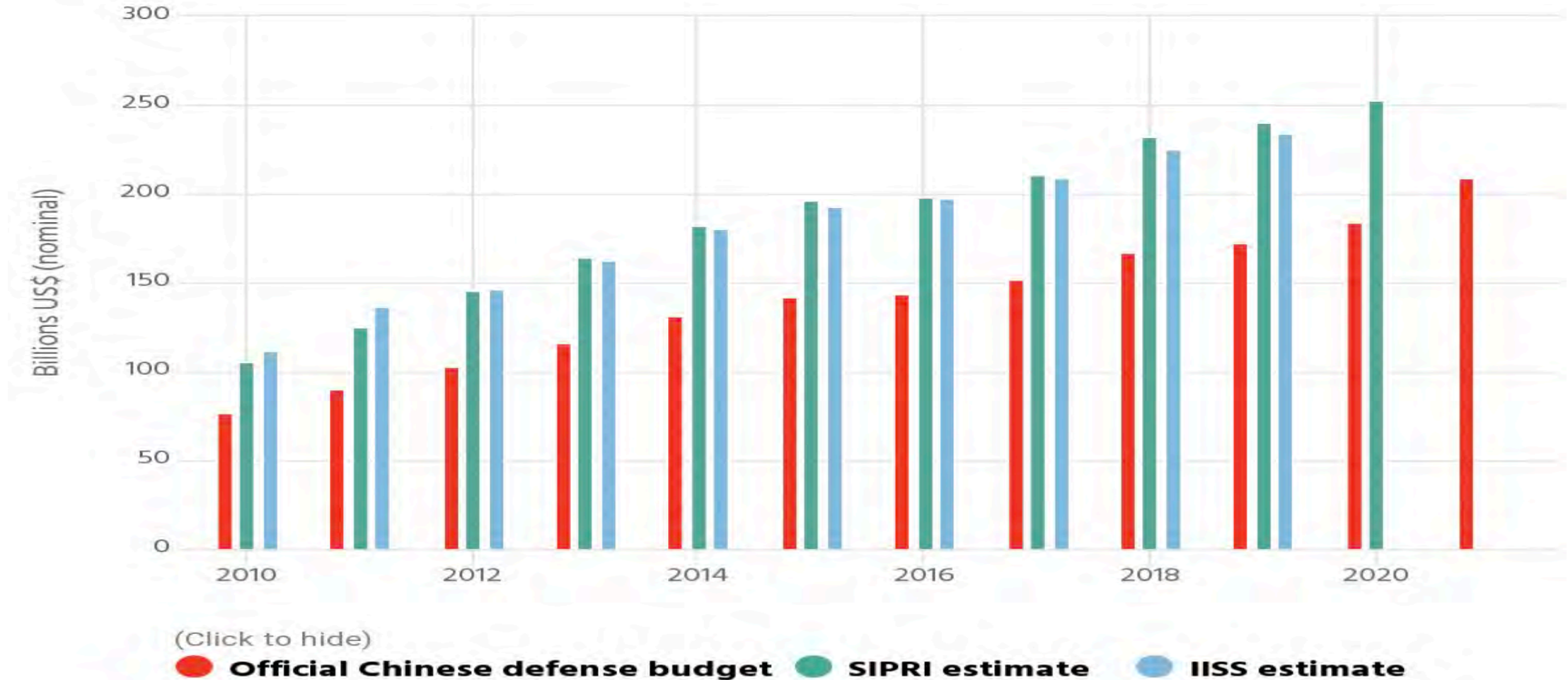
The PRC's Estimated Defense Budget Growth. If the PRC's official defense budget increases annually by an average of 7 percent, growing as high as \$270 billion by 2023, the PLA can dedicate more money for training, operations, and modernization considering the reduction of the PLA's size by 300,000 people. Economic forecasters project that the PRC economic growth will slow during the next 10 years, which could slow future defense spending growth. However, this presumes the PRC maintains current interests to balance national development with defense spending. Assuming accurate economic projections and a steady defense burden, the PRC will remain the second-largest spender after the United States.

CRS Estimate of Comparative Global Military Spending



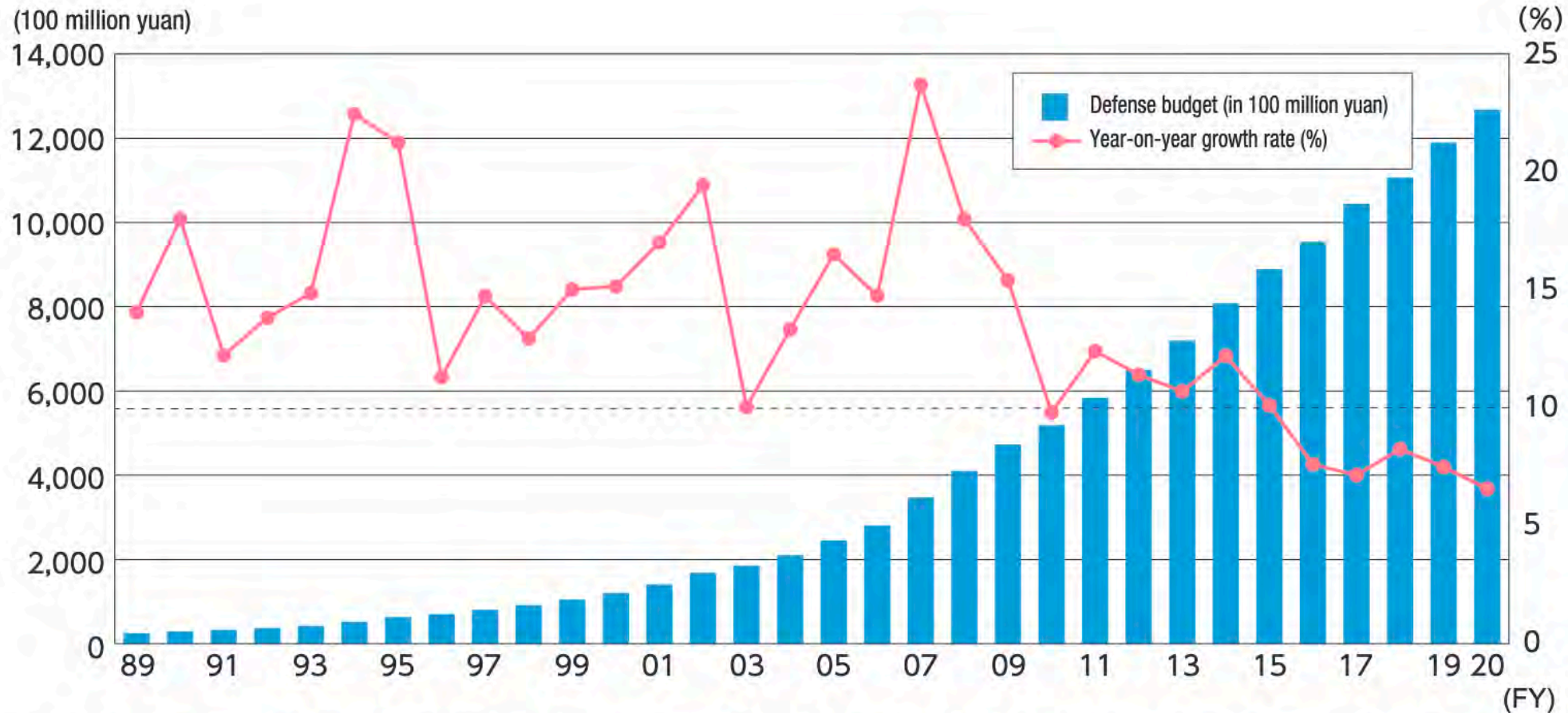
Source: Caitlin Campbell, *China Primer: The People's Liberation Army (PLA)*, Congressional Research Service, January 5, 2021, <https://crsreports.congress.gov/product/pdf/IF/IF11719/4>.

China vs. IISS vs. SIPRI Estimates of Military Spending



Source: Center for Strategic and International Studies China Power Project, “What Does China Really Spend on Its Military?” 2021; Members of Center for Strategic and International Studies China Power Project, interview with Commission staff, October 15, 2019. Note: All values in nominal U.S. dollars. SIPRI stands for Stockholm International Peace Research Institute. IISS stands for International Institute for Strategic Studies. Estimated figures from IISS for 2018 and 2019 and from SIPRI for 2019 are not available. Adapted from *China’s National Defense in a New Era*, July 2019, <http://www.xinhuanet.com/english/download/whitepaperonnationaldefenseinnewera.doc>.

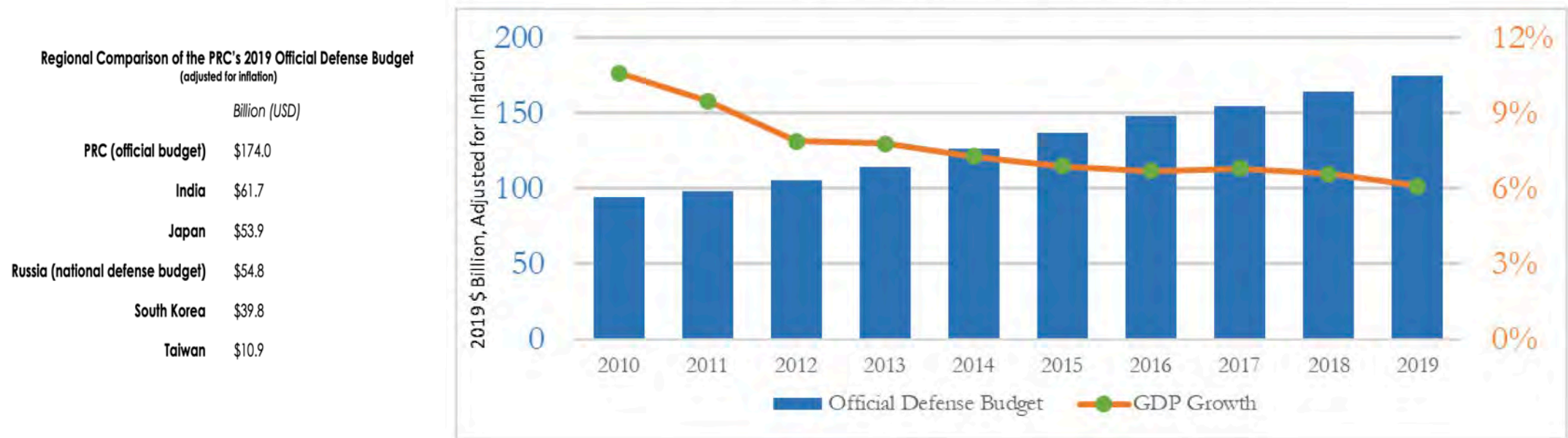
Japanese Estimate of Long-Term Trends in Chinese Spending: 1980-2020



Note : This basically shows the defense budget within “the central government’s general public budget,” which had been named as “the central fiscal expenditures” prior to FY 2014. Year-on-year growth rate compares the budget of a given year against the initial budget of the previous year. Note that FY2002 defense budget was calculated based on the increased amount from the defense budget in the previous FY because only the amount and rate of growth were released. For FY 2016, FY 2018, FY 2019 and FY2020, the amount of “the central government expenditures,” which are part of the central government’s general public budget, are used because only the central government expenditures were announced.

DoD: China's Official Military Spending 2010-2019

China: Official Defense Budget, 2010–2019



In early 2019, the PRC announced a 6.2-percent inflation-adjusted increase in its annual military budget to \$174 billion, which is approximately 1.3 percent of gross domestic product. This year's budget continues more than 20 years of annual defense spending increases and sustains the PRC's position as the second-largest military spender in the world after the United States. The PRC's defense budget has nearly doubled during the past 10 years—data from 2010 through 2019 indicates China's official military budget grew at an annual average of approximately 8 percent in inflation-adjusted terms. Based on its official defense spending figures, which omit several major categories of expenditures, the PRC can support continued growth in defense spending for at least the next five to ten years, based on economic data and growth projections.

China's Estimated Military Expenditures. The PRC's published military budget omits several major categories of expenditures, including R&D and foreign weapons procurement. In 2019, China's actual military-related spending could be more than \$200 billion, much higher than stated in its official budget. However, actual military expenses are difficult to calculate, largely because of China's poor accounting transparency.

China's Estimated Defense Budget Growth. If China's official defense budget increases annually by an average of 6 percent, growing to \$270 billion by 2023, the PLA can dedicate more money for training, operations, and modernization considering the reduction of the PLA's size by 300,000 people. Economic forecasters project that China's economic growth will slow during the next 10 years, falling from 6.1 percent in 2019 to 3 percent in 2030, which could slow future defense spending growth. Assuming accurate economic projections and a steady defense burden, China will remain the second-largest spender after the United States.

DIA China's Official Military Spending 2007-2018 – I

The official defense budget has remained at 1.2 to 1.4 percent of gross domestic product for the past decade, allowing for steady, sustainable expenditure growth and qualitative improvements throughout the PLA.

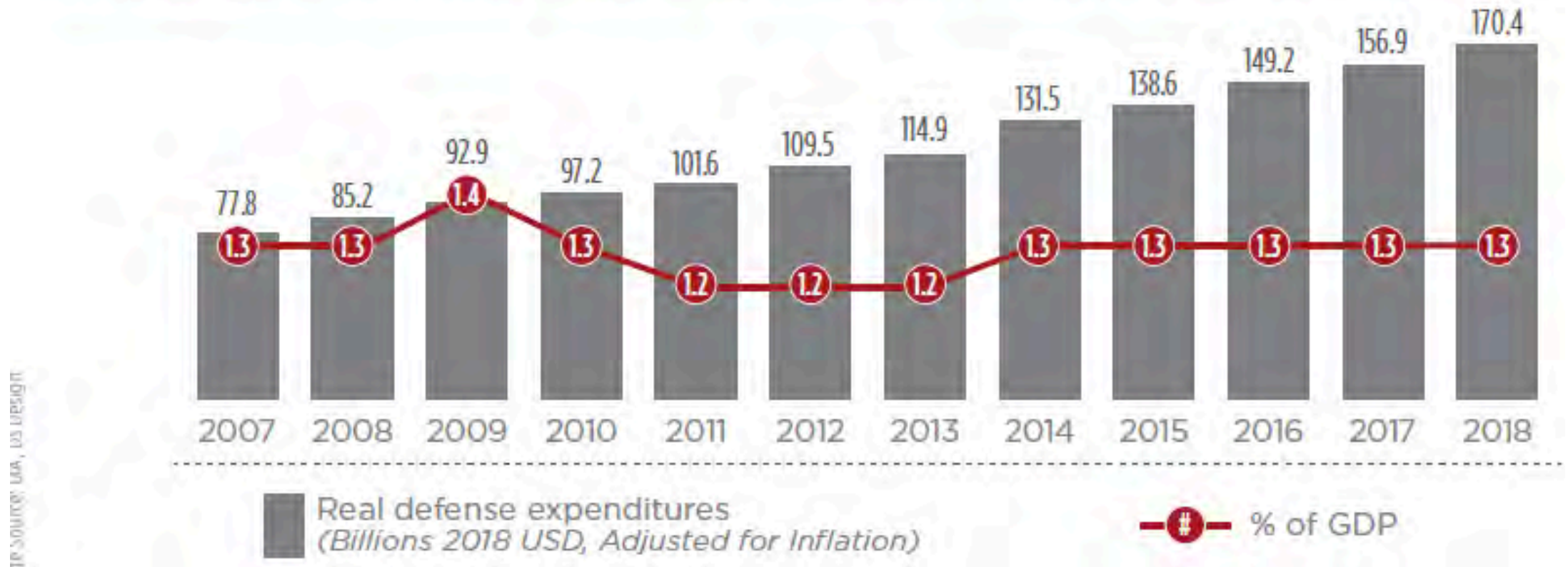
Estimating actual military expenses is difficult because of China's poor accounting in transparency and incomplete transition to a market economy. The formal defense budget process does not include funding for foreign weapons procurement, some research and development (R&D), and certain personnel benefits. Other government ministries distribute defense funds in addition to extra budgetary funds that supplement personnel living subsidies, equipment maintenance, and other budgetary items

China's total military-related spending for 2018 probably exceeded \$200 billion, a threefold increase since 2002. Such spending has been on the rise since the 1990s, when China formally began to emphasize defense-related programs throughout the course of several "Five-Year Plans."

Although the total dollar value of China's defense budget remains significantly below that of the United States, China has benefited from "late-comer advantage." In other words, China has not had to invest in costly R&D of new technologies to the same degree as the United States. Rather, China has routinely adopted the best and most effective platforms found in foreign militaries through direct purchase, retrofits, or theft of intellectual property. By doing so, China has been able to focus on expediting its military modernization at a small fraction of the original cost.

DIA China's Official Military Spending 2007-2018 – II

China's Official Defense Spending 2007-2018 (billions of 2018 dollars)



China's Evolving Civil Capabilities and the Trends in China's Technology and Industry

Chinese Defense Technology and Industry – I

MILITARY INDUSTRIAL BASE TRENDS

Key Takeaways

- The PRC has substantially reorganized its defense-industrial sector to improve weapon system research, development, acquisition, testing, evaluation, and production.
- The PRC's Military-Civil Fusion (MCF) Development Strategy is a key part of its defense sector reform.
- Many of the PRC's missile programs are comparable to other international top-tier producers; the PRC may try to use aspects of the S-400 surface-to-air missile (SAM) system it began receiving from Russia in 2018 to reverse-engineer capabilities it lacks.
- The PRC is the top ship-producing nation in the world by tonnage and has the capability to produce naval gas turbine and diesel engines as well as shipboard weapons and electronic systems, which makes it nearly self-sufficient for all shipbuilding needs.
- In 2020, the PRC fielded its first missile with a hypersonic glide vehicle and advanced its scramjet engine development, which has applications in hypersonic cruise missiles.

Missile and Space Industry. Most of the PRC's missile systems, including its ballistic and cruise missile systems, are comparable in quality to systems of other international top-tier producers. The PRC produces a wide range of missiles—ballistic, cruise, air-to-air, and surface-to-air—for the PLA and for export. During 2020, the PRC fielded its first missile with a hypersonic glide vehicle and advanced its scramjet engine development, which has applications in hypersonic cruise missiles. The PLA Navy revealed during its 70th anniversary celebration in April 2019 that its new guided-missile cruiser can employ long-range land attack cruise missiles. Within the past 2 years, Beijing made its first sale of a surface-to-air-missile system to a European nation, Serbia. The PRC is developing a ramjet-powered air-to-air missile in addition to the beyond-visual-range PL-15, which was featured at the 2018 airshow in Zhuhai.

The PRC's space industry, historically managed by the PLA, is rapidly expanding its intelligence, surveillance, reconnaissance, navigation, and communication satellite constellations. A third lunar mission and the completion of the PRC's global navigation satellite services during 2020 demonstrated the industry's continued progress. The PRC's domestic space market is dominated by state-run enterprises; however, increased investment has created private space companies, which have achieved successful orbital launch attempts during the past two years. During 2020, the PRC launched its first satellites for a new space-based Internet-of-things project with container monitoring and maritime communications applications and continued developing a spaced-based broadband Internet network.

Naval and Shipbuilding Industry. The PRC, the top ship-producing nation in the world by tonnage, is increasing its shipbuilding capacity and capability for all naval classes, including submarines, warships, and transport and amphibious ships. The PRC domestically produces naval gas turbine and diesel engines, as well as almost all shipboard weapons and electronic systems for its shipbuilding sector, making the sector nearly self-sufficient for all shipbuilding needs.

Chinese Defense Technology and Industry – II

Armaments Industry. The PRC's production capacity is improving in nearly every category of PLA ground systems, including armored personnel carriers, assault vehicles, air defense artillery systems, artillery systems and pieces, and main and light battle tanks. Notably, the PRC began testing unmanned Type 59 tanks in November 2018. The PRC can produce ground weapon systems at or near world-class standards; however, quality deficiencies persist with some exported equipment, which is inhibiting its ability to expand its export markets.

Aviation Industry. The PRC is advancing its domestic aviation industry through two major state-owned aircraft corporations, the AVIC and the Commercial Aircraft Corporation of China (COMAC). AVIC designs and produces the PRC's military aircraft including the J-20 fifth-generation fighter, the Y-20 large transport, and the future H-20 flying wing stealth bomber. COMAC produces large passenger aircraft and aims to compete in the commercial airliner market. COMAC is producing the ARJ21 regional jet, flight-testing the C919 airliner, and working with Russia to develop the CRJ929 wide-body airliner. China is the second-largest exporter of UAVs. However, the PRC's aviation industry is unable to produce reliable high-performance aircraft engines and relies on Western and Russian engines, such as the Franco-American CFM Leap 1C that powers the COMAC C919 and the Russian D-30 that powers the Y-20 and H-6K and H-6N variants. The PRC is developing the CJ-1000, AEF3500, and WS-20 high-bypass turbofan engines to power the C919, CRJ929, and Y-20, respectively.

S&T GOALS IN SUPPORT OF MILITARY MODERNIZATION

Key Takeaways

- The PRC has continued its aggressive, top-level push to master advanced technologies and become a global innovation superpower. The PRC seeks to dominate technologies associated with the Fourth Industrial Revolution; this push directly supports the PLA's ambitious modernization efforts and its goal of becoming a "world-class" military capable of "intelligentized" warfare.
- The PRC continues its pursuit of leadership in key technologies with significant military potential, such as AI, autonomous systems, advanced computing, quantum information sciences, biotechnology, and advanced materials and manufacturing. As evidenced by the country's recent accomplishments in space exploration and other fields, China stands at, or near, the frontier of numerous advanced technologies.
- The 14th Five-Year Plan maintains the PRC's focus on technological independence and indigenous innovation in fields associated with the Fourth Industrial Revolution.
- As of 2020, the PLA has funded multiple AI projects that focus on applications including machine learning for strategic and tactical recommendations, AI-enabled wargaming for training, and social media analysis.

Drive to Dominate Strategic S&T Sectors. The PRC aspires to be an innovation superpower that is largely non-reliant on foreign technology and that serves as a global center for high-tech industries. The country's long-term focus on rapid, state-led S&T development—and its specific stress on indigenous innovation over the last fifteen years—has positioned the PRC at, or near, the lead of numerous scientific fields, to include AI, quantum communications, high-performance computing, 5G mobile

Chinese Defense Technology and Industry – III

networks, biotechnology, and advanced materials and manufacturing. China also excels at high-speed railways, electric vehicles, and numerous aspects of the digital ecosystem, such as big data analytics and cloud computing. The 14th Five-Year Plan is the major policy document that will guide the PRC's technological developments, among others, through the year 2025. While the full plan was not available at the time of this document's writing, reports indicate it will maintain the PRC's focus on technological independence and indigenous innovation in fields associated with the Fourth Industrial Revolution.

- The 14th Five-Year Plan prioritized an array of key emerging technologies, to include advanced semiconductors, AI, quantum technology, 5G technology, and new energy vehicles.
- The 2017 National Artificial Intelligence Plan describes steps for the PRC to become the “world's major AI innovation center” by 2030 and calls for the country to accelerate the integration of AI throughout the economy, society, and national defense. In 2020, the CCP reaffirmed its commitment to “intelligentization,” the PRC's concept of future warfare based emerging and disruptive technologies, particularly AI.
- In 2020, the PRC's Ministry of Science and Technology planned to allocate approximately \$85 million to fund AI research. It identified 22 research tasks including brain-inspired software and hardware, human-machine teaming, swarming, and decision making.
- The PRC has a 2,000 km quantum-secure communication ground line between Beijing and Shanghai and plans to expand the line across China. The PRC also plans to have a satellite-enabled, global quantum-encrypted communications capability operational by 2030.

While Beijing has muted its references to the *Made in China 2025* (MIC 25) plan in response to international criticism, the PRC continues to implement this plan at the national, provincial, and local levels. Focused on smart manufacturing, and launched in 2015, MIC 25 seeks to achieve major scientific breakthroughs and to build globally competitive companies in ten core technologies. The plan stresses the need to replace imported technology with domestically produced technology, a goal that corresponds with China's desire to reduce its reliance on other nations and develop a fully indigenous defense sector. In addition to presenting an economic challenge to nations that export high-tech products, the plan directly **Leveraging Private Sector Capabilities**. The commercial sector increasingly drives breakthroughs in advanced dual-use technologies, and major PRC companies have significant research efforts aimed at generating breakthroughs in key fields. PRC state investment funds established to support priority industries have marshalled an estimated hundreds of billions of dollars in capital. Under Beijing's MCF strategy, the PLA seeks to exploit China's private sector achievements to further its force modernization plans.

- The PRC has designated 15 companies as the country's official “AI Champions,” which include Alibaba, Baidu, Huawei, SenseTime, and Tencent. This designation tasks these companies to facilitate industry-wide coordination with the PRC government. Each champion is responsible for a specific AI focus area, including autonomous vehicles, smart cities, and cybersecurity.
- Tech giants Alibaba, Baidu, and Tencent have been researching quantum computing since 2018, with Alibaba offering one of the world's few quantum computing clouds services. The PRC has two leading quantum communications start-up companies, Quantum CTEK and Anhui Qasky. Quantum CTEK, which had its initial public offering in June 2020, is becoming one of the largest manufacturers in the commercial quantum-communications technology sector.
- The 2017 National Intelligence Law requires PRC companies, such as Huawei and ZTE, to support, provide assistance, and cooperate in the PRC's national intelligence work, wherever they operate.

Chinese Defense Technology and Industry – IV

Potential Military Applications. The PRC’s pursuit of an innovation-driven economic model directly supports its goal of building a “modern and specialized military capable of fighting and winning wars in the information age.” The PLA is pursuing a number of advanced military capabilities with disruptive potential such as autonomous systems, hypersonic weapons, electromagnetic railguns, directed energy weapons, and counterspace capabilities. Many technologies associated with the Fourth Industrial Revolution—such as AI, smart sensors, 3D printing, Internet of Things platforms, and wearable electronics—hold significant promise for battlefield applications. The PLA has reorganized a key military think tank—the Academy of Military Science (AMS)—and reasserted this organization’s leadership of military science research programs. The revamped AMS is tasked with driving defense innovation and ensuring that the PLA’s warfighting theory and doctrine fully capitalize on disruptive technologies like AI and autonomous systems. Given China’s willingness to deploy emerging technologies rapidly and at massive scale as well as the PRC’s focus on MCF, the PLA would likely quickly benefit from any domestic scientific breakthroughs with military utility.

- As of 2020, the PLA has funded multiple AI projects that focus on applications including machine learning for strategic and tactical recommendations, AI-enabled wargaming for training, and social media analysis.
- The PRC is developing unmanned systems in all domains and has tested unmanned air, ground, and maritime systems with limited AI capabilities.

Potential military applications of some emerging technologies include:

- *AI and Advanced Robotics*: enhanced data exploitation, decision support, manufacturing, unmanned systems, and C4ISR.
- *Semiconductors and Advanced Computing*: enhanced cyber operations and weapons design, and shortened R&D cycles.
- *Quantum Technologies*: secure global communications, enhanced computing and decryption capabilities, enhanced position, navigation, and timing (PNT) capabilities.
- *Biotechnology*: precision medicine, biological warfare, enhanced soldier performance, human-machine teaming.
- *Hypersonic and Directed Energy Weapons*: global strike and defeat of missile-defense systems, and anti-satellite, anti-missile, and anti-unmanned aircraft system capabilities.
- *Advanced Materials and Alternative Energy*: improved military equipment and weapon systems.

Foreign Technology Acquisition. The PRC uses imports, foreign investments, commercial joint ventures, mergers and acquisitions, and industrial and technical espionage to help achieve its military modernization goals. In 2020, the PRC continued to supplement its national S&T and industrial modernization by obtaining foreign technologies and knowledge through a variety of licit and illicit means. The PRC is investing in and seeking to acquire technologies that will be foundational for future commercial and military innovations including AI, robotics, autonomous vehicles, quantum information sciences, augmented and virtual reality, financial technology, and biotechnology. The line demarcating products designed for commercial versus military use is blurring with these technologies.

Chinese Defense Technology and Industry – V

Activities Supporting the PRC's Military Modernization. The PRC is actively pursuing an intensive campaign to obtain foreign technology through foreign direct investment, talent recruitment, and R&D and academic collaborations. The PRC uses a variety of licit means to acquire foreign technology and knowledge to supplement its S&T and military-industrial base. These efforts include:

- *Foreign Direct Investment.* The PRC invests in or outright purchases foreign companies that have technology, facilities, and people working in key technology areas.
- *Talent Recruitment.* The PRC uses various incentive strategies to attract foreign personnel to work and manage strategic programs and fill technical knowledge gaps. For example, Beijing's "Thousand Talents Program," recruits individuals from PRC diaspora populations, persons with familiar ties or ties of affection in the PRC, recent emigrants from the PRC, and foreign national experts whose recruitment the PRC views as necessary to its scientific and technical modernization.
- *Research and Development and Academic Collaborations.* The PRC actively seeks partnerships with private, government, and academic research labs to gain exposure to cutting-edge technology and researchers. These partnerships also provide the PRC with the technical expertise to run, manage, and organize such facilities.

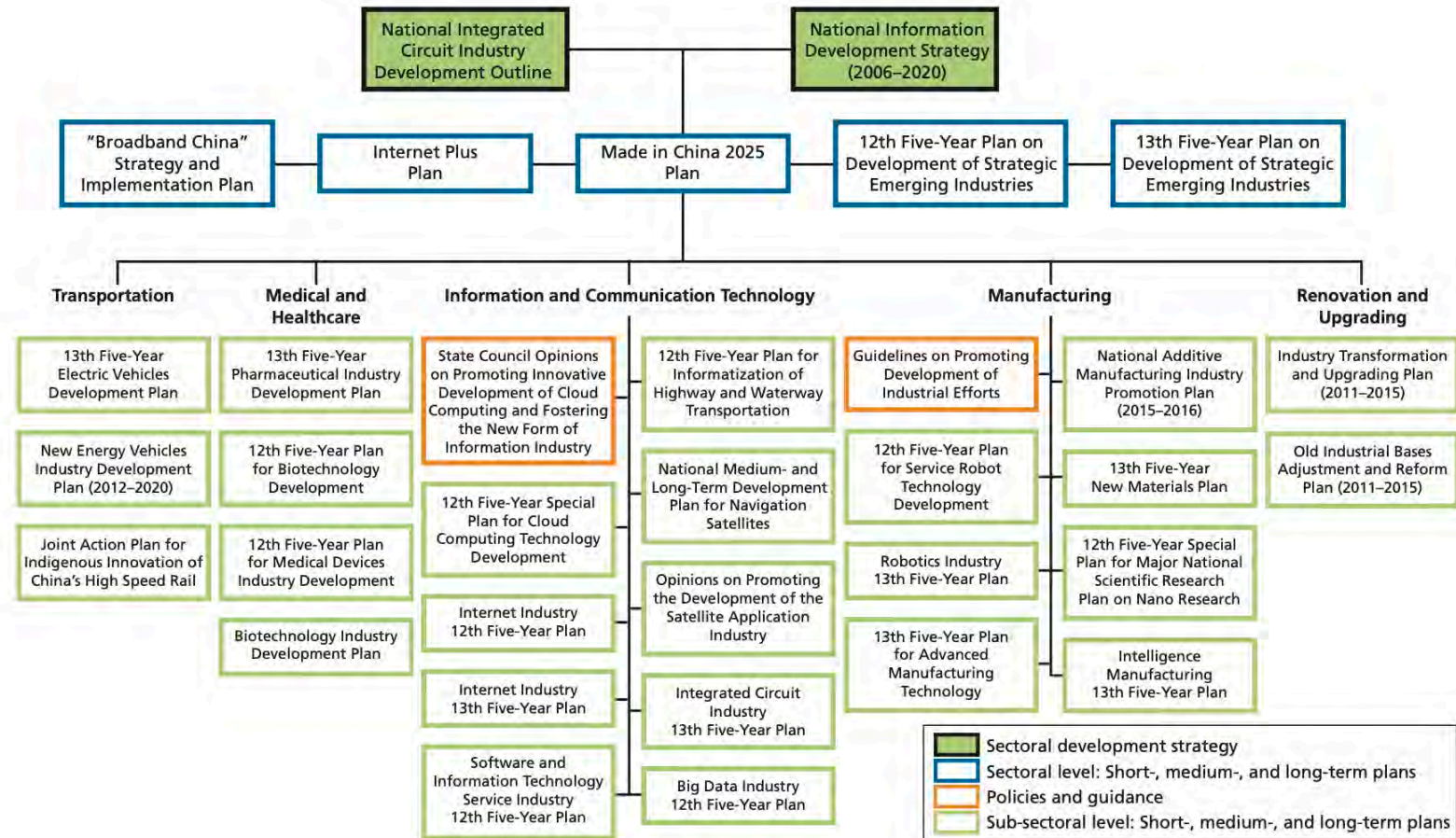
Espionage Activities Supporting the PRC's Military Modernization. Multiple U.S. criminal indictments since 2015 involve PRC nationals, naturalized U.S. citizens or permanent resident aliens from the PRC, and U.S. citizens, procuring and exporting controlled items to China, according to a U.S. Department of Justice summary of major U.S. export enforcement, economic espionage, and sanctions-related criminal cases. The PRC's efforts to acquire sensitive, dual-use, or military-grade equipment included radiation hardened integrated circuits, monolithic microwave integrated circuits, accelerometers, gyroscopes, naval and marine technologies, syntactic foam trade secrets, space communications, military communication jamming equipment, dynamic random access memory, aviation technologies, and ASW. In 2020, the FBI opened a new PRC-related counterintelligence case about every 10 hours. FBI Director Christopher Wray also stated that "of the nearly 5,000 active FBI counterintelligence cases currently underway [in 2020], almost half are related to the PRC." In addition, the FBI has seen economic espionage cases with a link to the PRC increase by approximately 1,300% over the past decade.

Recent cases include:

- In September 2020, a PRC national pled guilty to conspiring to fraudulently export maritime raiding craft and engines to China. The U.S. military uses these vessels and multi-fuel engines because they can be launched from a submerged submarine, or dropped into the ocean by an aircraft. No comparable engine is manufactured in China.
- In June 2020, a PRC national was sentenced to 36 months in federal custody for attempting to send to China an export controlled radio, which is designated as a defense article due to its certification by the National Security Agency for Top Secret wire and data communications.
- In October 2019, a PRC national was sentenced to 40 months in prison for conspiring to export military- and space-grade technology illegally from the United States to China. The PRC national worked with other individuals in China to purchase radiation-hardened power amplifiers and supervisory circuits used for military and space applications.

China's Growing Capability to Compete in Civil Military RDT&E

RAND Estimate of Key Areas of Chinese Civil Development Plans and Priorities with Impact of Strategic Capability to Compete



SOURCE: Cheung et al., 2016.

CRS: Comparative National Research and Development Expenditure: 2019

Countries with the Highest Expenditure on R&D, 2019

(in billions of current PPP dollars)

Rank	Country	Amount	Rank	Country	Amount
1	United States	\$657.5	11	Canada	29.3
2	China	525.7	12	Spain	24.9
3	Japan	173.3	13	Turkey	24.2
4	Germany	147.5	14	Australia	22.4
5	South Korea	102.5	15	Netherlands	22.3
6	France	72.8	16	Sweden	19.3
7	United Kingdom	56.9	17	Israel	18.7
8	Russia	44.5	18	Switzerland	18.6
9	Taiwan	44.0	19	Belgium	18.2
10	Italy	38.8	20	Poland	17.2

Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them. Australia and Switzerland based on 2017 data.

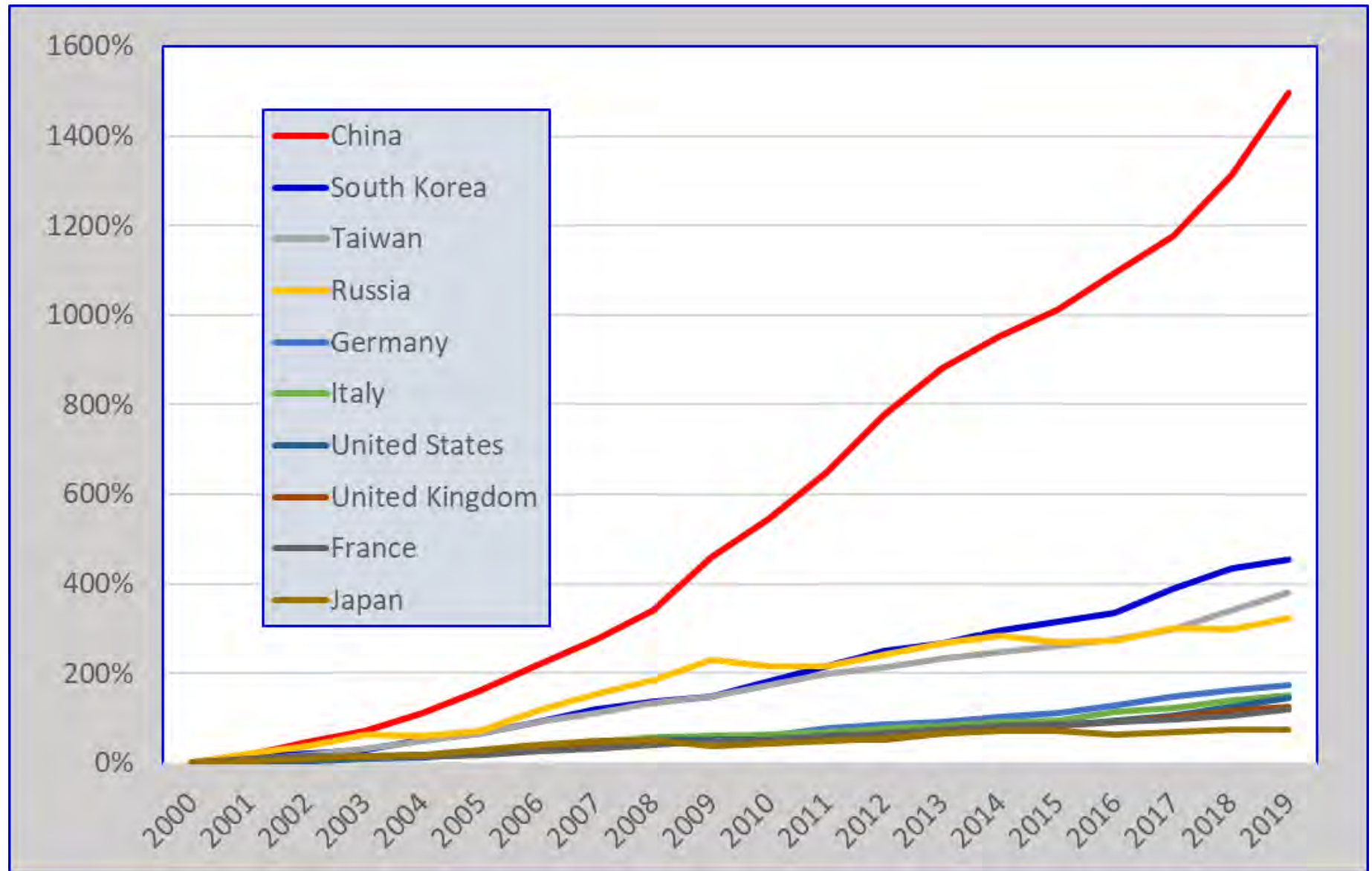
In 2019 (the most recent year for which comprehensive data are available), global R&D expenditures were \$2.200 trillion.

The United States continued to fund more R&D than any other country.

China, ranked second in 2019, funded more R&D than the next four highest countries—Japan, Germany, South Korea, and France—combined.

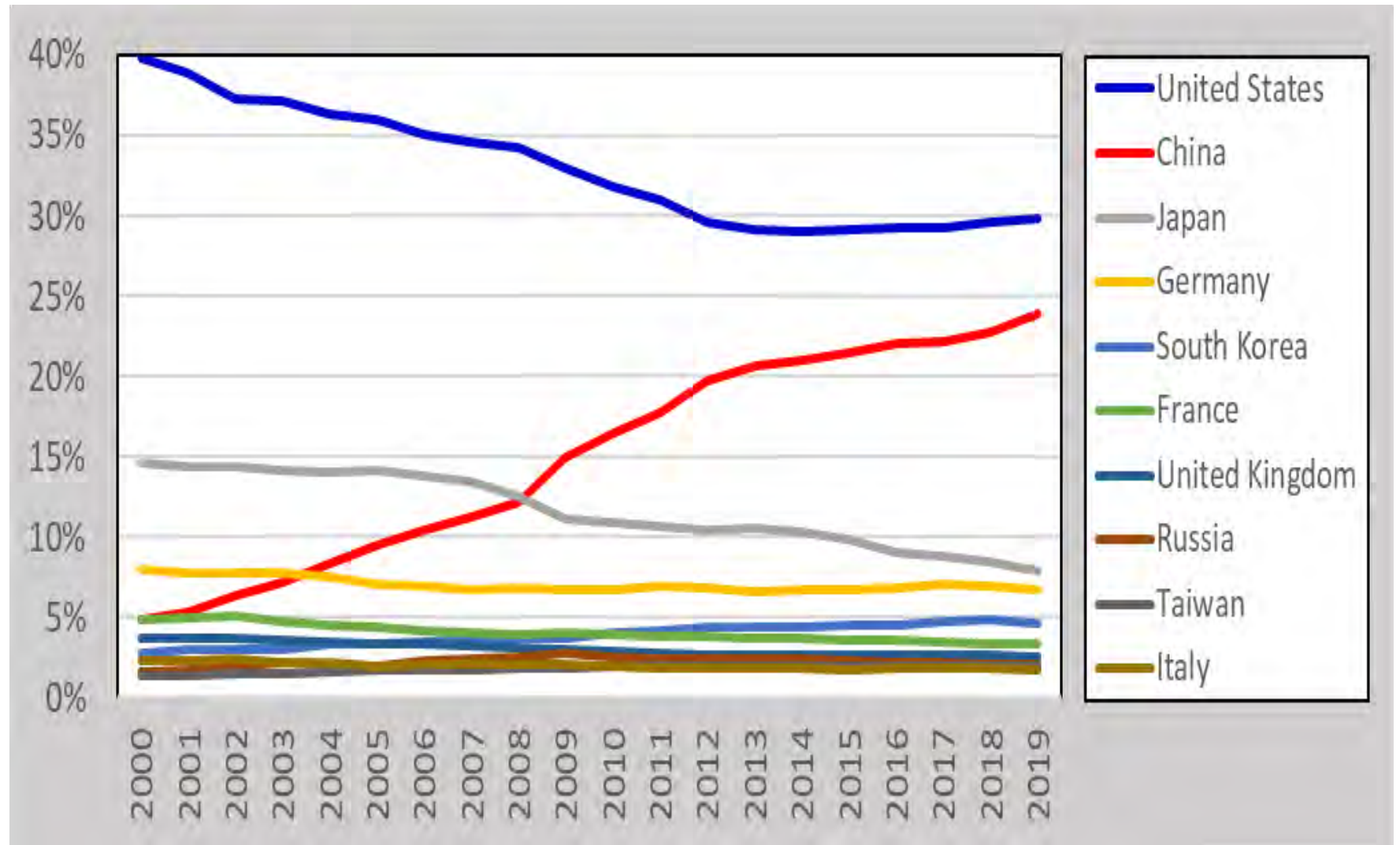
The 10 largest R&D-funding countries of 2019 accounted for \$1.863 trillion in R&D expenditures, about 84.7% of the global total; the top 20 R&D-funding countries accounted for \$2.078 trillion, 94.5% of the global total.

CRS: Comparative Growth in National Research and Development Expenditure: 2000-2019



Source: Adapted from John F. Sargent Jr., *Global Research and Development Expenditures: Fact Sheet*, Congressional Research Service, CRS R44283, Updated September 27, 2021; Taken from CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

CRS: Comparative National Share of Global Research and Development Expenditure: 2000-2019



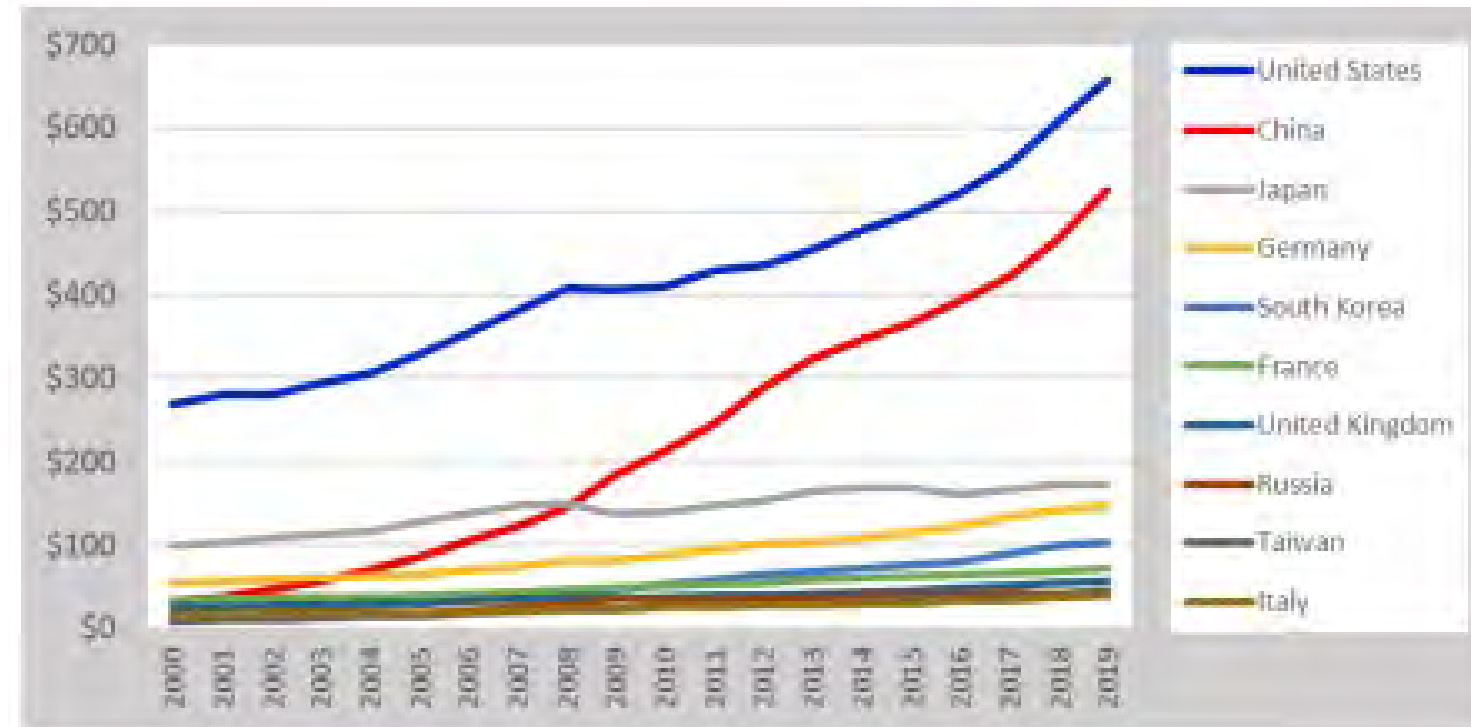
Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Notes: Global R&D includes the expenditures of the OECD countries, Argentina, China, Romania, Russia,

Singapore, South Africa, and Taiwan. Share computed in PPP terms. PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.

CRS: Comparative National Expenditure on Global Research and Development: 2000-2019

In \$US Billions of PPP
Dollars

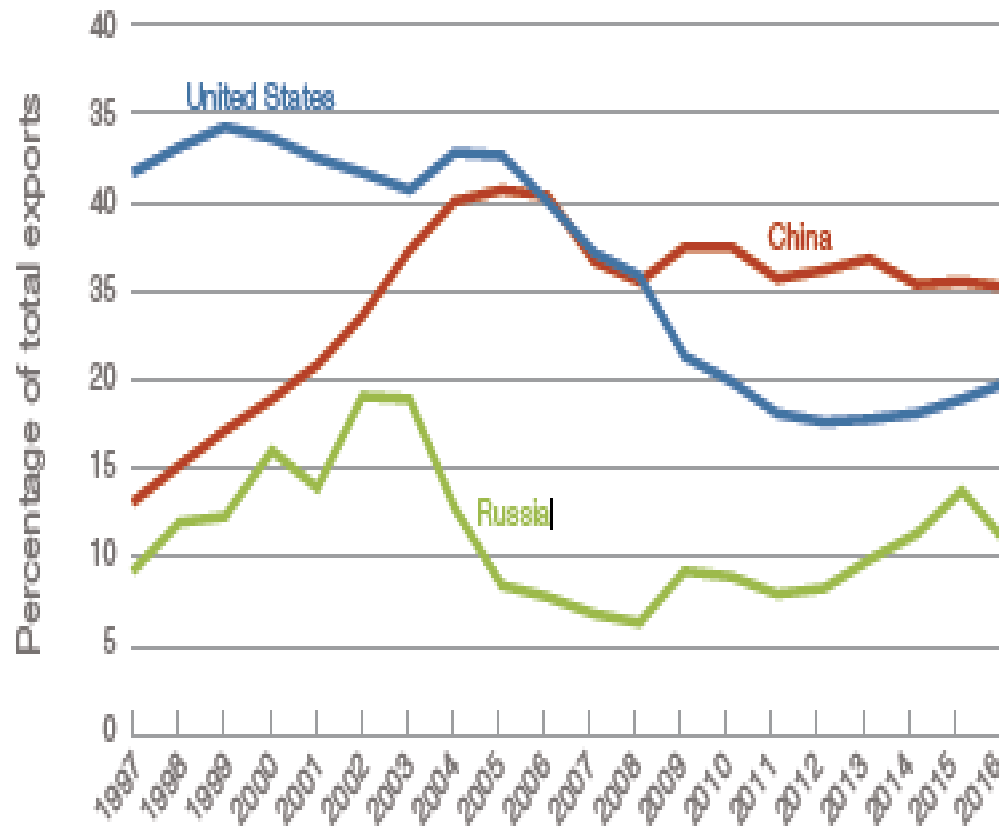


Source: CRS analysis of Organisation for Economic Cooperation and Development, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.

Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.

RAND Comparative National Research and Development Expenditure: 1997-2016

High-Tech Exports (as Percentage of Manufactured Exports)



SOURCE: World Bank, 2018.

Expenditure on R&D is an important indicator of public- and private-sector efforts to develop a competitive advantage in science and technology and covers capital and current expenditures in private firms, government, higher education institutions, and nonprofits as a share of the GDP.

Over the studied period, the U.S. expenditure on R&D grew from 2.47 percent of GDP in 1997 to 2.79 percent of GDP in 2016 (Figure A.5).¹² Measured in PPP dollars, the United States spent \$276 billion in 1997, \$333 billion in 2002, \$400 billion in 2007, and \$464 billion in 2016.

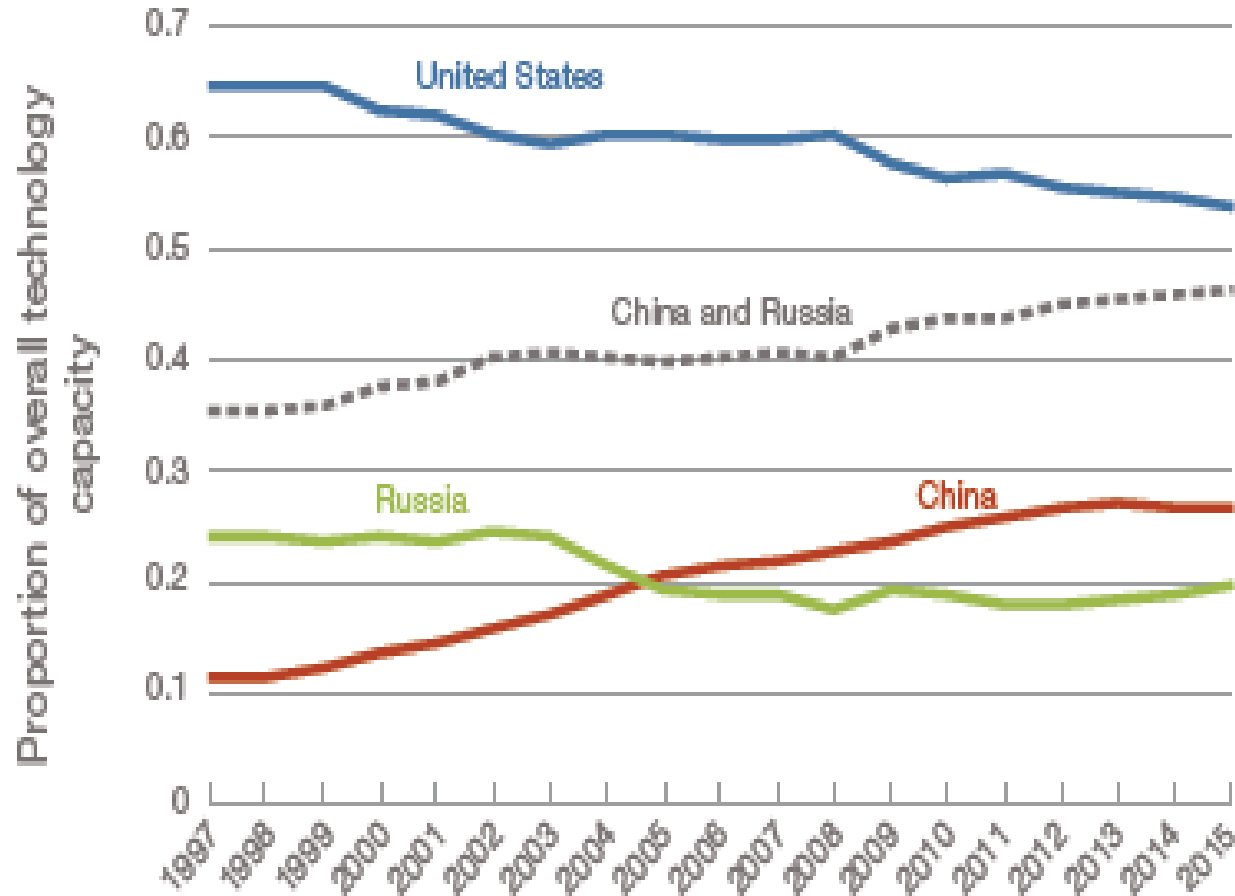
Over the same period, China displayed a vigorous growth in R&D expenditure in both absolute and relative terms. In 1997, China spent only \$23 billion on R&D; in 2016, absolute spending reached \$410 billion. In relative terms, China's spending on R&D as a share of GDP grew from 0.63 percent in 1997 to 2.06 percent in 2016, reaching the level of advanced economies, which tend to spend between 2 percent and 3 percent of GDP on domestic R&D.

As of 2018, China spent only 5 percent of its R&D funds on basic research and 84 percent on experimental research, compared with 17 percent spent on basic research and 64 percent spent on experimental research in the United States. China's more limited spending on basic research could be a result of a larger share of private-sector spending in R&D, as well as the opportunity to use the results of basic research conducted elsewhere.

In contrast, Russia's spending on R&D roughly matched its GDP growth over the studied period. In 1997, Russia spent 1.04 percent of its GDP on R&D; in 2016, the figure stood at 1.13 percent, significantly lower than spending in the United States and in China. In absolute terms, Russia's spending increased from \$15 billion (PPP) in 1997 to \$37 billion in 2016. Notably, although China and Russia were spending comparable dollar amounts on R&D in 1997, China by 2016 outspent Russia at roughly 11 to 1.

RAND Technology Capacity Index: 1997-2015

Technological Capacity Index



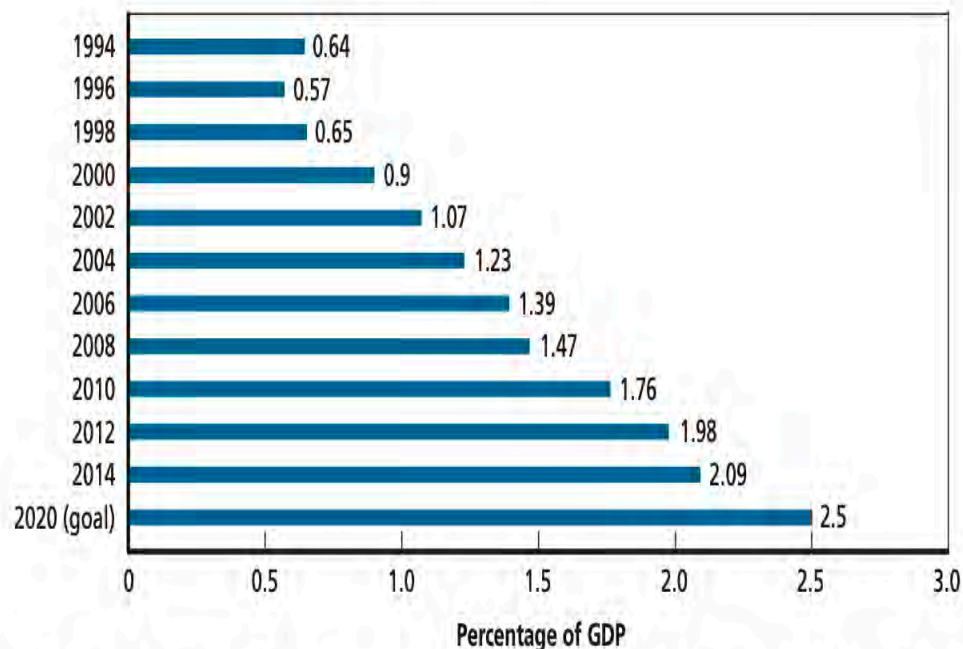
To measure technological capacity, we look at the ability to produce and commercialize advanced technology over time. Our technological capacity index is composed of four variables: R&D expenditure, number of researchers per 1,000 employees, number of triadic patents, and high-tech exports as a share of total manufactured exports. The first two variables mainly measure the inputs in the national innovation system, while the second two variables measure the output.

...a composite technological capacity index that is defined as the average of the sum of the relative proportions within each of the four indicators discussed above. For example, the value for the United States is determined by first calculating the relative share of the United States from the sum of the values for the United States, China, and Russia Research Methodology within a given indicator, and then calculating the average of the relative values for the four indicators.

America's technological capacity has declined since 1997 from 0.64 to 0.54, while China's technological capacity increased from 0.11 to 0.26. Over the same period, Russia's technological capacity declined from 0.24 to 0.10

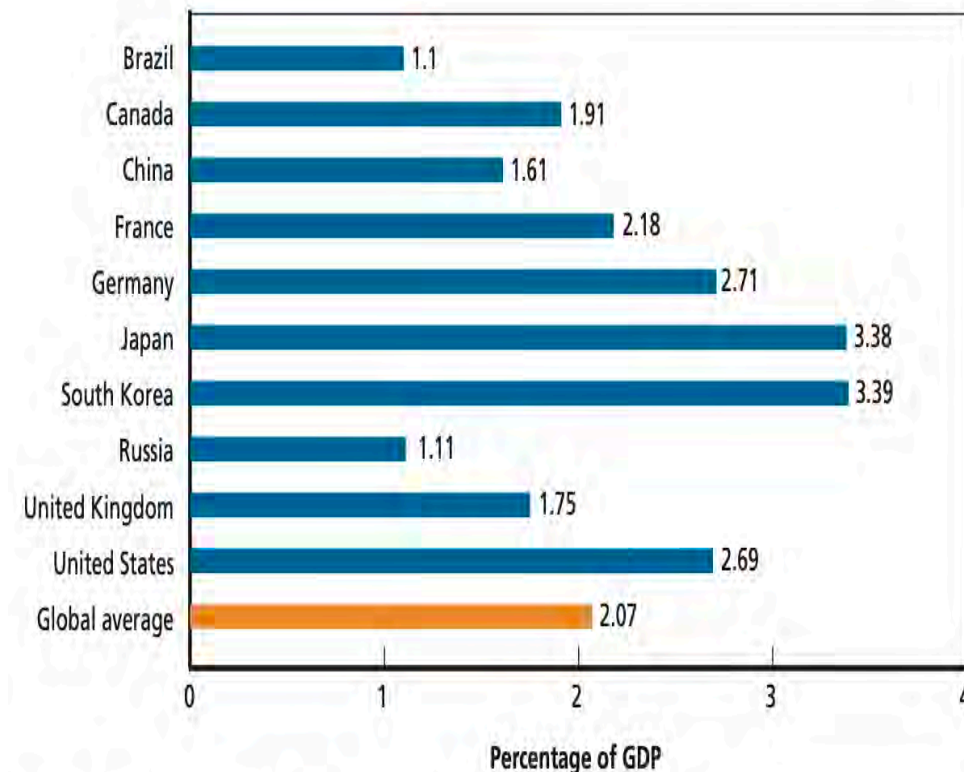
RAND Estimate of Trends in R&D Spending: 1994-2014

China's Gross Expenditures on Research and Development as a Percentage of GDP, 1994–2014



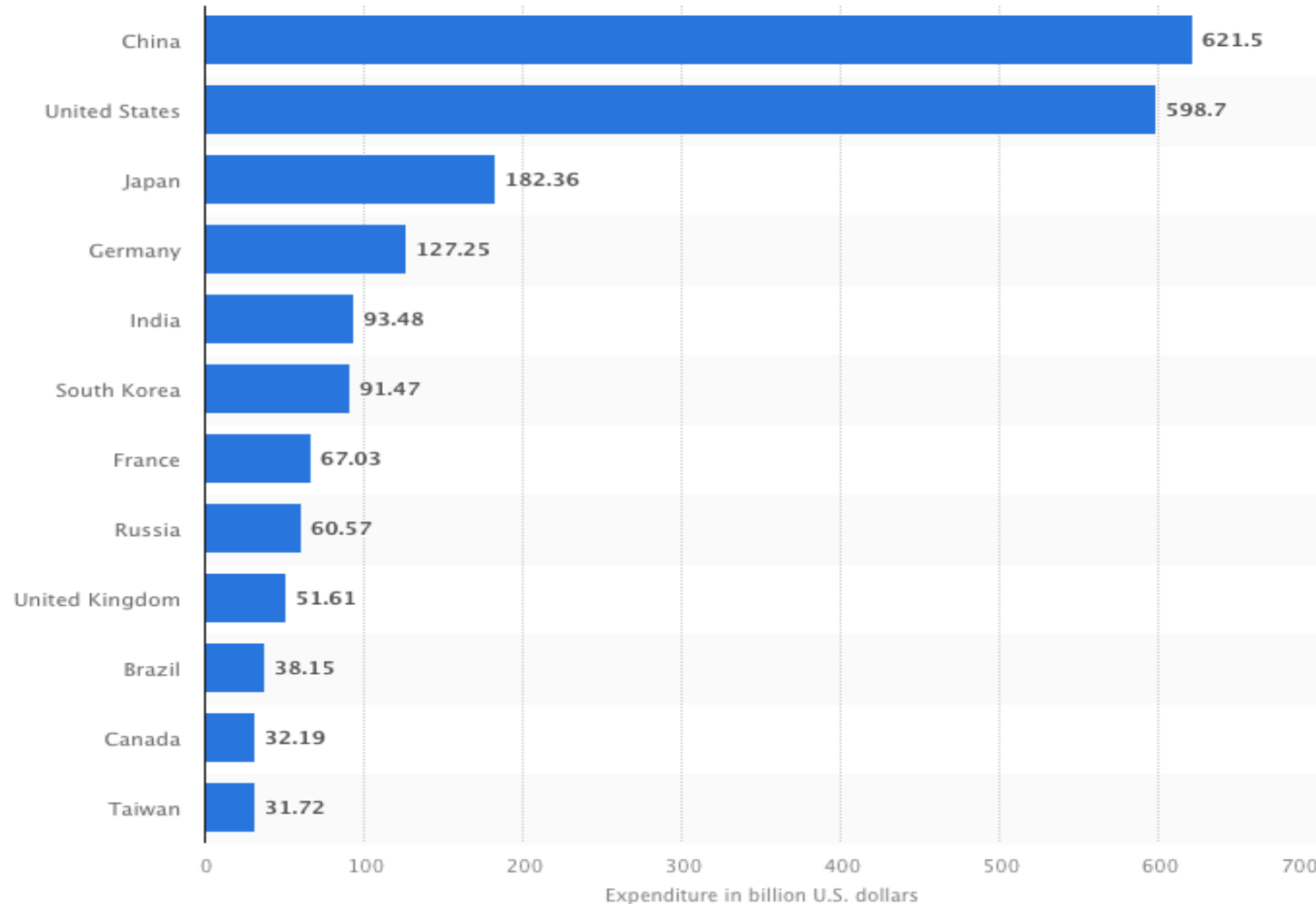
SOURCES: Original data from National Bureau of Statistics and the Ministry of Science and Technology, *China Statistical Yearbook on Science and Technology*, 1995–2015 yearly editions, Beijing: China Statistics Press, 1995–2015; chart adapted from Tai Ming Cheung, Thomas Mahnken, Deborah Seligsohn, Kevin Pollpeter, Eric Anderson, and Fan Yang, *Planning for Innovation: Understand China's Plans for Technological, Energy, Industrial, and Defense Development*, University of California, 2016, p. 60.

R&D Expenditures as a Percentage of GDP for Selected Countries, 2005–2012 Average



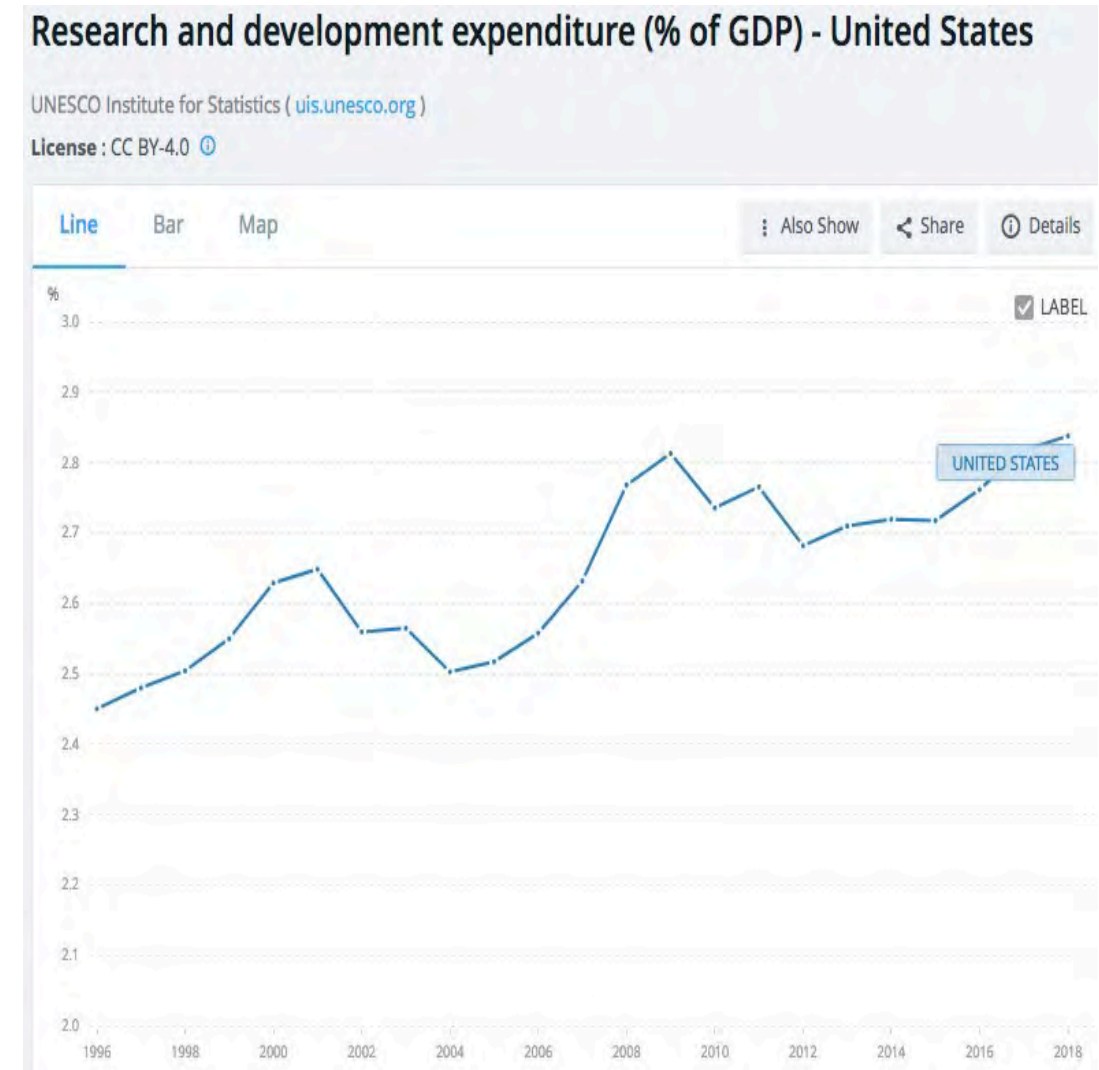
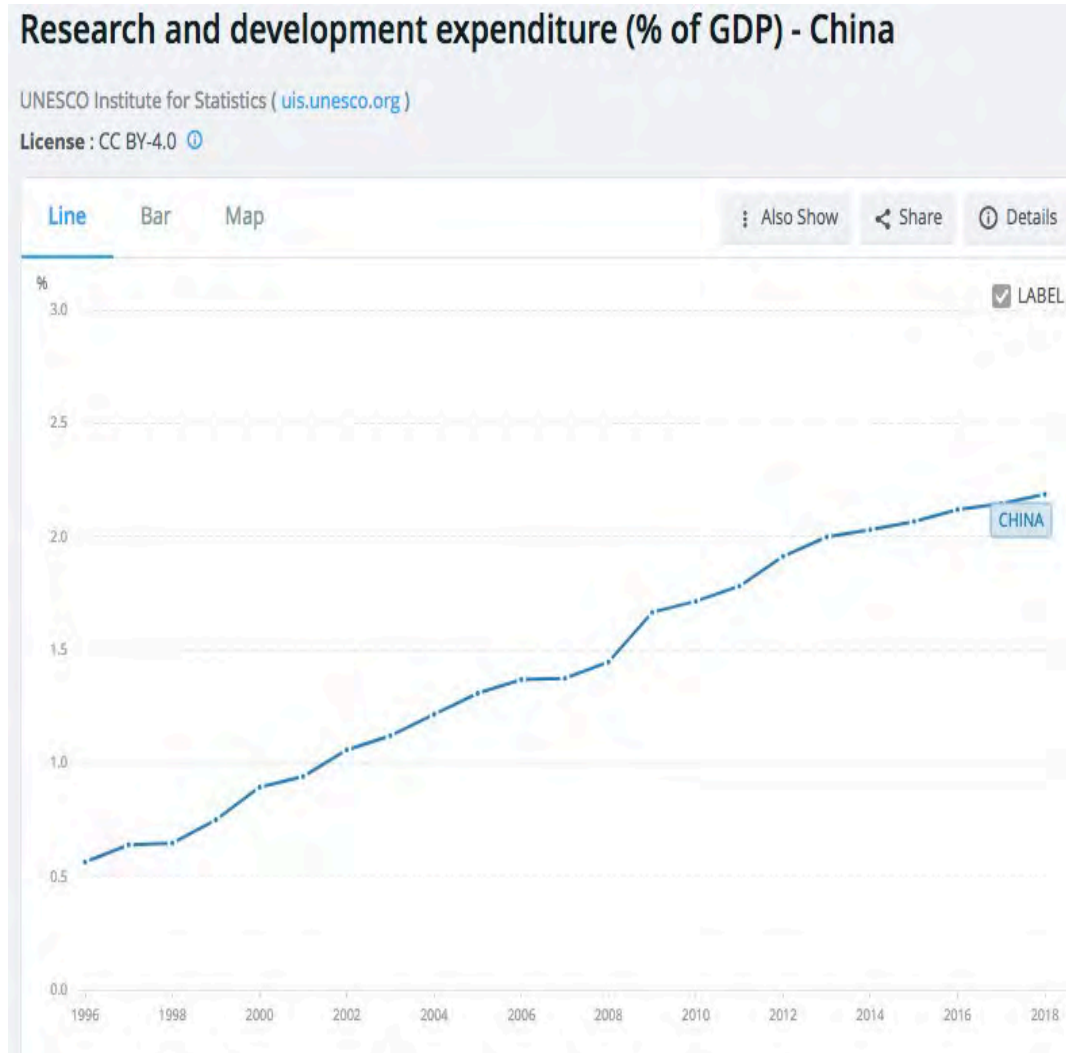
SOURCE: Cheung et al., 2016; data from World Bank, 2017.

Statista: Leading countries by gross research and development (R&D) expenditure worldwide in 2021 (in billion U.S. dollars)



According to the forecast for 2021, China will be the leading country worldwide in terms of spending on research and development, with R&A expenditure exceeding 621 billion U.S. dollars. The United States is expected to invest about 598.7 billion U.S. dollars into research and development.

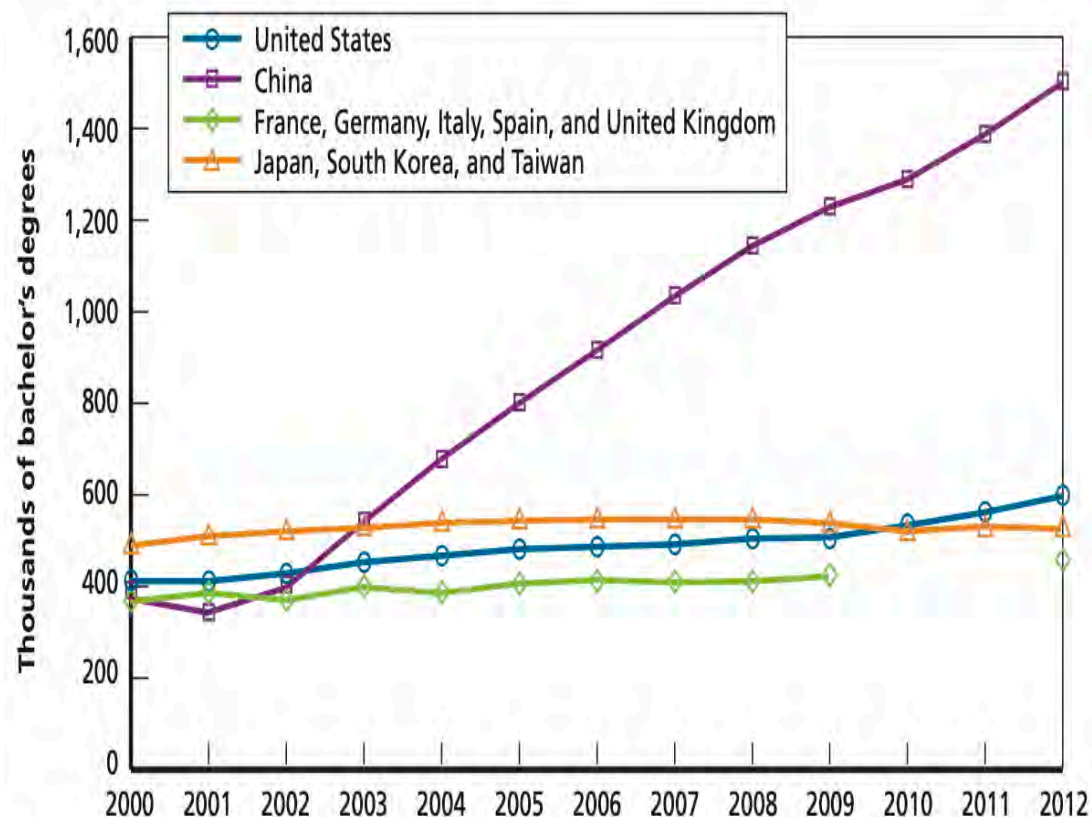
World Bank Estimate of R&D Spending as % of GDP



Source: World Bank, <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=US>.

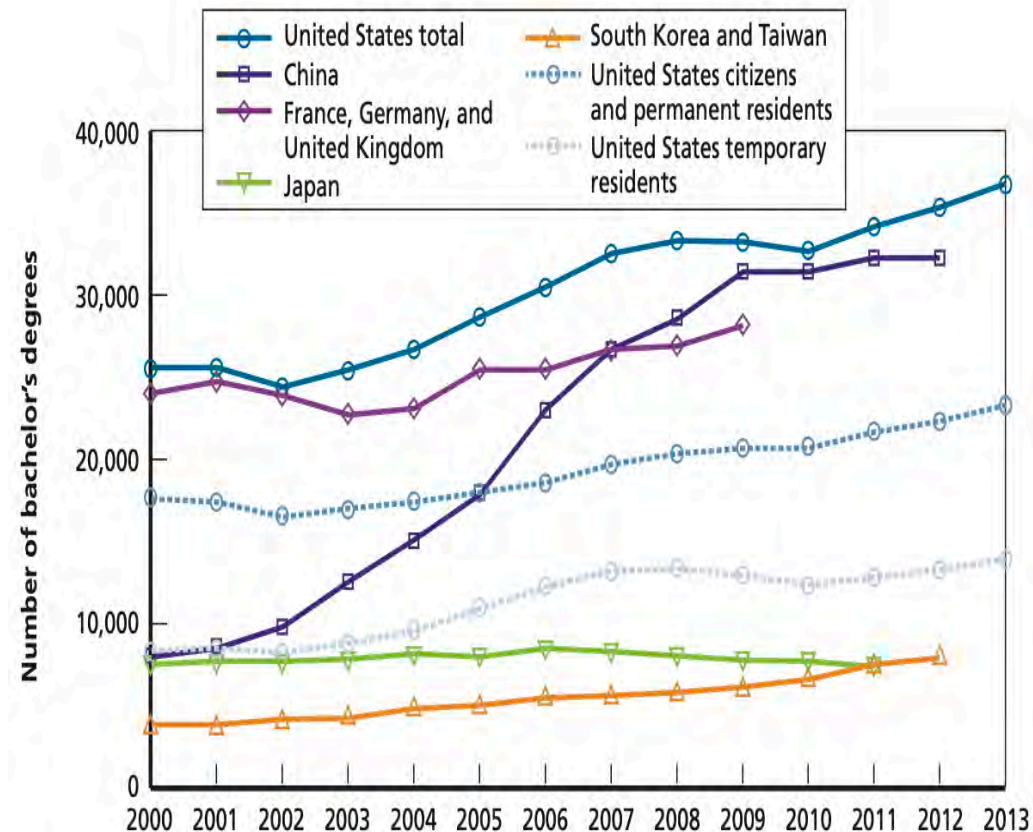
RAND Estimate of Comparative Levels of Technical Education

Science and Engineering Bachelor's Degrees by Location, 2000–2012



SOURCES: National Science Board, *Science and Engineering Indicators 2016*, 2016, p. O-7; OECD, *Online Education Database*, database, updated September 2017b.

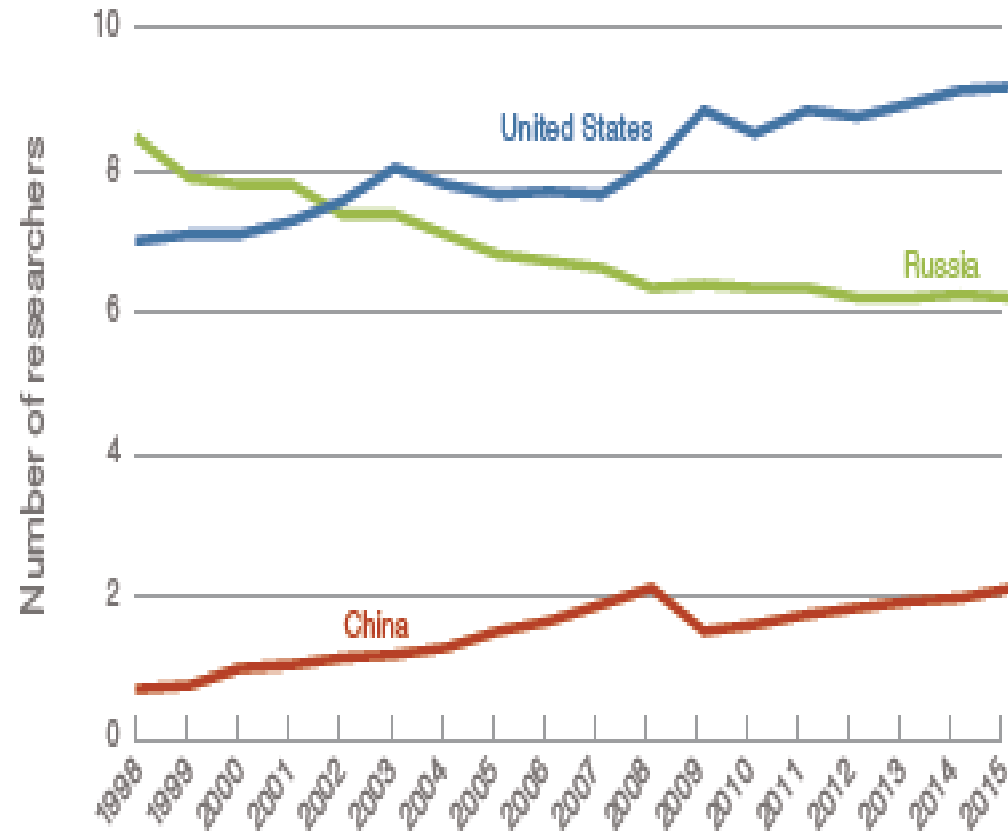
Doctoral Degrees in Science and Engineering by Location, 2000–2013



SOURCES: National Science Board, 2016, p. O-10; OECD, 2017b.

RAND: Researchers Per 1,000 Employed

Researchers per 1,000 Employed



SOURCE: World Bank, 2018.

The second input indicator is a measure of human capital: the number of researchers engaged in the creation of new knowledge, products, processes, methods, and systems, as well as the number involved in the management of the concerned projects, measured per 1,000 people employed.

Over the past 20 years, the share of researchers in the working population in the United States increased from 7 per 1,000 employed in 1998 to 9.1 researchers per 1,000 employed in 2016.

From 1998 to 2015, China roughly tripled the number of researchers, from 0.68 per 1,000 employed in 1998 to 2.09 per 1,000 employed in 2015.

Russia had 8.4 researchers per 1,000 employed in 1998 and only 6.2 researchers per 1,000 employed in 2015.

“Dual Use” Civil-Military Science & Technology – I

China’s S&T Goals and Plans. The PRC has issued an array of major national plans over the last decade that stress indigenous innovation and the rapid development of strategic S&T sectors, such as information and communications technology (ICT), high-end manufacturing, quantum technology, alternative energy, and biotechnology. The PRC’s 13th Five-Year Plan calls for accelerating research on “majorly influential disruptive technologies” and the pursuit of “leapfrog” S&T developments in order to win “a competitive advantage in the new round of industry transformation.” While slowly increasing funding for basic research, China has made comprehensive efforts to grow the country’s inventive capabilities over the last decade.

- The 2017 National Artificial Intelligence Plan describes steps for China to become the “world’s major AI innovation center” by 2030 and calls for the country to accelerate the integration of AI with the economy, society, and national defense. The plan foresees a great expansion in the “breadth and depth of AI applications in... national defense construction.”
- Other plans address the development of various sectors of China’s robust Internet ecosystem, including cloud computing, big data, e-commerce, and next-generation broadband wireless communications networks, including fifth-generation (5G) wireless networks. Due to information sharing requirements with the PRC’s security services as required by PRC laws, worldwide expansion of 5G networks by PRC companies will challenge the security and resiliency of other countries’ networks.

The commercial sector increasingly drives breakthroughs in advanced dual-use technologies, and PRC companies have research efforts aimed at generating breakthroughs in emerging technologies. China continues to execute “Made in China 2025,” an ambitious industrial policy centered around “smart manufacturing,” that seeks to create a vanguard of corporations in the PRC that are global leaders in ten strategic industries. These industries include new generation information technology, high-grade machine tooling and robotics; aerospace equipment; marine engineering equipment and high-tech ships; advanced rail transportation equipment; new-energy automobiles; electric power equipment; agricultural equipment; new materials; and biomedicine and high-tech medical devices. The plan stresses the need to replace imported technology with domestically produced technology, a goal that corresponds with China’s desire to reduce its reliance on other nations and develop a fully indigenous defense sector. In addition to presenting an economic challenge to nations that export high-tech products, the plan directly supports China’s military modernization goals by stressing proprietary mastery of advanced dual-use technologies. China’s leaders have used less inflammatory rhetoric regarding “Made in China 2025” in response to concerns from advanced industrial countries regarding the PRC’s licit and illicit acquisition of intellectual property pursuant to that policy.

Heavy Government and Corporate Sector Investment. The PRC has mobilized vast resources to fund research and subsidize companies involved in strategic S&T fields while pressing private firms, universities, and provincial governments to cooperate with the military in developing advanced technologies. Although China remains reliant on certain types of foreign technology, the country’s decades-long execution of a strategy of advancing domestic S&T and R&D through large-scale technology transfer has deepened the expertise of scientists and engineers in the PRC and placed them at, or near, the forefront of many scientific fields.

- The PRC’s state investment funds established to support priority industries have marshalled hundreds of billions of dollars in capital.
- China expects to field an exascale computer based on domestically produced technology by 2020, ahead of the United States, the European Union, and Japan.
- China conducted the first quantum-secured intercontinental videoconference in September 2017 and plans to have a satellite-enabled, global, quantum-encrypted communications capability operational by 2030. China is also reportedly building the world’s largest quantum research facility slated to open in the city of Hefei in 2020. China already has a 2,000 km secure quantum communication ground line between Beijing and Shanghai and plans to expand the line across China.
- In 2019, scientists in the PRC claimed to have developed a human brain-computer interface to send targeting information directly to a search-and-rescue drone. Also in 2019, a separate group of scientists claimed to have developed a brain-computer interface that enabled human-thought control of a rat in a maze, signifying China’s interest advanced human-machine teaming technologies.

“Dual Use” Civil-Military Science & Technology – II

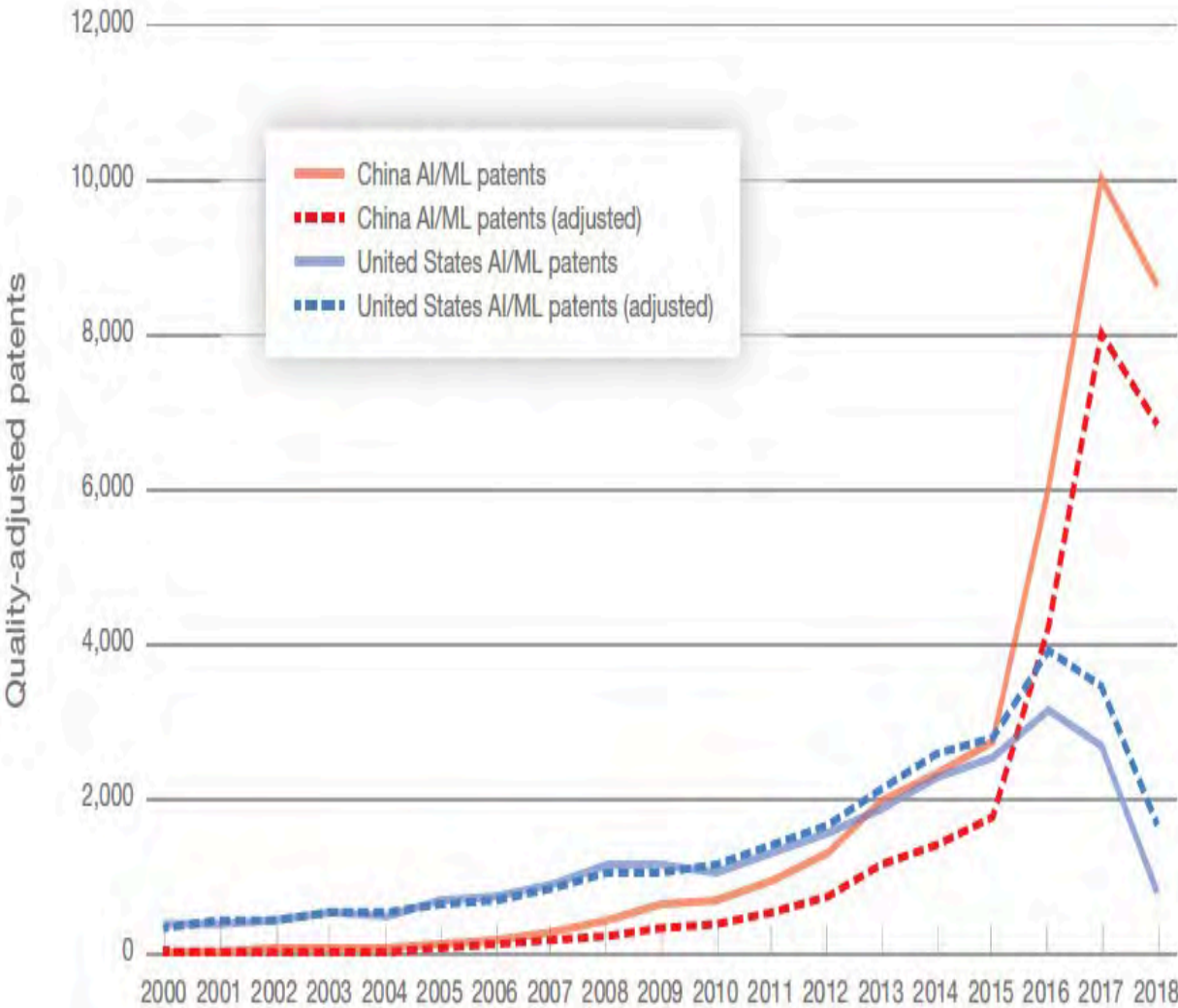
China’s private sector, led by Internet companies Baidu, Alibaba, and Tencent and telecommunications equipment manufacturers Huawei and Zhongxing Telecommunications Company Ltd. (ZTE), is driving the development of emerging technologies, such as facial recognition and 5G, by establishing innovation centers and funding technology startups, or in the case of 5G, competing to build the world’s next-generation networks. PRC technology companies are also expanding into overseas markets, in some cases by offering smart city technologies, a development that could increase their access to foreign talent and data.

- In 2017, China designated Alibaba, Baidu, iFlytek, and Tencent as the country’s official “AI Champions,” with SenseTime joining in 2018. This designation gives these companies the lead for setting national technical standards and enables extensive cooperation with China’s national security community. In 2019, China added ten new companies, including Huawei, Hikvision, Megvii, and Yitu, to the champions list.
- In November 2017, the PRC startup Yitu won a U.S. government-sponsored competition involving facial recognition technology. Yitu, along with other PRC AI and facial recognition firms like SenseTime, Megvii, and Deepglint, reportedly received hundreds of millions of dollars in investments in 2017. China is the world’s largest market for video surveillance technologies.
- The 2017 National Intelligence Law requires PRC companies, such as Huawei and ZTE, to support, provide assistance, and cooperate in China’s national intelligence work wherever they operate.

Potential Military Applications. China’s pursuit of an innovation-driven economic model supports its goal of building a “modern and specialized military capable of fighting and winning wars in the information age.” China intends to harness its commercial technology sector to accomplish the PLA’s goal of intelligentized warfare. The PLA has reorganized a key military think tank—the Academy of Military Sciences (AMS)—and reasserted this organization’s leadership of military science research programs. The CMC has tasked the revamped AMS to drive defense innovation, conduct enhanced academic outreach, and to ensure that the PLA’s warfighting theory and doctrine fully capitalize on disruptive technologies like AI and autonomous systems.

- Researchers at the China Academy of Sciences reportedly developed an early version of an AI- powered decision-support system that the PRC Ministry of Foreign Affairs is field-testing with its diplomats. The system uses deep learning and a neural network for “geopolitical environment simulation and prediction.”
- The PRC is pursuing a number of advanced military capabilities with disruptive potential such as hypersonic weapons, electromagnetic railguns, directed energy weapons, and counterspace capabilities. The country’s effort to build national corporate champions that achieve rapid market dominance across a range of frontier technologies directly complements the PLA’s modernization efforts and carries serious military implications. Given China’s willingness to deploy emerging technologies rapidly and at massive scale as well as China’s focus on MCF, the PLA would likely quickly benefit from any scientific breakthroughs with military utility. Potential military applications of some emerging technologies include:
 - *AI and Advanced Robotics:* enhanced data exploitation, decision support, manufacturing, unmanned systems, and command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR).
 - *Semiconductors and Advanced Computing:* enhanced cyber operations and weapons design, and shortened R&D cycles.
 - *Quantum Technologies:* secure global communications, enhanced computing and decryption capabilities, undersea target detection, and enhanced submarine navigation.
 - *Biotechnology:* enhanced warfighter selection and performance, advanced human-machine teaming.
 - *Hypersonic and Directed Energy Weapons:* global strike and defeat of missile defense systems, anti- satellite (ASAT)/missile/ unmanned aircraft system capabilities.
 - *Advanced Materials and Alternative Energy:* improved military equipment and weapon systems.

RAND: Quality-Adjusted Artificial Intelligence Patents, China and United States, 2000-2018

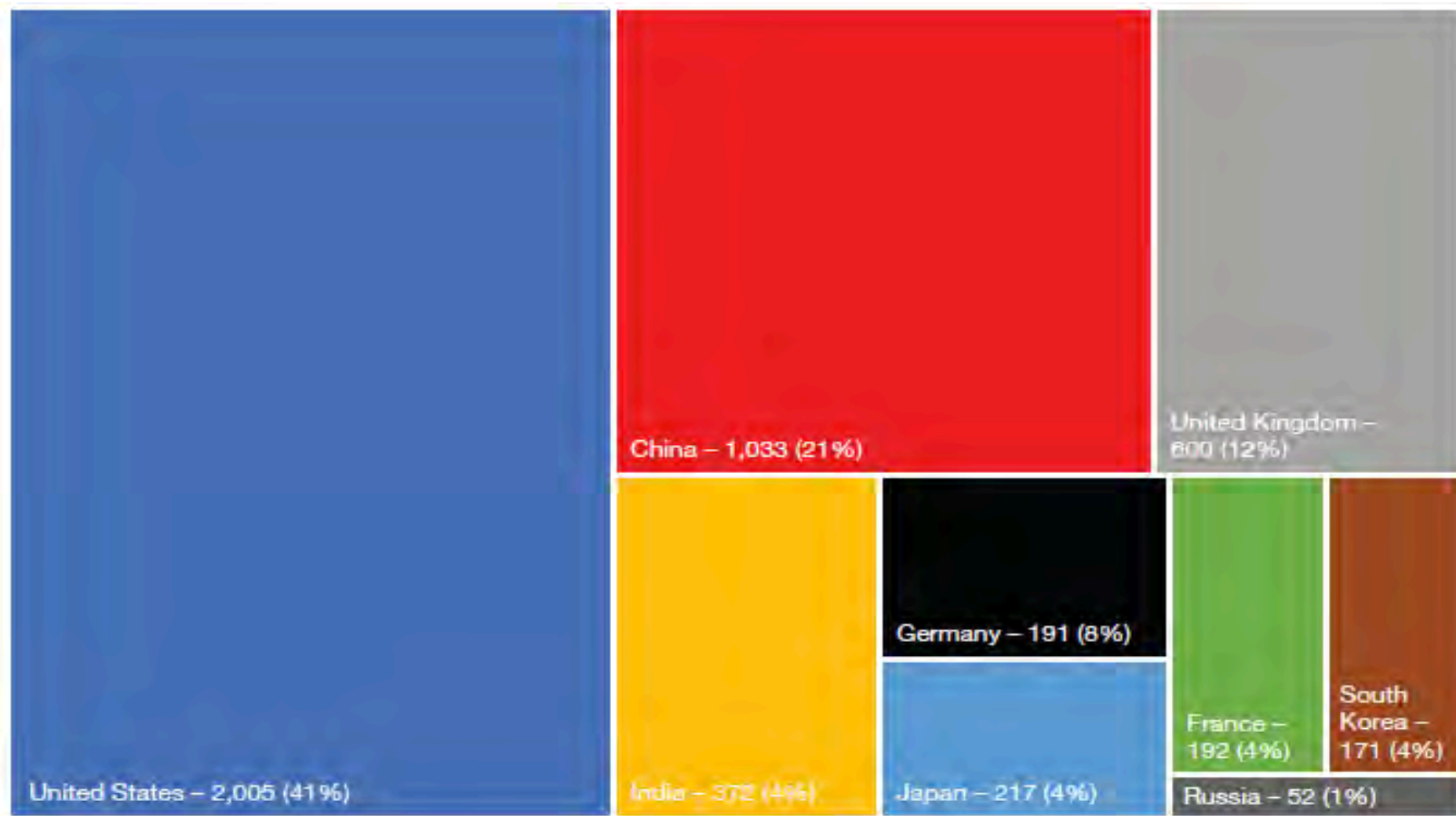


Quality-Adjusted Artificial Intelligence and Machine Learning Patents

Country	AI/ML Patents	Average Family Size	Quality-Adjusted AI/ML Patents
China	18,646	1.1	14,875
United States	3,442	2.3	5,091
Japan	1,042	2.4	1,570
South Korea	558	1.9	760
Germany	377	2.5	629
United Kingdom	80	2.6	140
India	59	4.5	123
France	32	3.3	71
Russia	5	1.0	4

Source: Adapted from Jon Schmid, *An Open Source Method for Assessing National Scientific and Technical Standing*, RAND Research Report, p. 11, www.rand.org/t/RRR1482-3.

RAND: High-Impact Artificial Intelligence and Machine Learning Publications, 2017-2018



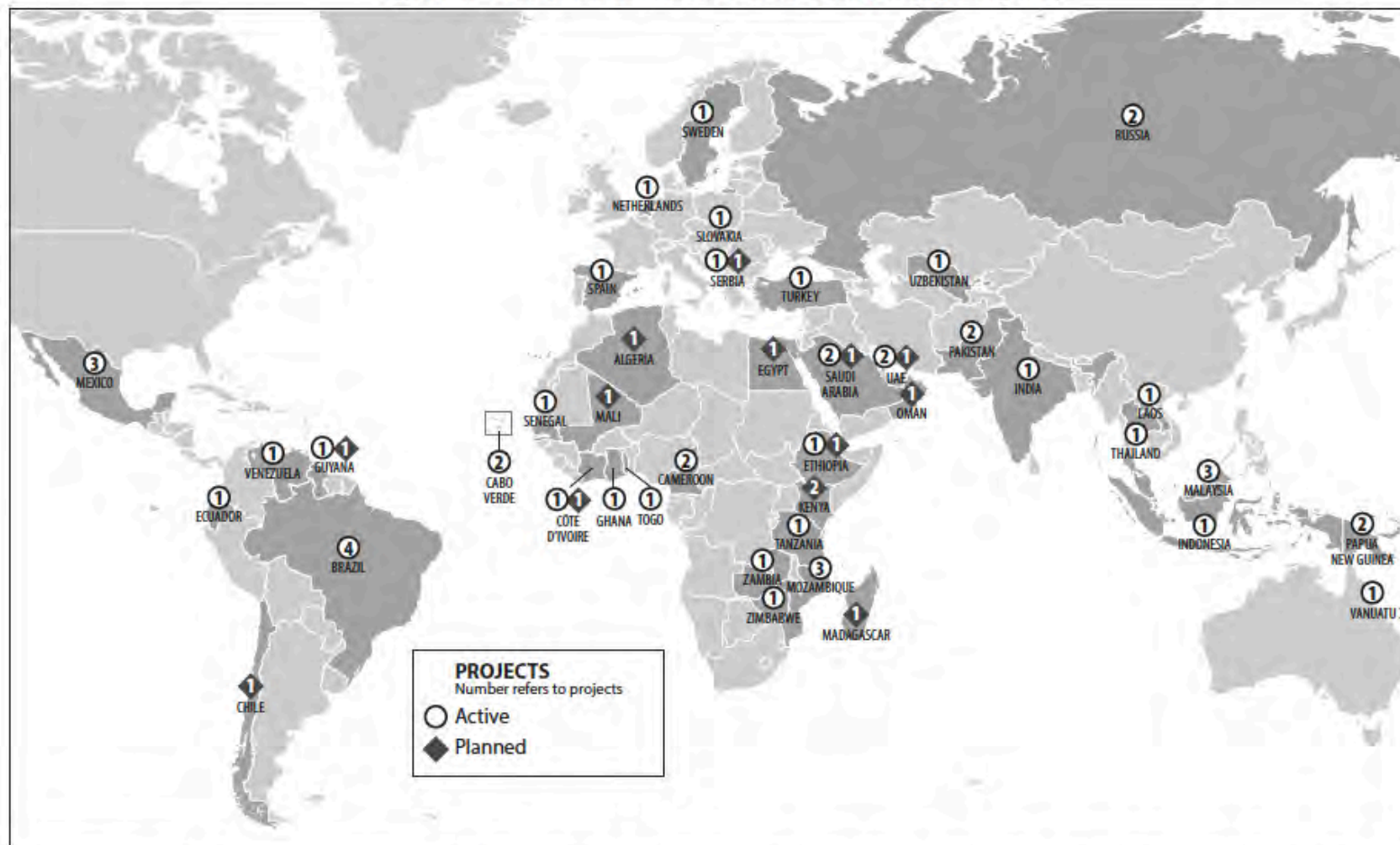
Final Rankings in Science and Technology, 2017-2018

Final Rankings in Science and Technology, 2017-2018

Country	Metric 1 (High-Impact Publications)	Metric 2 (Network Density)	Metric 3 (Quality-Adjusted Patents)	Metric 4 (S&T Organizational Capacity)
United States	1	1	2	1
China	2	5	1	2
Germany	5	3	5	4
United Kingdom	3	2	6	7
India	4	8	7	3
Japan	6	9	3	6
France	7	4	8	5
South Korea	8	7	4	8
Russia	9	6	9	9

China's Growing Role in Cloud Computing

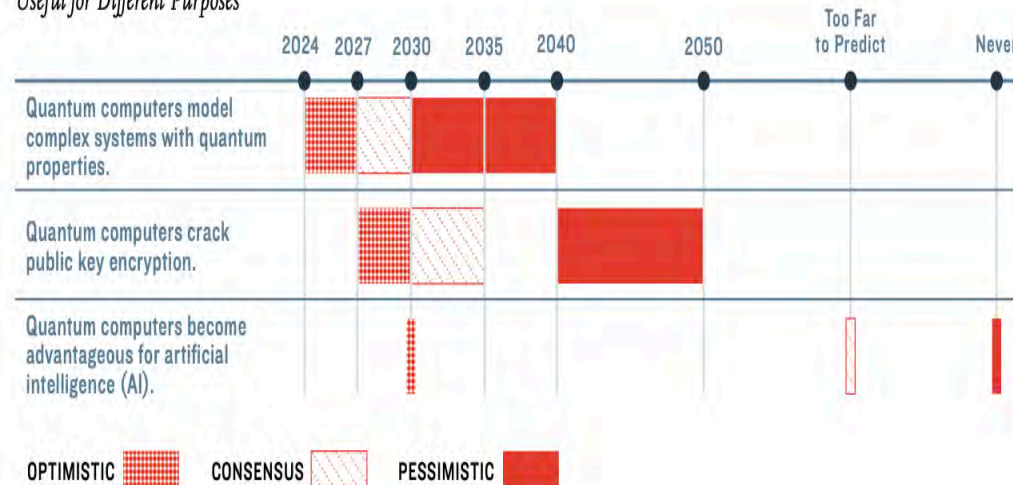
Figure 3: Huawei's Overseas Cloud Computing Projects



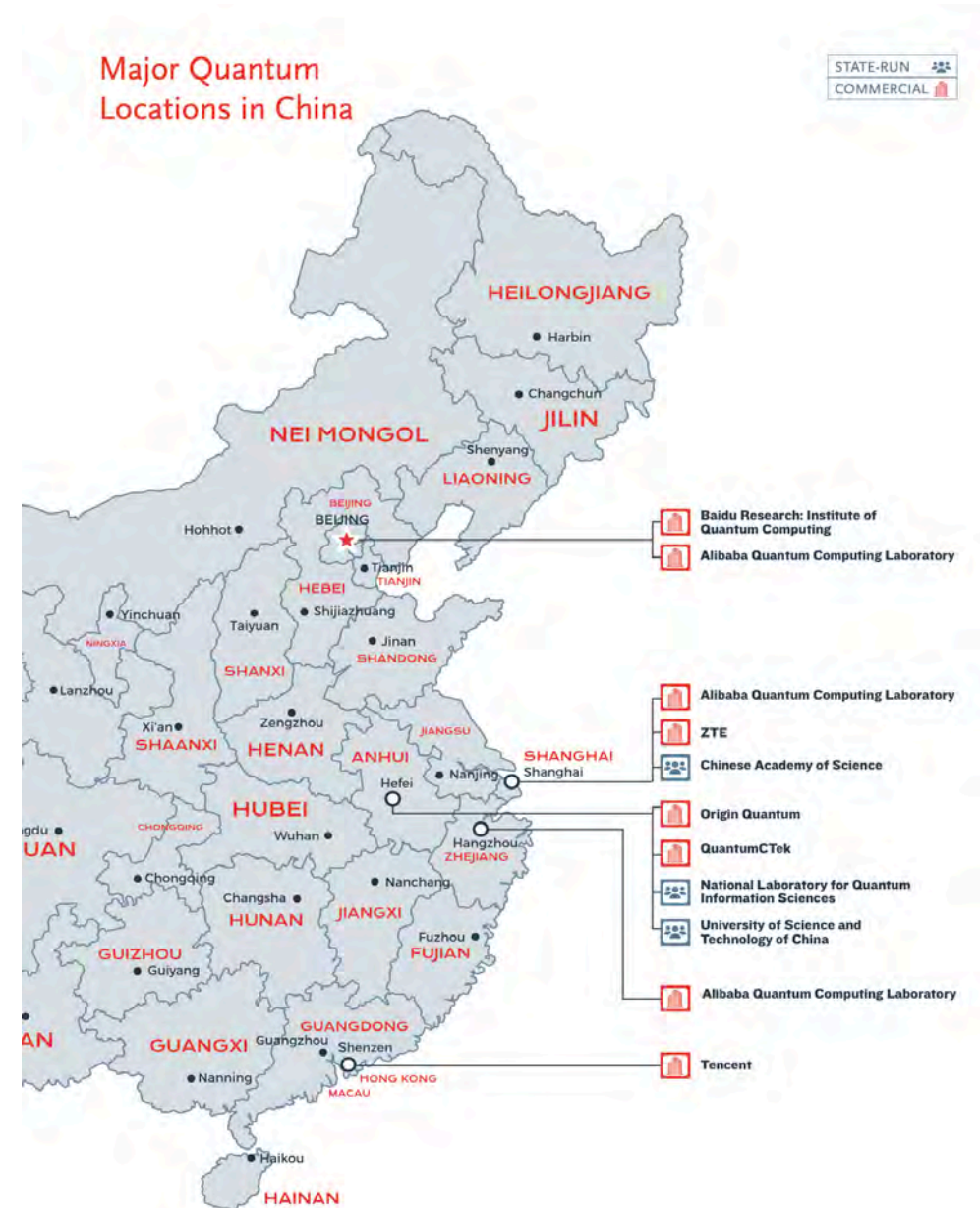
Source: Reconnecting Asia Project, "Reconnecting Asia Huawei Cloud & e-Government Data," Center for Strategic and International Studies, April 2021.
Note: "Planned" indicated projects that have been signed through a contract or memorandum of understanding.

Future Impact of China's Growing Role in Quantum Technology

When Quantum Becomes
Useful for Different Purposes

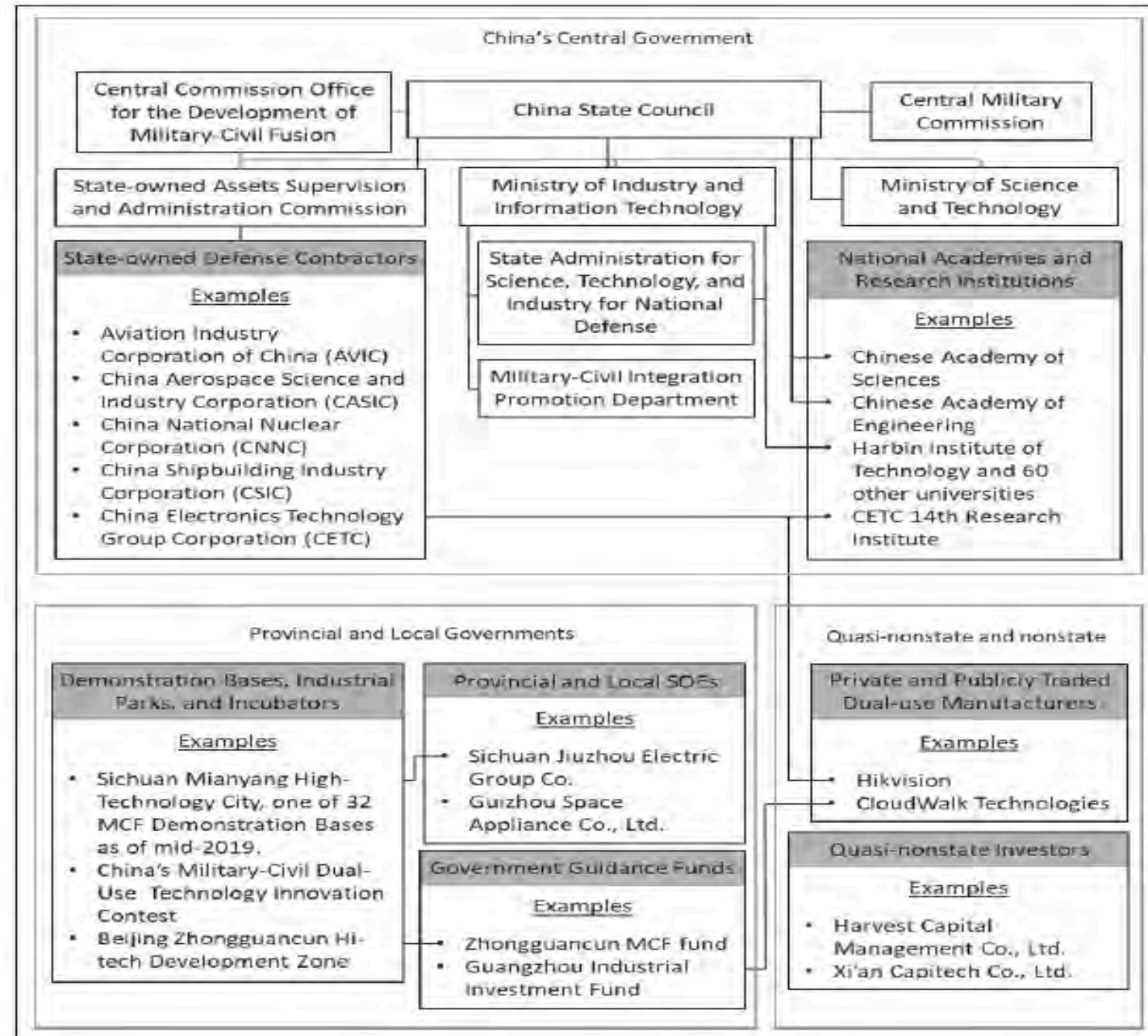


Source: Adapted from *Chinese Threats in the Quantum ERA*, Booz Allen Hamilton, pp. 13-14,
<https://www.boozallen.com/content/dam/home/pdf/ai/chinese-threats-quantum-era.pdf>.



China's Growing Capability to Compete in Manufacturing and Defense Industrial Base

China's Military-Industrial Ecosystem



Source: 2021 Report to Congress of the U.S.-China Economic and Security Review Commission, November 2021, p. 273.

Global Rankings of China's Top Defense State-Owned Companies in 2019

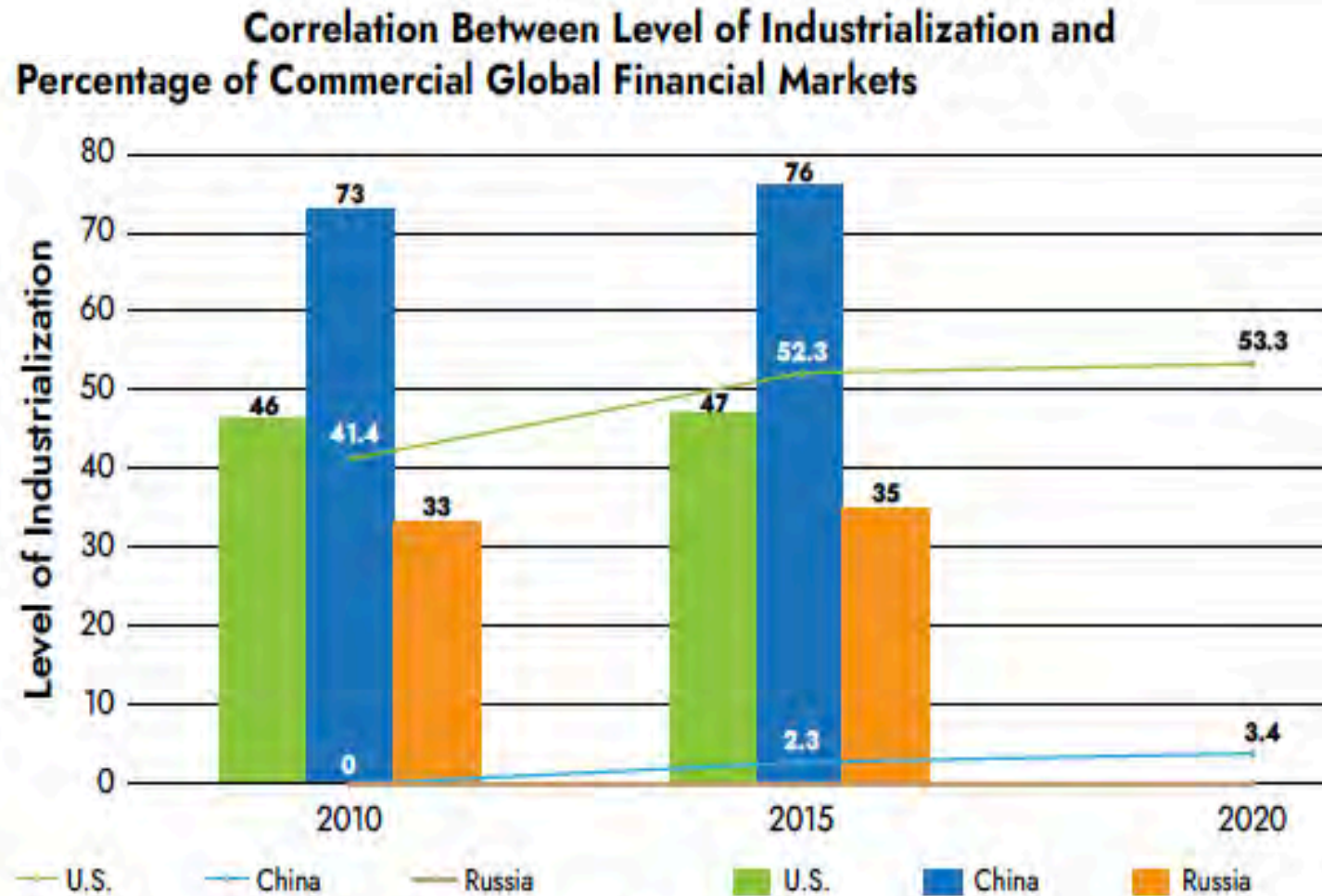
Global defense company rankings based on assessments of defense revenues for 2019

Company	Defense News ranking (out of 100)	Stockholm International Peace Research Institute ranking (out of 25)
Aviation Industry Corporation of China (AVIC)	6	6
China North Industries Group Corporation Limited (NORINCO)	8	9
China Aerospace Science and Industry Corporation (CASIC)	11	Not ranked
China Shipbuilding Industry Corporation (CSIC)	14	Not ranked
China Electronics Technology Group Corporation (CETC)	15	8
China South Industries Group Corporation (CSGC)	18	24
China Aerospace Science and Technology Corporation (CASC)	20	Not ranked
China State Shipbuilding Corporation (CSSC)	24	Not ranked
China National Nuclear Corporation (CNNC)	Not ranked	Not ranked

Source: Defense News, “Top 100 for 2019”; Lucie Béraud-Sudreau et al., “Mapping the International Presence of the World’s Largest Arms Companies,” Stockholm International Peace Research Institute, December 2020.

Notes: Both Defense News and SIPRI ranked companies by reported defense revenue. China’s two largest shipbuilding companies, China Shipbuilding Industry Corporation and China State Shipbuilding Corporation, merged to become China State Shipbuilding Corporation Limited in November 2019, although they are listed separately here.

Lynch & Saunders: Comparative Size of Industrialization: 1990 vs. 2020



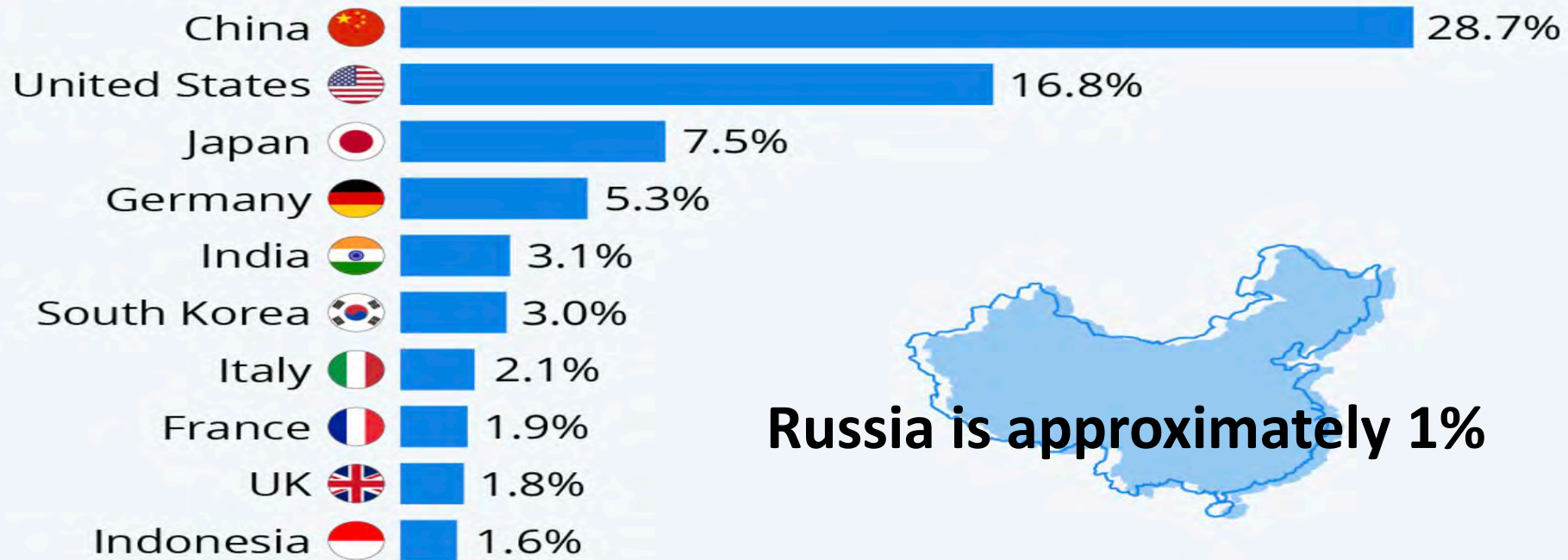
Source: Chart generated by authors. Data sources are at the online appendix B of this volume, available at <https://ndupress.ndu.edu/Contemporary-GPC-Dynamics-Matrix/>.

Forty-seven percent of the U.S. economy was industrialized in 2015 vs. seventy-six percent for China.

Almost 19 percent of American manufactured exports were in the high-technology category in 2018, lower than the 31 percent of China's exports in 2017 but near the global average of 18 percent for 2018.

China Is the World's Manufacturing Superpower

Top 10 countries by share of global manufacturing output in 2019*



* output measured on a value-added basis in current U.S. dollars

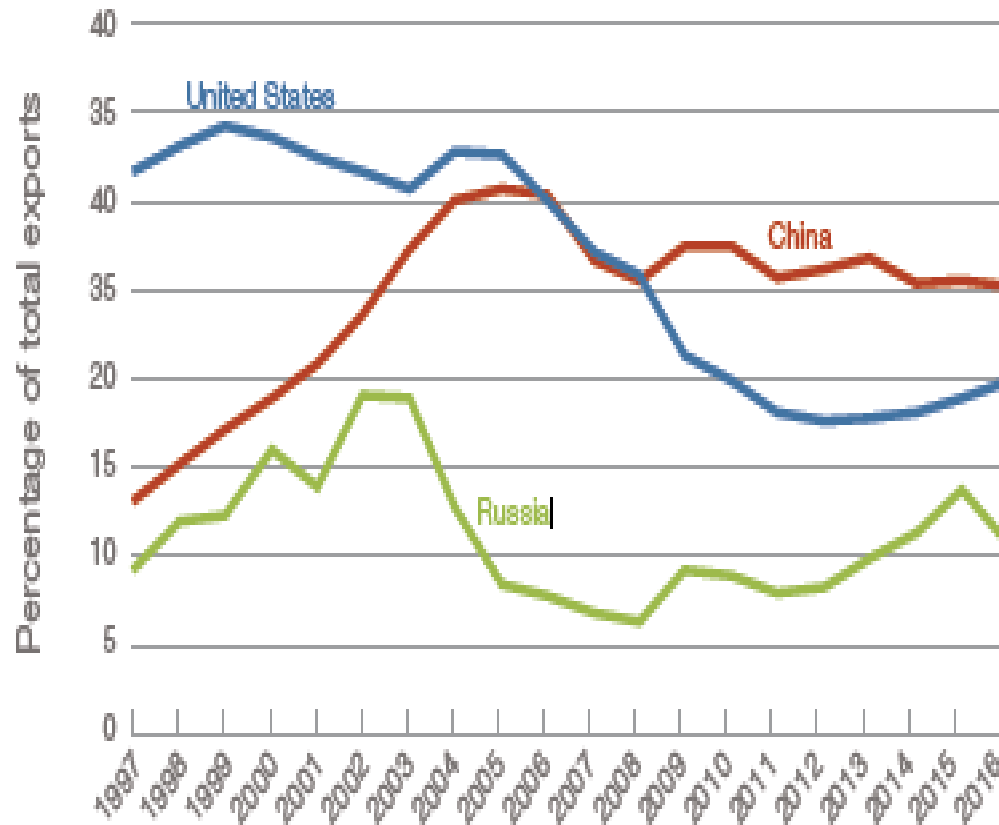
Source: United Nations Statistics Division



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RAND High-Tech Exports (as Percentage of Manufactured Exports)

High-Tech Exports (as Percentage of Manufactured Exports)



SOURCE: World Bank, 2018.

High-tech exports are important because they show the distribution of global supply chains for the production of high-tech goods (). In 1997, the United States was the leader in both absolute and relative terms, with over 30 percent of its exports being high-technology products.

China was mainly exporting lower value-added goods, with only 13 percent of high-tech goods in its export mix. The figure for Russia was even lower, at 9.3 percent. By 2005, the indicators for the United States and China reached comparative values: 32.7 percent for the United States and 30.8 percent for China.

This parity reflected China's accession to the WTO and accelerating offshoring of high-tech production to China. Over the same period, although Russia doubled the dollar value of its high-tech exports from 1.89 billion current dollars in 1997 to 3.82 billion current dollars in 2005, the relative share of high-tech products in its exports decreased from 9.3 percent in 1997 to 8.4 percent in 2005, mainly because of the increase in other commodities, such as chemicals.

By 2012, the high-tech goods share of U.S. exports declined to 17.7 percent because of continuing offshoring, while the share of high-tech exports of total Chinese exports decreased to 26.2 percent. In absolute terms, however, U.S. high-tech exports decreased from 190 billion

current dollars in 2005 to 148 billion in 2012, while Chinese exports increased from 215 billion current dollars in 2005 to 506 billion in 2012.

The relative decline in the case of China is explained by the fact that other manufactured exports grew at a higher rate. Russia's high-tech exports also increased in absolute terms, from 3.8 billion current dollars in 2005 to 7 billion in 2012, while the relative share of high-tech goods in overall manufactured exports remained at 8 percent.

In 2016, China's high-tech exports slightly decreased in absolute and relative terms, to 496 billion current dollars (25.2 percent of its total manufactured exports), while U.S. high-tech exports slightly increased, from 148 billion current dollars and 17.7 percent of total manufactured exports in 2012 to 153 billion current dollars and 20 percent of total manufactured exports in 2016.

UN/Brookings Estimate of Global Manufacturing Capacity: 2015

China leads the world in terms of manufacturing output, with over \$2.01 trillion in output (see Table 1). This is followed by the United States (\$1.867 trillion), Japan (\$1.063 trillion), Germany (\$700 billion), and South Korea (\$372 billion).

Manufacturing constitutes 27 percent of China's overall national output, which accounts for 20 percent of the world's manufacturing output. In the United States, it represents 12 percent of the nation's output and 18 percent of the world's capacity. In Japan, manufacturing is 19 percent of the country's national output and 10 percent of the world total. Overall, China, the United States, and Japan comprise 48 percent of the world's manufacturing output.

Source: Adapted from Darrell M. West and Christian Lansang , Global Manufacturing Output, Brookings, July 10, 2018, <https://www.brookings.edu/research/global-manufacturing-scorecard-how-the-us-compares-to-18-other-nations/>.

Country	Manufacturing Output (USD in billions)	Percent of National Output	Percent of Global Manufacturing
China	\$2,010	27%	20%
United States	1,867	12	18
Japan	1,063	19	10
Germany	700	23	7
South Korea	372	29	4
India	298	16	3
France	274	11	3
Italy	264	16	3
United Kingdom	244	10	2
Taiwan	185	31	2
Mexico	175	19	2
Spain	153	14	2
Canada	148	11	1
Brazil	146	11	1
Russian Federation	139	11	1
Turkey	125	18	1
Indonesia	115	22	1
Poland	100	20	1
Switzerland	93	18	1
Netherlands	88	12	1

Source: United Nations Conference on Trade and Development, 2015

UN/Brookings Global Manufacturing Output: 1970-2015

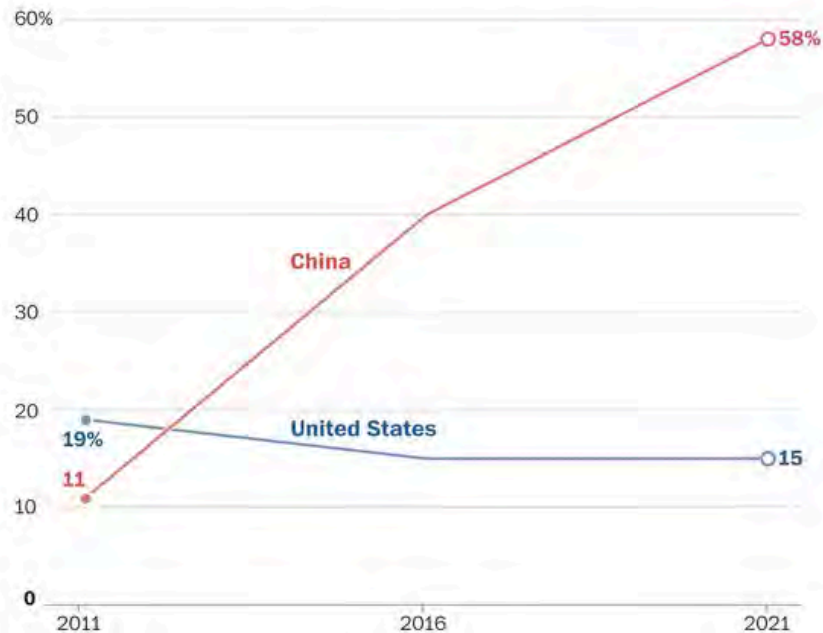
Year	U.S.	Russia	Japan	Germany	China	U.K.	France	Italy	Canada	Spain
1970	1	2	3	4	5	6	7	8	9	10
1980	1	2	3	4	5	8	6	7	11	10
1990	1	7	2	3	8	6	5	6	11	10
2000	1	16	2	3	4	5	7	7	9	11
2005	1	14	2	4	3	7	6	5	10	9
2006	1	14	2	4	3	7	6	5	10	9
2007	1	12	3	4	2	8	6	5	13	10
2008	1	9	3	4	2	7	6	5	14	11
2009	1	17	3	4	2	10	6	5	14	11
2010	2	11	3	4	1	10	8	6	14	12
2011	2	11	3	4	1	10	9	6	14	15
2012	2	10	3	4	1	11	8	7	14	15
2013	2	9	3	4	1	11	8	6	14	15
2014	2	11	3	4	1	9	8	7	14	15
2015	2	15	3	4	1	8	9	7	13	14

Source: <http://www.madeherenow.com/news/post/2017/01/27/britain-moves-up-the-world-manufacturing-league-table>

China's Advances in Manufacturing Technology – I

Chinese companies lead the world in smartphone sales

Share of smartphone units shipped by the top 15 brands worldwide



Note: Data for 2021 includes the first and second quarters

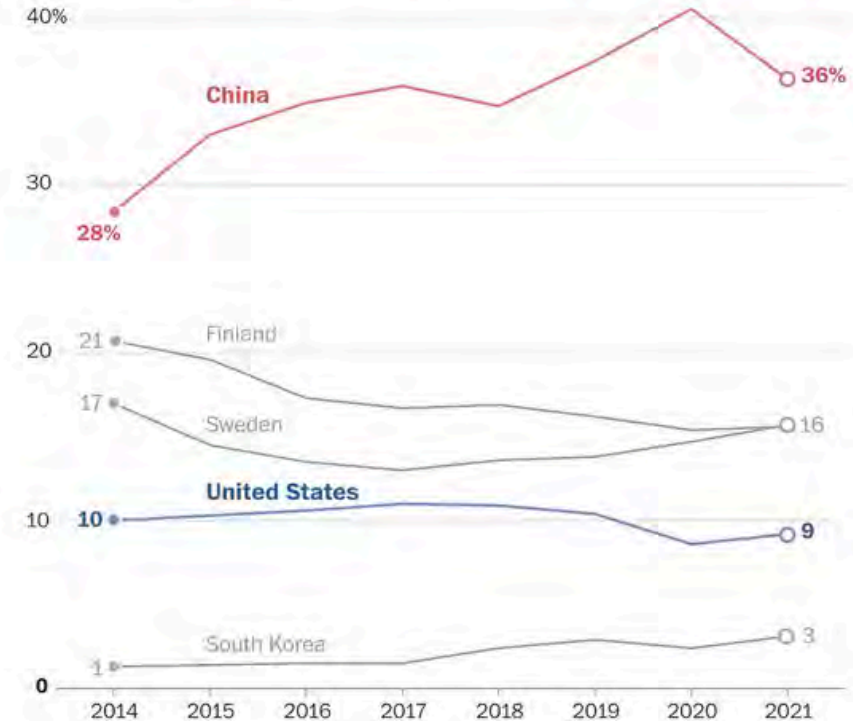
Source: IDC Quarterly Mobile Phone Tracker

THE WASHINGTON POST

Apple, an American company, and Samsung, a South Korean one, are the smartphone brands most Westerners know, together accounting for a bit more than one-third of smartphones sold globally. But in many parts of the world, including Asia and Africa, Chinese brands dominate, helping them secure three of the top five sales rankings globally, according to IDC Quarterly Mobile Phone Tracker.

Chinese companies, led by Huawei, dominate sales of telecom network equipment

Annual share of global revenue since 2014



Note: Data for 2021 includes only the first quarter

Source: Dell'Oro Group

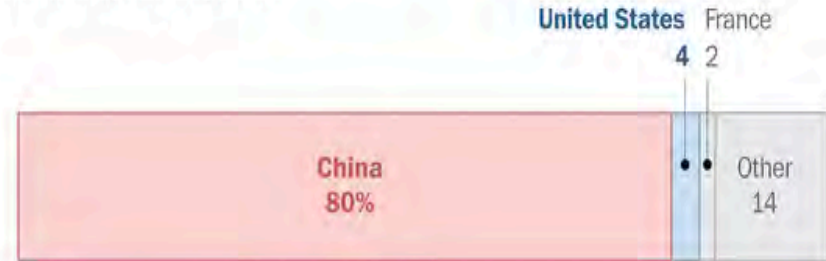
THE WASHINGTON POST

Chinese technology first came to many Westerners' notice through the telecommunications sector, where Huawei quickly grew into the world's biggest manufacturer of the cellphone-tower equipment that transmits cellular signals.

China's Advances in Manufacturing Technology – II

Chinese companies dominate drone sales in the U.S. market

Share of units sold for commercially used drones in the first half of 2020



Note: "Other" includes companies that control less than 0.2% of share

Source: Drone Industry Insights

THE WASHINGTON POST

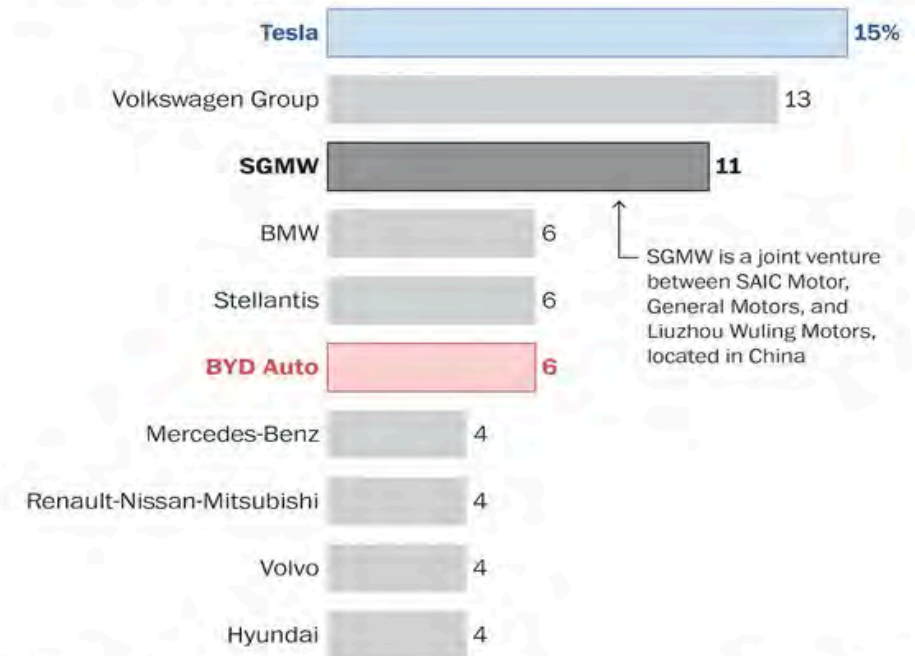
The commercial drone sector is one of the starkest examples of China's strength in the hardware business. One Chinese company, [DJI](#), founded by tech entrepreneur Frank Wang, owns the U.S. market for the unmanned aircraft, which are used for agriculture, cinematography, public safety and aerial photography.

U.S. and other Western manufacturers barely register in the sector, with [Skydio](#), an autonomous drone maker in California [founded by three MIT graduates](#), holding just under 1 percent of the commercial drone market in the U.S., according to Drone Industry Insights.

Electric vehicles

Tesla leads worldwide market for electric vehicles

Share of units sold among top 10 electric and plug-in hybrid vehicle makers in the first half of 2021



SGMW is a joint venture between SAIC Motor, General Motors, and Liuzhou Wuling Motors, located in China

Source: Canalys

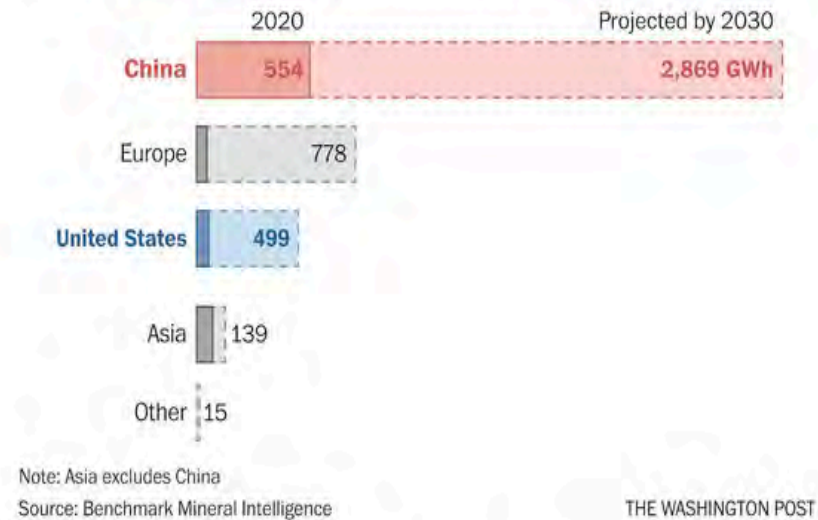
THE WASHINGTON POST

Western, Japanese and Korean automakers dominated the global market for gasoline-powered cars. But in the electric vehicle business, [Chinese manufacturers are starting to pose more competition](#) — particularly inside China, which is now the world's largest automotive market.

China's Advances in Manufacturing Technology – III

China is projected to maintain big lead in lithium-ion battery cell production

Gigawatt hours of battery cell production capacity

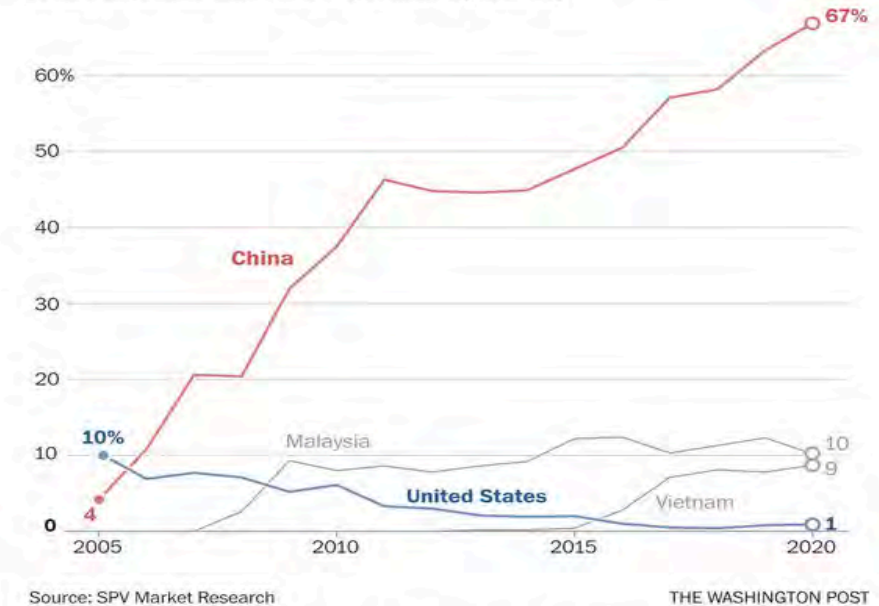


Lithium-ion batteries are central to the emerging green economy, powering electric vehicles and storing solar and wind energy for later use. China is way ahead in producing them, and that gap is expected to continue.

China has been bolstering its battery and electric-vehicle companies with tens of billions of dollars of state support, including research and development funding, subsidies for manufacturers and financing for battery-charging stations. It has also driven demand by subsidizing consumer purchases of electric vehicles, and by making buyers of gasoline-fueled cars wait much longer for a license plate.

China manufactures and ships a majority of the world's photovoltaic cells for solar panel production

Share of photovoltaic cell shipments by country



Global demand for solar panels is booming as countries scramble to harness more renewable energy sources. And China is by far the biggest supplier of the technology.

China's dominance of the industry is even bigger when considering that much of the production happening in Malaysia and Vietnam is controlled by Chinese companies.

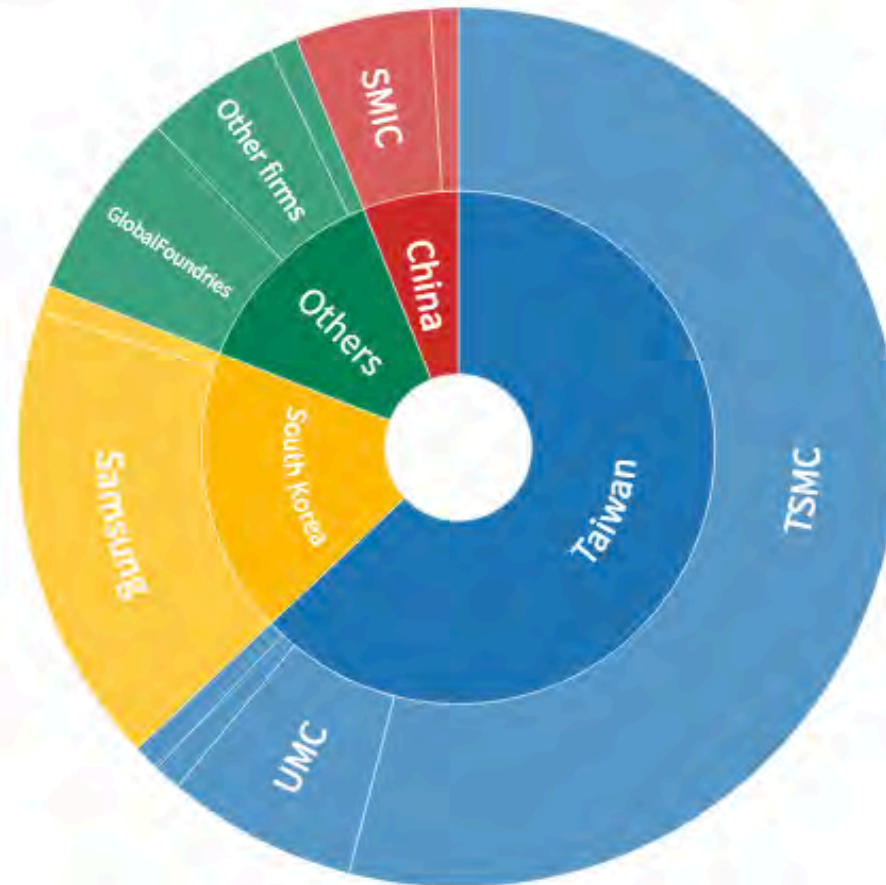
China's regional and central governments heavily subsidized solar manufacturers with low-cost land, electricity and financing, helping sustain them even when they were losing money, according to the Information Technology & Innovation Foundation, a D.C. think tank. The surge in Chinese production drove down panel prices globally and forced many Western manufacturers out of business.

Potential Impact of Taiwan's Dominance in Semiconductor Foundry Operations

Taiwan dominates the foundry market, or the outsourcing of semiconductor manufacturing. Its contract manufacturers together accounted for more than 60% of total global foundry revenue last year, according to data by Taipei-based research firm TrendForce.

Much of Taiwan's dominance can be attributed to Taiwan Semiconductor Manufacturing Co or TSMC, the world's largest foundry that counts major technology firms such as Apple, Qualcomm and Nvidia as its clients. TSMC accounted for 54% of total foundry revenue globally last year, TrendForce data showed.

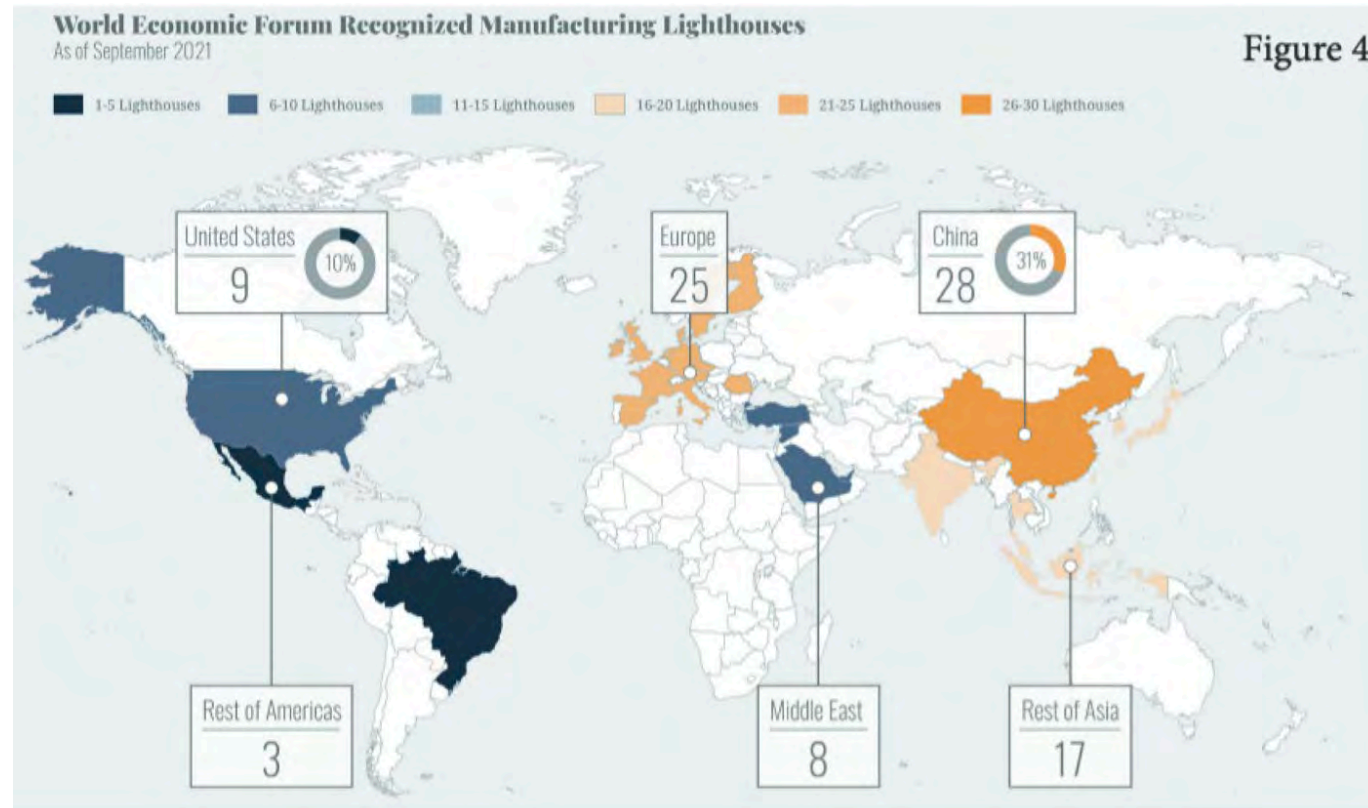
Semiconductor contract manufacturers by market share
Total foundry revenue stood at \$85.13 billion in 2020



SOURCE: TrendForce (March 2021)



Chinese Dominance of Manufacturing “Lighthouses”



The Problem: Current indicators reveal a troubling lack of U.S. leadership in manufacturing productivity. For example, the World Economic Forum Global Lighthouse Network highlights factories that serve as aspirational targets for the adoption of Industry 4.0 digital manufacturing technologies, which include automation of industrial processes through the Internet of Things and machine-to-machine enabled speed and data analytics. Currently, just 9 of 90 lighthouses operate in the United States, whereas 28 are in China—a glaring issue given that the United States is a global leader in many of the digital technologies that enable these factories (see Figure 4).³⁹

Manufacturing Value Coming From Outside of Region

29 Percent of Manufacturing Value-Added in U.S. Consumption Comes From Out of Region, Roughly Twice as Much as in Germany, Japan, and China

Percent of value added by major regions in country's final demand

North America East Asia Europe Rest of World

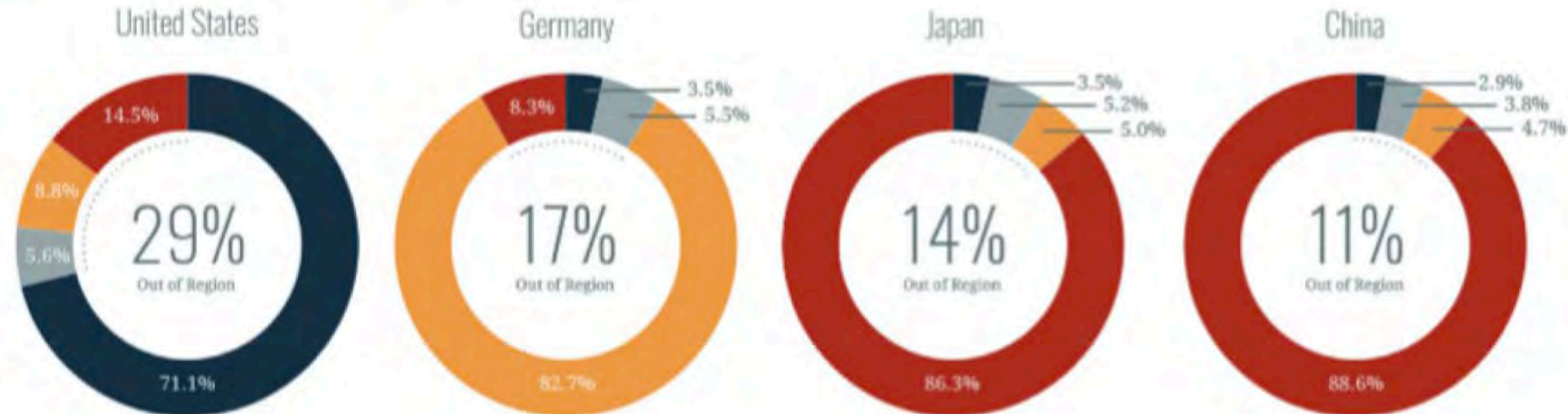
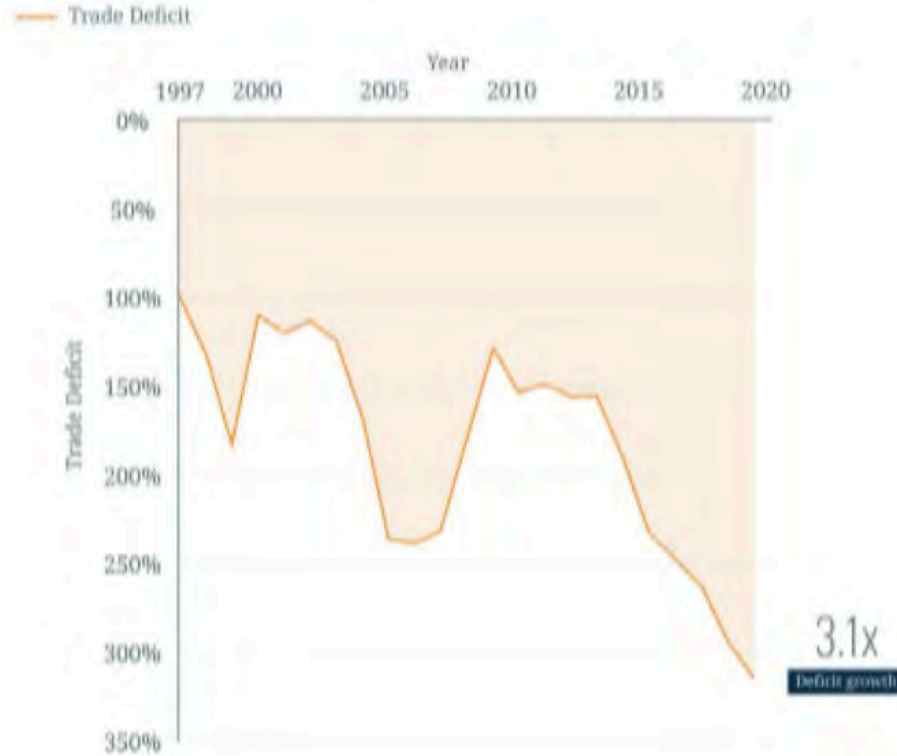


Figure 6

U.S. Manufacturing Deficit and Trade Shocks

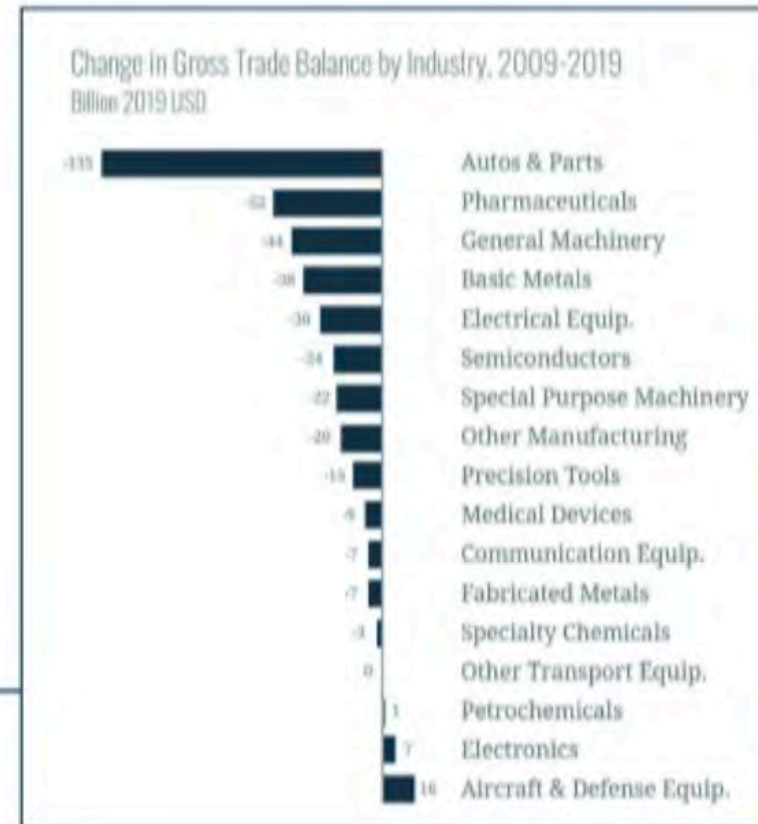
A Rapid Increase in Trade Deficit for Manufactured Goods has Left the United States Exposed to COVID-19 Driven Supply Shocks

Indexed to 1997



Source: McKinsey Global Institute.

Figure 1

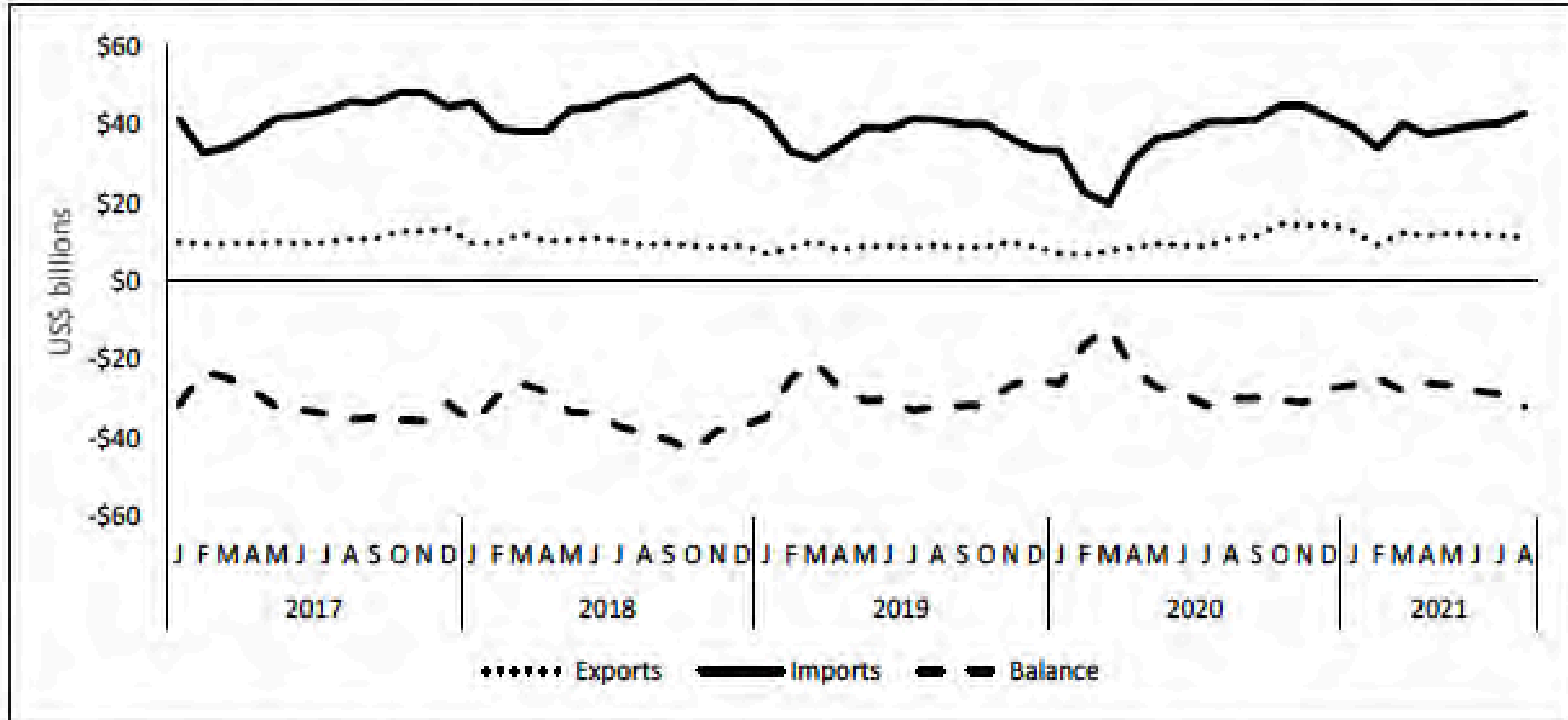


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Chinese and U.S. Competition in Trade

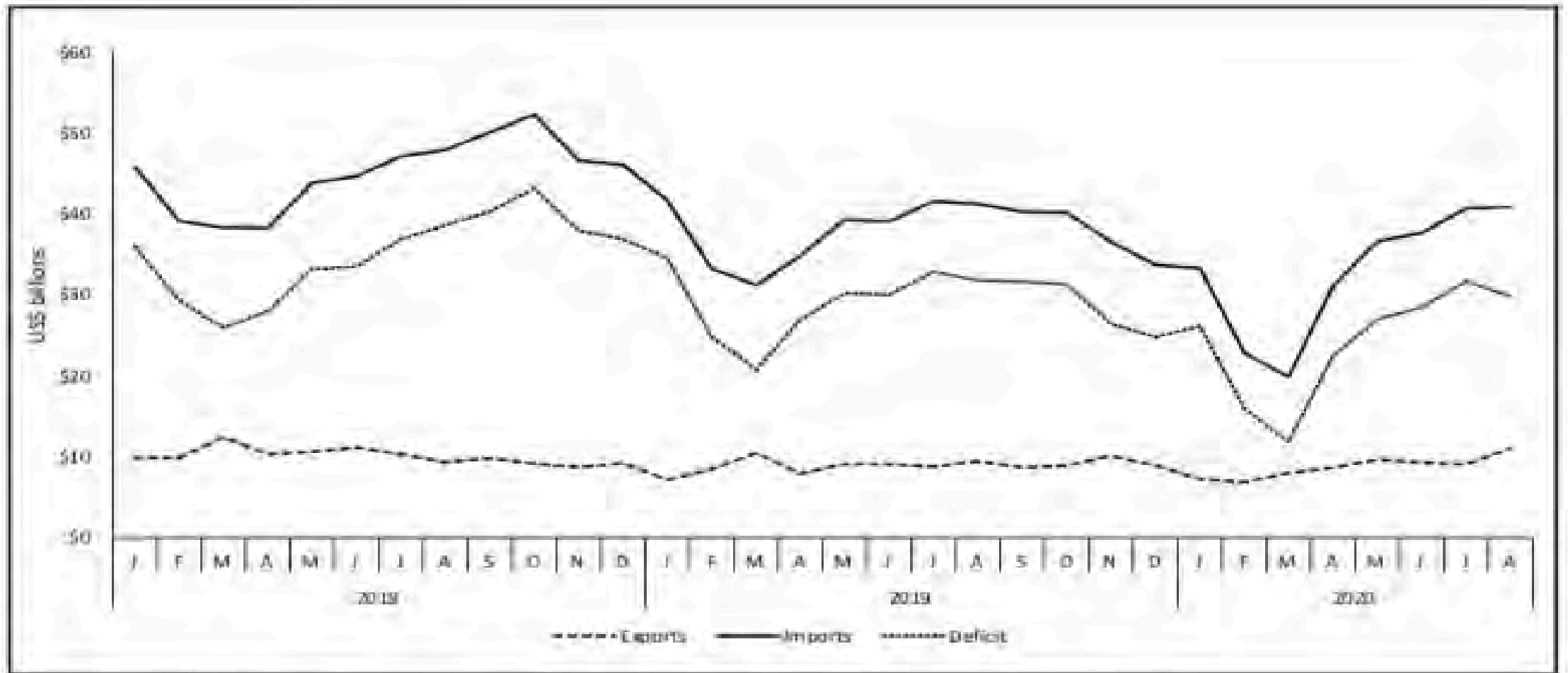
U.S. Bilateral Trade with China: January 2017-August 2021

Figure 1: U.S. Bilateral Trade with China, January 2017-August 2021



Source: U.S. Census Bureau, *Trade in Goods with China*, October 5, 2021.

U.S. Trade Deficit with China: January 2018-August 2020



Source: U.S. Census Bureau, *Trade in Goods with China*, October 6, 2020

Trade Balance: 2010 vs. 2020

The [U.S. trade deficit](#) with China was \$315.1 billion in 2012 and rose to \$367.3 billion by 2015 before dropping to \$346.8 billion the following year. By 2018, it had increased to \$418.9 billion before falling to \$345.2 billion in 2019. At the end of 2020, the deficit with China had dropped to \$310.8 billion, the lowest since 2011. ^[1]

Annual U.S. Trade Deficit With China



Note: All figures are in millions of U.S. dollars

Source: United States Census Bureau

[Get the data](#) • [Add this chart to your site](#)

 the balance

Chinese Counters to U.S. Actions and Sanctions

Table 1: Select Chinese Measures Enacted or Introduced in 2020–2021

Title	Purpose	Date
<i>Blocking and Retaliation</i>		
Export Control Law	Regulates dual-use technology and codifies license regime for sensitive products, services, and other transfers.	Effective December 2020
Measures for Blocking Improper Extraterritorial Application of Foreign Laws and Measures	Creates authority for China's government to block implementation of secondary sanctions and prohibit compliance with some foreign laws and measures.	Effective January 2021
Measures for Security Review of Foreign Investment	Establishes security review process for all inbound foreign investment.	Effective January 2021
Anti-Foreign Sanctions Law	Creates legal tool for reciprocating against foreign sanctions and authority to impose retaliatory sanctions on a wide variety of targets, along with family members and affiliates.	Effective June 2021
<i>Data Governance</i>		
Data Security Law	Establishes system of data classification and obligations for organizations handling data, including security requirements and assessments for its protection, collection, use, and transfer internally and overseas.	Effective September 2021
Personal Information Protection Law	Establishes rights to personal information for all individuals in China and obligations for organizations handling personal information for its protection, collection, use, and transfer internally and overseas.	Effective November 2021
Several Provisions on the Management of Automobile Data Security (Draft)	Outlines obligations for organizations on the collection, protection, sharing, and use of data collected by automobiles.	Introduced May 2021
Cybersecurity Review Measures (Draft)	Outlines security review procedures for operators of critical information infrastructure and organizations handling data sensitive to national security, including IPOs and organizations handling data of more than one million users.*	Introduced July 2020
Opinions on Strictly Cracking Down on Illegal Securities-Related Activity in Accordance with Law	Calls for stronger supervision and enforcement of cross-border listings, including improvement of laws and regulations related to data security, transfer, and management involved in such listings.	Introduced July 2021
Internet Information Service Algorithmic Recommendation Management Provisions (Draft)	Establishes new security, privacy, and content management rules for internet services that rely on algorithmic recommendations. Providers allow consumers greater control to enable or disable algorithmic recommendations.	Introduced August 2021

Source: Compiled by Commission Staff.

Source: 2021 Report to Congress of the U.S.-China Economic and Security Review Commission, November 2021, p. 138.

China's Phase One Trade Agreement Commitments and Compliance Status: 2021

Phase One Commitment	Commitment Target	Interim Result	Outstanding Concerns	Phase One Commitment	Commitment Target	Interim Result	Outstanding Concerns
Purchase Targets	Beijing committed to increase purchases of U.S. goods by at least \$200 billion over 2017 levels over two years: \$76.7 billion in 2020 and \$123.3 billion in 2021.	As of August 2021, Chinese imports of U.S. goods stood at 69 percent (\$89.4 billion) of a prorated \$129.9 billion target.	Beijing has leveraged SOEs for some of the purchases, raising concerns that it is using the agreement to strengthen government actors in the economy. ²³⁴	Liberalize Financial Services	China agreed to remove investment restrictions, reduce regulation, and review pending license applications of U.S. companies in its domestic banking, credit rating, electronic payments, asset management, insurance, and securities industries.	In 2020, China committed to allow U.S. credit ratings agencies to acquire majority ownership in existing joint ventures and review U.S. companies' applications for credit rating services for onshore securities. In 2021, China approved U.S. firms owning a majority stake in wealth management joint ventures and having sole ownership over fund management companies. ^{*238}	Many of Beijing's financial services commitments are restatements or minor improvements on pledges in progress. U.S. financial services firms report licensing requirements can be excessively onerous, hindering entry into and expansion within the Chinese market. ²³⁹
Address Intellectual Property (IP) Violations	The agreement included changes to address longstanding concerns over China's administration of the IP life-cycle: patenting, licensing, and civil and criminal enforcement. The agreement required China to establish an action plan to deter IP theft and counterfeiting, as well as to enforce court judgments. Other IP provisions aim to create a level playing field for foreign firms and ensure stronger IP protection in valuable markets such as pharmaceuticals.	On April 20, 2020, the China National Intellectual Property Administration (CNIPA) released a 2020–2021 plan to implement guidance on strengthening IP protection. From October 2020 to January 2021, China amended its Patent Law, Copyright Law, and Criminal Law, leading some rightsholders to report some degree of improvement in IP enforcement.	China legal expert Mark Cohen noted that while the CNIPA guidance appears to reflect the Phase One agreement in its timetables and delegation of responsibility, CNIPA is administratively subordinate to the State Administration of Market Regulation and may lack the authority to implement the plan. ²³⁵ Local-level implementation is an additional concern, as amendments to national laws governing IP rights do not necessarily create binding obligations at the provincial and lower levels of government in China. ²³⁶	Increase Agricultural Market Access	China agreed to permit the import of beef, pork, and processed meat that passes inspection by the U.S. Food and Drug Administration Food Safety and Inspection Service. Beijing also committed to reduce the review and approval period for genetically modified products to “no more than 24 months,” down from the prior approval period of five to seven years.	According to former trade negotiator Darci Vetter, provisions on U.S. meat, poultry, and specialty dairy products appeared promising in terms of increasing market access. The deal text also pledged to reduce burdensome registration, licensing, and bureaucratic processes for U.S. agricultural exporters. ²⁴⁰	Trade association BIO expressed continuing concerns regarding U.S. biotech developers' lengthy wait for product approvals, as Chinese regulators will not begin the approvals process until U.S. regulators have completed their review. ²⁴¹
Eliminate Forced Technology Transfer	The agreement prohibits China from conditioning market access on transfer of technology—reiterating a commitment China made in its 2001 WTO accession protocol—and directing overseas investment with the explicit aim of acquiring technology to fulfill industrial policy goals. ²³⁷	The agreement includes no monitoring guidelines, enforcement mechanisms, deadlines, or targets.	The agreement lacks metrics to evaluate Beijing's compliance. Chinese law already prohibits conditioning regulatory approvals on technology transfer, but requests continue. U.S. companies are reluctant to come forward in cases of forced technology transfer for fear of reprisal.				

China's Growing Global Influence

Chinese Influence Operations – I

- The PRC conducts influence operations, which target cultural institutions, media organizations, business, academic, and policy communities in the United States, other countries, and international institutions, to achieve outcomes favorable to its strategic objectives.
- The CCP seeks to condition domestic, foreign, and multilateral political establishments and public opinion to accept Beijing’s narratives and remove obstacles preventing attainment of goals.
- CCP leaders probably consider open democracies, including the United States, as more susceptible to influence operations than other types of governments.
- The PLA has emphasized the development of its “Three Warfares” concept—comprised of psychological warfare, public opinion warfare, and legal warfare—in its operational planning since at least 2003. The PLA will likely continue to develop its digital influence capabilities by incorporating advancements in artificial intelligence (AI) to improve the quality and deniability of its messaging.

Since at least 2003, the PLA has been developing the “Three Warfares” concept to demoralize adversaries and influence foreign and domestic public opinion during conflicts. Psychological warfare uses propaganda, deception, threats, and coercion to affect the adversary’s decision-making, while also countering adversary psychological operations. Public opinion warfare disseminates information for public consumption to guide and influence public opinion and gain support from domestic and international audiences. Legal warfare uses international and domestic laws to gain international support, manage political repercussions, and sway target audiences. The PRC views the cyber domain as an emerging and ideal platform providing opportunities for influence operations, and the PLA likely seeks to use digital influence activities to support its overall “Three Warfares” concept and to undermine an adversary’s resolve in a contingency or conflict.

Consistent with this strategy, the PRC conducts influence operations to achieve outcomes favorable to its security and military strategy objectives by targeting cultural institutions, media organizations, business, academic, and policy communities of the United States, other countries, and international institutions. The CCP seeks to condition domestic, foreign, and multilateral political establishments and public opinion to accept the PRC’s narrative surrounding its priorities such as promulgation of Beijing’s “one China principle,” OBOR, the CCP’s political control over Hong Kong, and South China Sea territorial and maritime claims. PRC influence operations are coordinated at a high level and executed by a range of actors, such as the United Front Work Department, the Propaganda Department, and the Ministry of State Security (MSS).

A cornerstone of the PRC’s strategy includes appealing to overseas PRC citizens or ethnic Chinese citizens of other countries to advance the Party’s objectives through soft power engagements. The PRC also sometimes uses coercion or blackmail to manipulate overseas PRC citizens to conduct influence operations on behalf of the PRC, such as threatening ethnic Uyghurs living in the United States with imprisonment of their family members. PRC intelligence services often facilitate these operations. Additionally, the PRC targets ethnic Chinese citizens of other countries to support its foreign technology acquisition strategy; it’s “Thousand Talents Program” targets people of ethnic Chinese descent or recent PRC emigrants whose recruitment the PRC government views as necessary to the PRC’s scientific and technical modernization, especially with regard to defense technology.

Furthermore, the PRC harnesses academia and educational institutions, think tanks, and state-run media to advance its soft power campaign in support of Beijing’s security interests. For example, PRC students abroad and academic organizations are used to spread the Party’s narrative on Tibet and the Dalai Lama. Chinese Students and Scholars Associations (CSSA) and Confucius Institutes organize events to support the PRC’s sovereignty claims and lodge complaints and organize protests against academic institutions that conduct activities which fail to comport with Beijing’s narrative.

Chinese Influence Operations – II

As of December 2020, Xinhua News Agency, the PRC's largest state-run media outlet and the Party's official mouthpiece, had not complied with the U.S. Department of Justice's request to register the agency's U.S. staff as foreign agents under the Foreign Agents Registration Act (FARA).

The PRC's foreign influence activities are predominately focused on establishing and maintaining influence with power brokers within foreign governments to promote policies that the PRC's views will facilitate its rise, despite Beijing's stated position of not interfering in foreign countries' internal affairs. The PRC's diplomatic outreach stresses building personal rapport with influential people, providing assistance, and emphasizing "win-win cooperation" through trade and diplomacy. This approach allows the PRC to offer expedited, small-scale accomplishments for partners abroad, often in exchange for seemingly symbolic gestures that support the PRC's long-term strategic goals. Some countries have begun to implement policy responses to the PRC's influence activities, including within the European Union, Australia, and New Zealand.

The PRC uses multilateral forums and organizations to generate new opportunities to pursue bilateral engagements with countries to expand its defense influence and security cooperation, strengthen its political influence, and limit outside interference in its initiatives. The PRC promotes strategic messaging portraying the PRC as a responsible global actor through organizations such as Brazil, Russia, India, China, and South Africa (BRICS), Shanghai Cooperation Organization (SCO), Association of Southeast Asian Nations (ASEAN), as well as forums such as the Forum on China Africa Cooperation, China-Arab States Cooperation Forum, and the Belt and Road Forum.

The PLA seeks to employ digital influence operations—overt and covert influence activities conducted through the Internet and social media platforms—during peacetime and wartime. During a conflict, the PRC could use digital influence activities to undermine enemy morale and confuse or deceive adversary decision makers. In wartime or peacetime, PLA goals for social media influence activities fall into three broad categories: promote a narrative favorable to the PRC, undermine adversary resolve, and shape foreign governments' policies in favor of Beijing's interests.

Since at least 2009, the PLA has expressed concern about the United States' perceived use of the Internet and social media to undermine CCP power in China. In response, the PLA has been conducting research into conducting digital influence operations and learning best practices from other countries, sending delegations to Russia, Israel, Belarus, and Germany to study how to use social media for military influence operations.

The PLA has a variety of public-facing social media accounts that it uses for overt messaging. These accounts are exclusively on PRC social media platforms, however, and have little to no international reach. Recently, PLA officials have discussed creating an official PLA account on Twitter, and other Western social media accounts. Although, due to rising popularity of PRC social media applications with Western audiences, the need for a PLA presence on traditional Western platforms may decline.

The PLA likely also conducts covert digital influence activities on social media to support public opinion warfare objectives. PLA analysts are studying how to use covert social media accounts to target users for political influence, and PLA SSF personnel may have conducted a covert social media campaign to support pro-PRC candidates and try to sway the outcome of the 2018 Taiwan election.

The PLA will likely continue to develop its digital influence capabilities by incorporating advancements in artificial intelligence (AI) to improve the quality and deniability of its messaging. The PLA has expressed interest in researching the technological requirements for the creation of deepfakes. In 2019, PLA personnel also suggested training AI algorithms to autonomously create content and coordinate influence activity between different fake accounts.

Atlantic Council Ratings of Formal Bilateral Influence Capacity – I

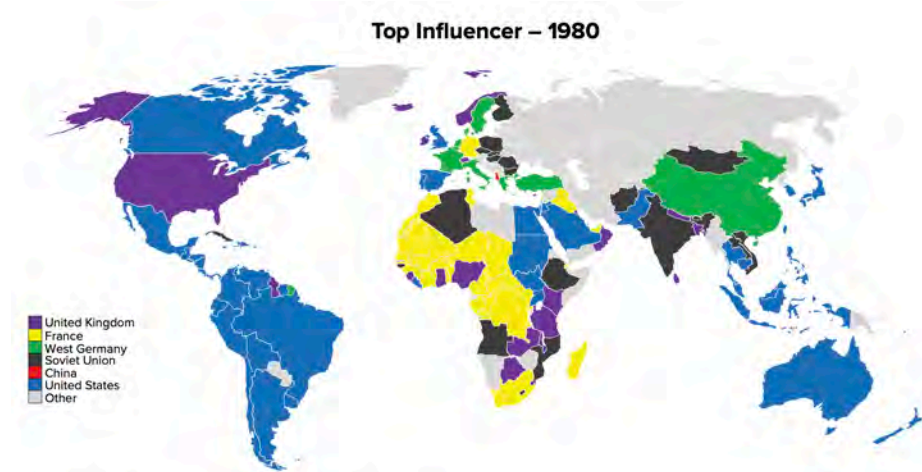


Figure 2: Top influencer in each country, 1980.

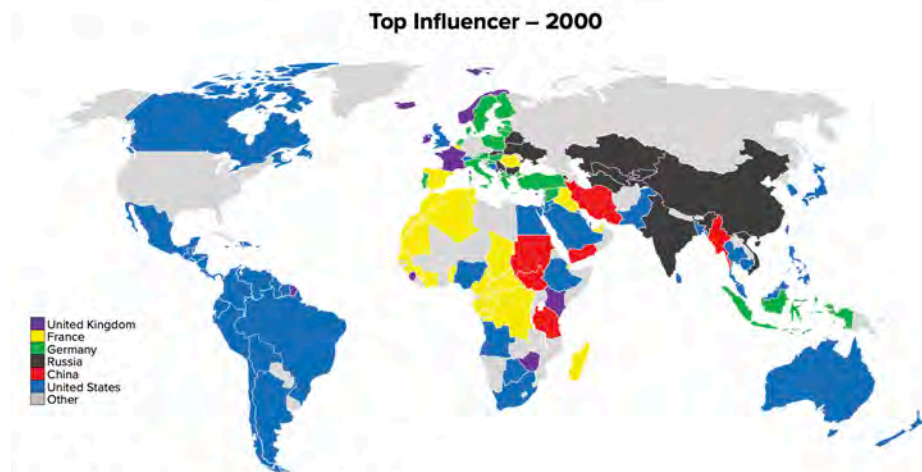


Figure 3: Top influencer in each country, 2000.

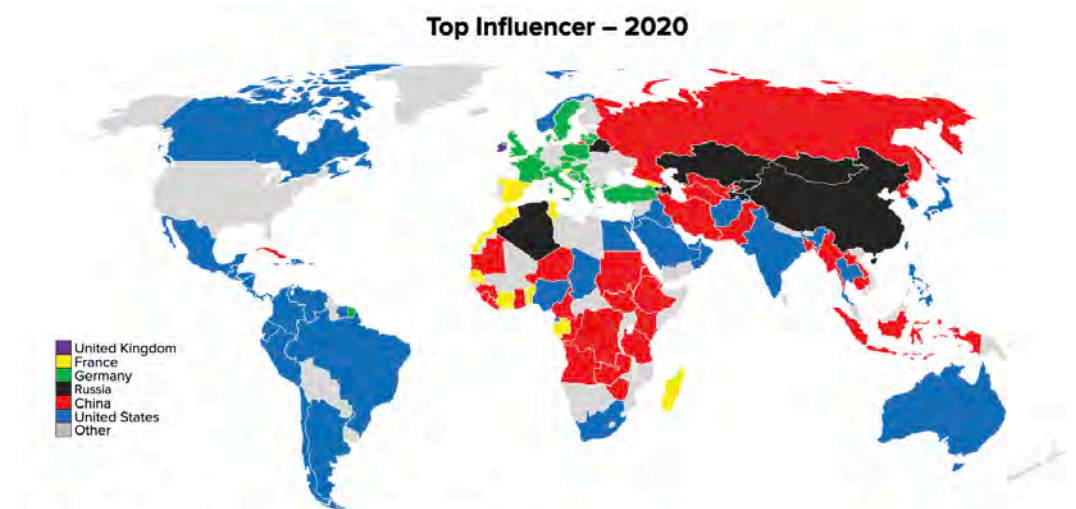


Figure 1: Top influencer in each country, 2020.

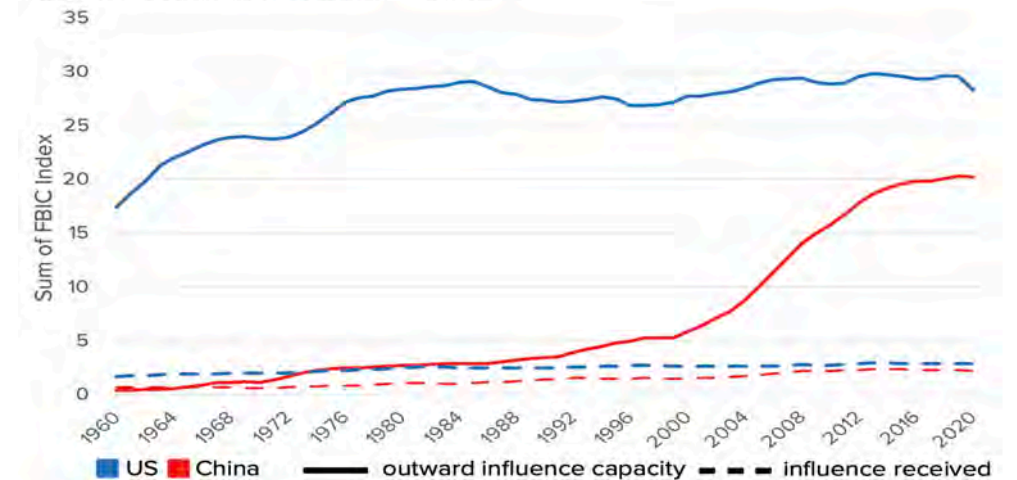


Figure 4: Sum of outward and inward FBIC Index scores for China and the United States.

Source: Excerpted from Jonathan D. Moyer, Collin J. Meisel, Austin S. Matthews, David K. Bohl, and Mathew J. Burrows, “China-US Competition Measuring Global Influence,” Atlantic Council/Fredewrick S. Pardee Center, May 2021, pp. 9-11, <https://www.atlanticcouncil.org/wp-content/uploads/2021/06/China-US-Competition-Report-2021.pdf>.

Atlantic Council Ratings of Formal Bilateral Influence Capacity – II

Figure 1 shows this for six historically influential countries for the year 2020. The United States is the most influential country across the Western Hemisphere, and Germany is the top-ranked influencer across much of Europe, while Chinese influence has spread across much of Southeast Asia and Africa. Russia is the top-influencer primarily in Central Asia, though its influence capacity also spills over into Belarus, its much smaller and highly dependent neighbor, and into Algeria, the third largest importer of Russian arms over the past half-decade. Meanwhile, the influence of previous colonial powers is much more limited, with French influence scattered across North, West, and Southern Africa, and the UK displaying the top influence only in Ireland.

Figures 2 and 3 show these patterns across time. In 1980, the world saw much more influence from traditional colonial powers, with French influence stretching across Africa and influence from the United Kingdom spread around the world. The influence of the Soviet Union was also much more pronounced, as was influence from the United States in most of East and Southeast Asia. By the year 2000, the geopolitical environment had shifted once again. French influence across Africa had declined, and influence from Russia was more consolidated across Eastern Europe and Central and South Asia. Chinese influence had started to emerge at this point, with growth in key emerging partners like Iran and Sudan.

The changing structure of the international system away from its unipolar moment in the years following the Cold War has been the focus of much policy-oriented research. The rise of China is unmistakable, with overall economic activity growing from \$937 billion in 1990 to \$13.3 trillion by 2020,¹⁴ military spending increasing from \$23 billion in 1990 to \$273 billion by 2020, and population in extreme poverty declining from 66 percent in 1990 to less than 1 percent by 2020... The growth of China's relational power is also reflected in its FBIC Index scores, showing a cumulative increase from a global summed value of three in 1990 to over twenty today. Meanwhile, US values have remained relatively flat from the 1980s to the present, with some slight reductions over the past few years. See *Figure 4*, which compares the outward influence capacities of China and the United States from 1960 through 2020 as well as the influence received in each country.

PEW Poll of Outside Views of China: 2002-2021 – I

Large majorities in most places have negative opinions of China

% who have an **unfavorable** view of China

	<div> <div>Most unfavorable</div> <div>Least unfavorable</div> </div>																	
	'02	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
U.S.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73	76
Canada	-	27	-	37	-	36	-	-	-	45	-	48	40	40	45	67	73	73
Sweden	-	-	-	40	-	-	-	-	-	-	-	-	59	49	52	70	85	80
Netherlands	-	34	-	-	-	-	-	-	-	-	-	-	43	42	45	58	73	72
Germany	-	37	33	54	68	63	61	59	67	64	64	60	60	53	54	56	71	71
Belgium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	67
France	-	42	41	51	72	60	59	49	60	58	53	49	61	52	54	62	70	66
UK	-	16	14	27	36	29	35	26	35	31	38	37	44	37	35	55	74	63
Italy	-	-	-	61	-	-	-	-	64	62	70	57	61	59	60	57	62	60
Spain	-	21	38	43	56	41	38	39	46	47	55	50	56	43	48	53	63	57
Greece	-	-	-	-	-	-	-	-	38	37	46	-	37	40	48	32	-	42
Japan	42	-	71	67	84	69	69	61	84	93	91	89	86	83	78	85	86	88
Australia	-	-	-	-	40	-	-	-	-	35	-	33	39	32	47	57	81	78
South Korea	31	-	-	42	49	54	56	-	-	50	42	37	-	61	60	63	75	77
Taiwan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	69
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34

Note: Prior to 2020, U.S. surveys were conducted by phone. See topline for results.

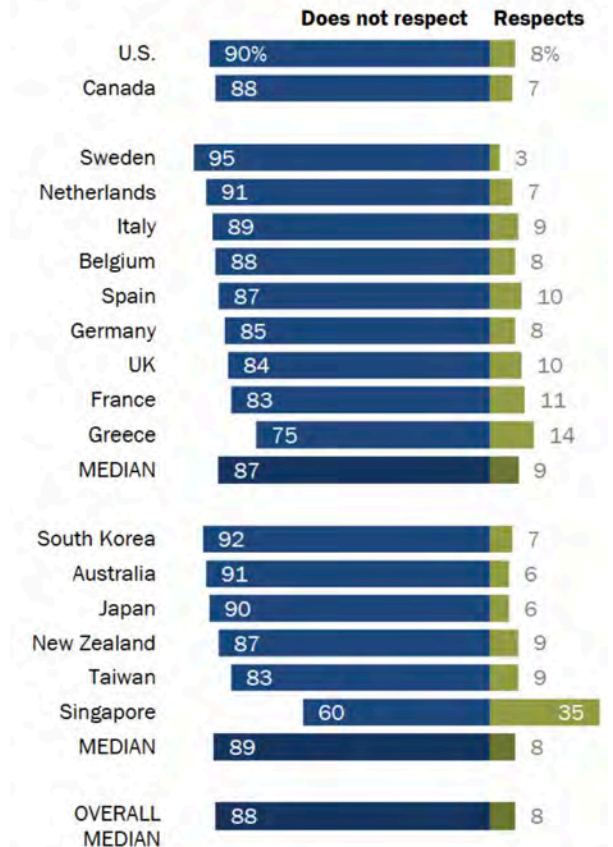
Source: Spring 2021 Global Attitudes Survey, Q4b.

"Large Majorities Say China Does Not Respect the Personal Freedoms of Its People"

PEW RESEARCH CENTER

Nearly all in publics surveyed say China disregards its people's freedoms

% who say the government of China ___ the personal freedoms of its people



Note: Those who did not answer are not shown.

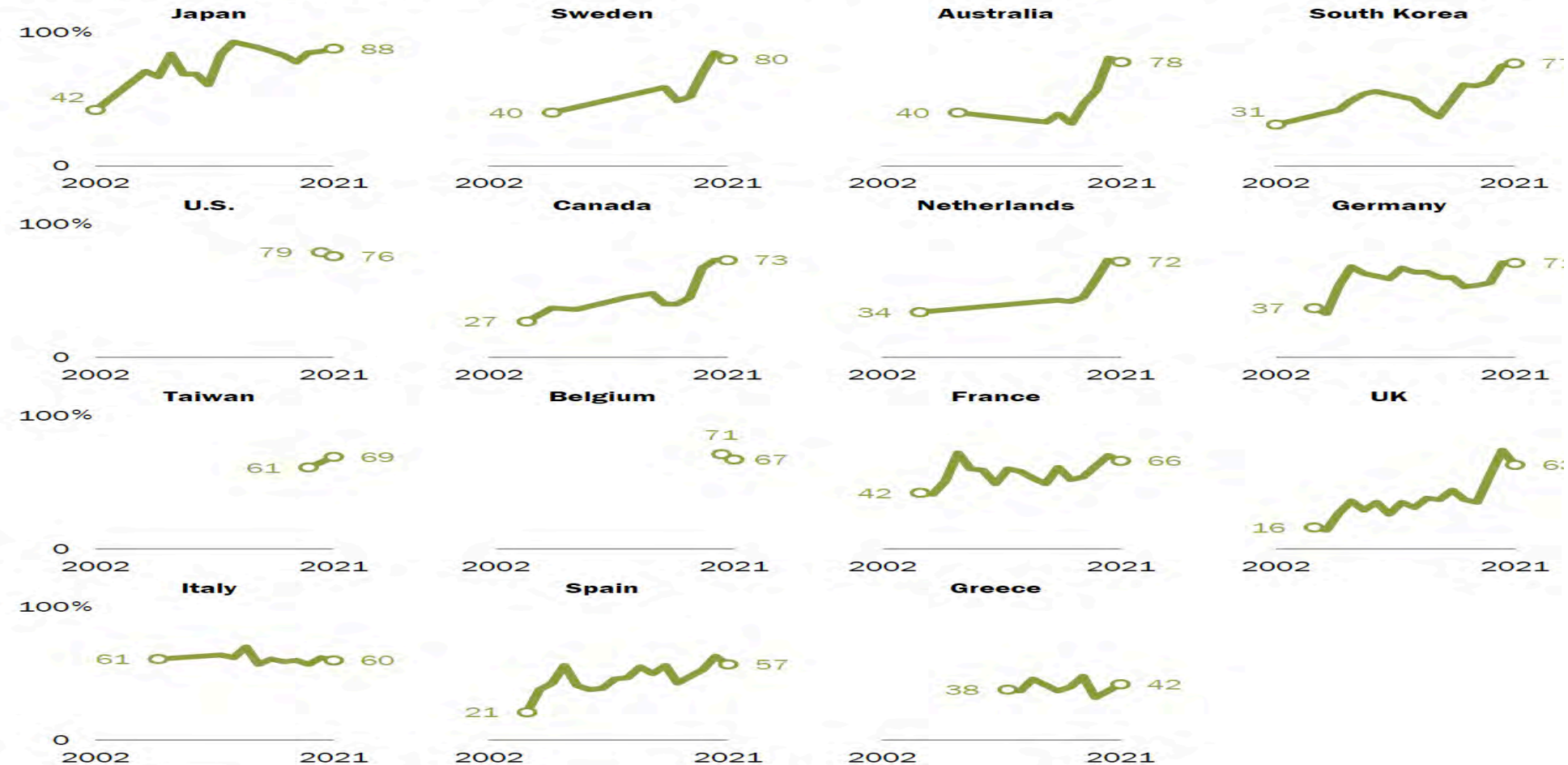
Source: Spring 2021 Global Attitudes Survey, Q6a.

"Large Majorities Say China Does Not Respect the Personal Freedoms of Its People"

PEW Poll of Outside Views of China: 2002-2021 – II

Unfavorable views of China remain at or near historic highs in many places

% who have an **unfavorable** view of China



Note: Prior to 2020, U.S. surveys were conducted by phone. See topline for results.

Source: Spring 2021 Global Attitudes survey, Q4b.

"Large Majorities Say China Does Not Respect the Personal Freedoms of Its People"

RAND Estimate of Chinese Influence – I: Output Analysis: Each Focus Country's Position on China's Leading Strategic Goals

	Did the Focus Country:						
	Establish Economic Ties with Taiwan ^a	Decline to Support the 2016 Hague Ruling ^b	Abandon Contested Territorial Claims	Join the Belt and Road Initiative and Allow Chinese Investment ^c	Allow 5G Investments from Chinese Company Huawei ^d	Stop or Downgrade Security Cooperation with the U.S. ^e	Allow Chinese Military Bases or Access ^f
Australia	Red	Red		Dark Green	Red	Red	
Brazil				Dark Green	Light Green		
Cambodia				Dark Green	Dark Green		Light Green
Ethiopia				Dark Green			
Germany	Red	Red			Red		
India		Red			Red	Red	
Indonesia		Light Green		Dark Green	Light Green		
Italy				Dark Green	Red		
Japan		Red			Red	Red	
Kenya				Dark Green			
Laos				Dark Green			
Malaysia	Red	Red			Light Green		
Mexico				Dark Green			
Nigeria				Dark Green			
Philippines	Red	Red		Dark Green		Light Green	
Singapore	Red			Dark Green			
South Korea	Red	Red		Dark Green	Light Green		
Sri Lanka				Dark Green			Light Green
Thailand	Red	Light Green		Dark Green	Light Green	Light Green	
Vietnam	Red	Red				Red	

NOTE: Green represents a position favorable to China; red represents a position opposed to China's; darker shades represent more-decisive stances.

RAND Estimate of Chinese Influence – II:

Chinese Influence-Seeking: Case Study Details and Outcomes, 2010–2019

Country	Input	Purpose	Degree of Chinese Influence	Output	Country	Input	Purpose	Degree of Chinese Influence	Output
Australia	<ul style="list-style-type: none"> Bribe legislators to support preferred policies Detain an Australian national as leverage in iron ore price negotiations Purchase media companies and publish pro-China information 	<ul style="list-style-type: none"> Sway political outcomes, especially related to the South China Sea Discourage Chinese diaspora in Australia from participating in anti-China demonstrations 	Moderate	<ul style="list-style-type: none"> Public backlash over China's efforts New laws passed to restrict foreign influence in politics Australian government remains hesitant to curtail Chinese influence or express positions contrary to Chinese preferences 	Mongolia	<ul style="list-style-type: none"> Close the border and cancel flights between the countries in response to Mongolia hosting the Dalai Lama Invest in infrastructure through the Belt and Road Initiative 	<ul style="list-style-type: none"> Discourage acceptance of the Dalai Lama, who promotes autonomy for Tibet 	Minimal	<ul style="list-style-type: none"> Public backlash Mongolia promised not to host the Dalai Lama anymore, but the new government is not beholden to that promise New laws passed to limit foreign influence Government diversified the source of its loans
Greece	<ul style="list-style-type: none"> Investments in Greek port infrastructure and other foreign direct investment Engagement with the government and nongovernmental organizations 	<ul style="list-style-type: none"> Make Greece China's economic entryway to the rest of Europe Allow economic success to sway political decisions 	Moderate	<ul style="list-style-type: none"> Greece loathe to challenge China Greece blocked and watered down EU measures against China 	New Zealand	<ul style="list-style-type: none"> Bribe public officials Intimidate academics Sign a free trade agreement and build an economic relationship Foster Confucius Institutes 	<ul style="list-style-type: none"> Sway political outcomes in China's favor Sway public opinion 	Moderate	<ul style="list-style-type: none"> Public backlash but the government response has been weak Self-censored speech at universities to avoid reprisals or loss of funding from Beijing
Japan	<ul style="list-style-type: none"> Initiated a fishing vessel conflict in disputed waters Suspended export of rare earth minerals important to Japanese tech companies Other economic sanctions (tourism) 	<ul style="list-style-type: none"> Test territorial integrity and seek to benefit from South China Sea resources Pressure Tokyo into preferred policies 	Minimal	<ul style="list-style-type: none"> Japan defended the Senkaku Islands with force Japan did not give in to economic pressures Tech companies diversified sources Japan began an economic program to compete with the Belt and Road Initiative Public backlash 	Norway	<ul style="list-style-type: none"> Suspend diplomatic relations and impose sanctions as punishment for awarding the Nobel Peace Prize to a Chinese dissident 	<ul style="list-style-type: none"> Get Norway to promise to never again award the prize to a Chinese dissident 	Minimal/moderate	<ul style="list-style-type: none"> Norway helped admit China as an observer to the Arctic Council Norway refused to meet with the Dalai Lama in 2014 Chairman of the Nobel committee was ousted from his position, but Norway did not apologize for its choice Diplomatic relations were restored in 2016 after Norway compromised little relative to China's initial demands
Maldives	<ul style="list-style-type: none"> Promote a pro-Beijing political party Invest in infrastructure through the Belt and Road Initiative Pursue a free trade agreement 	<ul style="list-style-type: none"> Shift political alignment toward Beijing Build an economic relationship beneficial to China 	Minimal	<ul style="list-style-type: none"> Pro-Beijing president and party voted out of office Significant backlash over China's actions 	Philippines	<ul style="list-style-type: none"> Support Chinese fishing vessels operating in disputed waters Impose economic sanctions 	<ul style="list-style-type: none"> Test territorial integrity and seek to benefit from South China Sea resources 	Minimal	<ul style="list-style-type: none"> Philippines initiated international arbitration of the issue, which resulted in the 2016 Permanent Court of Arbitration ruling in the Philippines' favor
					South Korea	<ul style="list-style-type: none"> Release official statements opposing the THAAD deployment Impose multiple forms of economic punishment 	<ul style="list-style-type: none"> Persuade South Korea to reverse or suspend the deployment Discourage further military advancements 	Minimal	<ul style="list-style-type: none"> THAAD briefly suspended but eventually fully deployed South Korea made assurances to China that it would not deploy any further U.S. defense systems or join a military alliance with the United States and Japan, but those promises could be reversed Public backlash

Source: Michael Mazzar, Bryan Frederick, John Drennan, Emily Ellinger, Kelly Eusebi, Bryan Rooney, Andrew Stravers, Emily Yoder
Understanding Influence in the Strategic Competition with China, RAND, RRA-290-1, 2021, pp. 80-84.

RAND Estimate of Chinese Influence –III:

Chinese Influence-Seeking: Case Study Details and Outcomes, 2010–2019

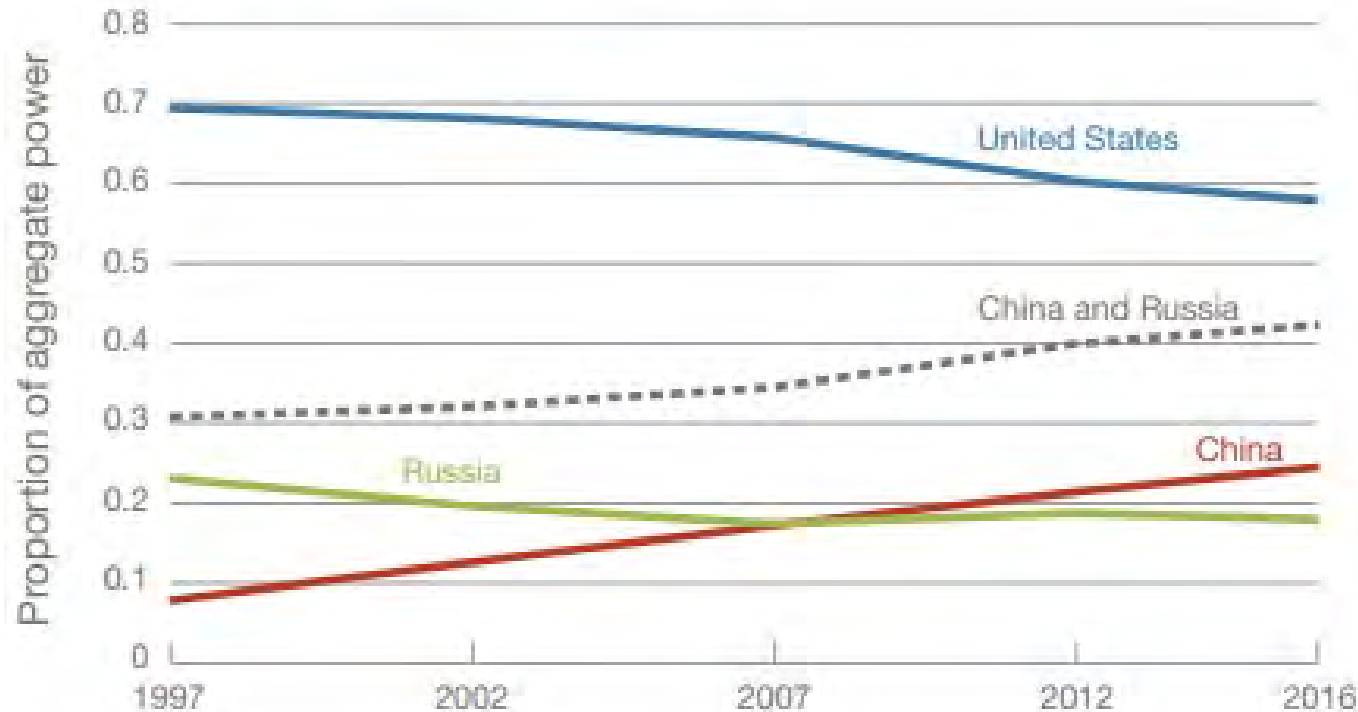
Country	Input	Purpose	Degree of Chinese Influence	Output
Sri Lanka	<ul style="list-style-type: none"> Shield Sri Lanka from UN sanctions Provide military equipment to help end the civil war Invest in infrastructure Intervene in politics to support a preferred candidate 	<ul style="list-style-type: none"> Coerce debt dependency Compel intelligence-sharing Sway political decisions 	Moderate	<ul style="list-style-type: none"> Preferred candidate was defeated in 2015, but another preferred candidate was elected in 2019 New port leased to a Chinese company for 99 years Sri Lanka's massive debt continues to give China influence
Taiwan	<ul style="list-style-type: none"> Impose economic punishment for the Tsai administration's stance on independence Use economic leverage and promises to get countries to switch allegiances from Taipei to Beijing Pursue United Front activities and general information operations 	<ul style="list-style-type: none"> Isolate Taiwan from the international community Prevent independence for Taiwan and maintain the One China status quo Ultimately unify Taiwan and the People's Republic of China 	Moderate	<ul style="list-style-type: none"> Public backlash Influence efforts backfired, and the preferred candidate was defeated in a landslide Taiwan's isolation pushed it closer to the United States rather than China
Thailand	<ul style="list-style-type: none"> Issue a safety warning to Chinese citizens to discourage travel to Taiwan following two incidents Hold military exercises with Taiwan Invest in infrastructure through the Belt and Road Initiative 	<ul style="list-style-type: none"> Demonstrate to Thailand the value of its relationship with China 	Moderate	<ul style="list-style-type: none"> Thailand waived visa fees for Chinese and other tourists Economic and security cooperation increased Thailand hedges between the United States and China

Source: Michael Mazzar, Bryan Frederick, John Drennan, Emily Ellinger, Kelly Eusebi, Bryan Rooney, Andrew Stravers, Emily Yoder
Understanding Influence in the Strategic Competition with China, RAND, RRA-290-1, 2021, pp. 80-84.

China's Growing Global Civil-Military Strategic Presence

RAND Aggregate Power Index

Relative Aggregate Power Index over Time



NOTE: The final data point is listed as 2016 because of the limited availability of some indicators for 2017, although we analyze military capabilities in 2017.

To measure the overall balance of power, we developed a new index that combines measures of relative military capacity, economic capacity, and technological capacity.

We propose measures for each type of capacity. We calculated the proportion of each type of capacity held by the United States, China, and Russia out of the total for all three countries from 1997 to 2017. We then averaged across the three types of capacities to create the index of relative power...

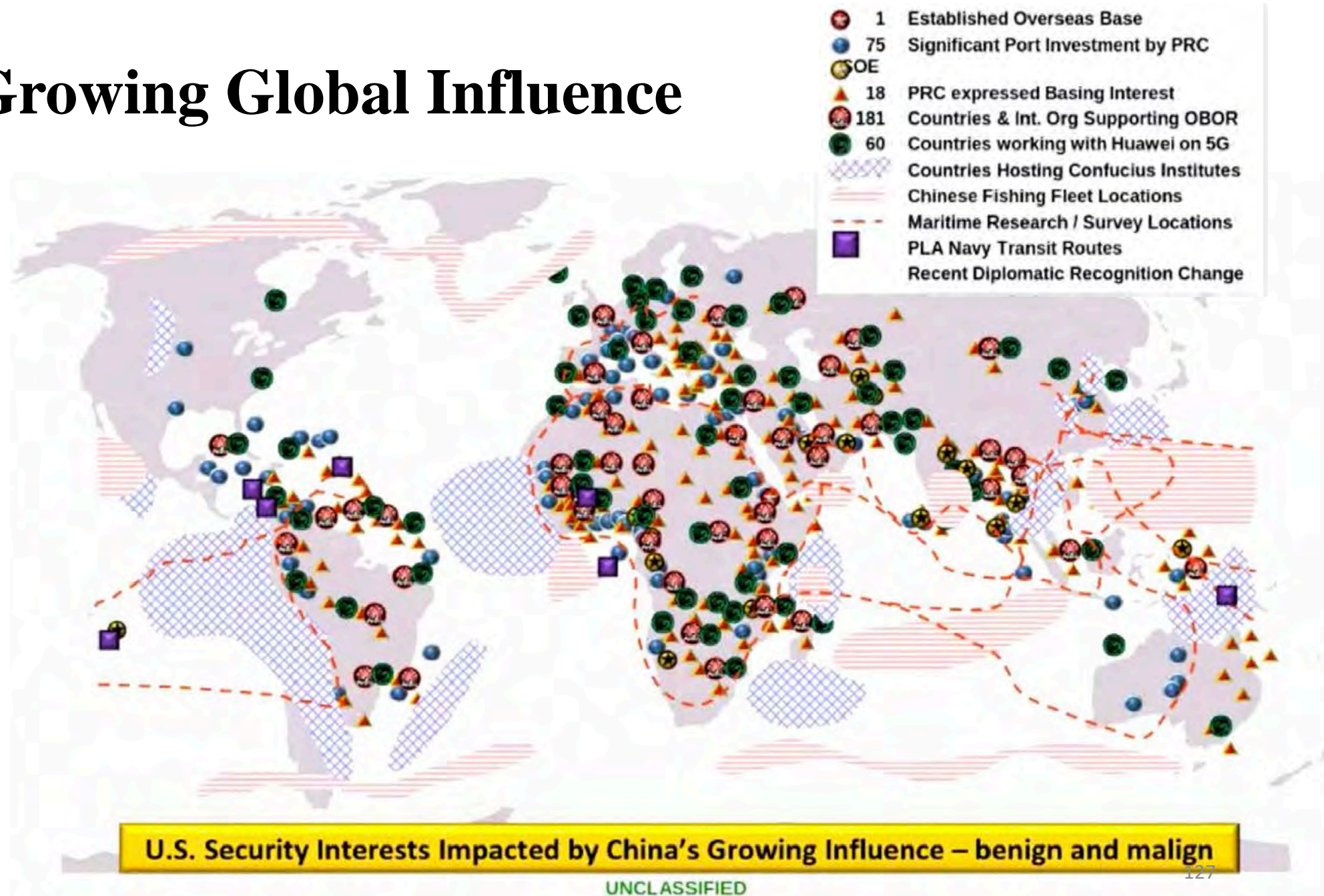
Comparative Global Civil & Military Strength in 2021

Category	U.S.		China		Russia		World Total
	Value	%of World	Value	%of World	Value	%of World	
Nuclear Weapons							
Retired	2,000	34%.	-	NA	2,897	49%	5,820
Stockpiled	3,800	39%	350	3.6%	4,497	47%	9,600
Deployed	1,700	45%	-	-	1,600	43%	3,700
Total ^a	5,500	41%	350	2.6%	6,257	47%	13,100
Military Budget							
IISS	758.0	41%	193.2	10.6%	43.1	2.3%	1,809.2
Military Spending							
SIPRI	778.2	39%	252.3	12.8%	61.7	3.1%	1,960.0
GDP							
\$US current Trillions	21,433	24.4%	14,279	16.2%	1,699	1.9%	87,734
Population							
Millions	334.9	4.3%	1,397.0	17.9%	142.3	1.8%	7,772.8

^a Adds France (290), UK (195), Pakistan (160), India (150), Israel (90), and DPRK (35).

Source: Hans M. Kristensen and Matt Korda, "Status of World Nuclear Forces," <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>; IISS "Defense budget data," *Military Balance*, 2020, pp. 529-530.; SIPRI, "Military Expenditure in Current \$US millions," SIPRI Military Expenditure Database; World Bank, "GDP (current US\$)" <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD>; CIA *World Factbook*, Country Sections, <https://www.cia.gov/library/publications/the-world-factbook/>

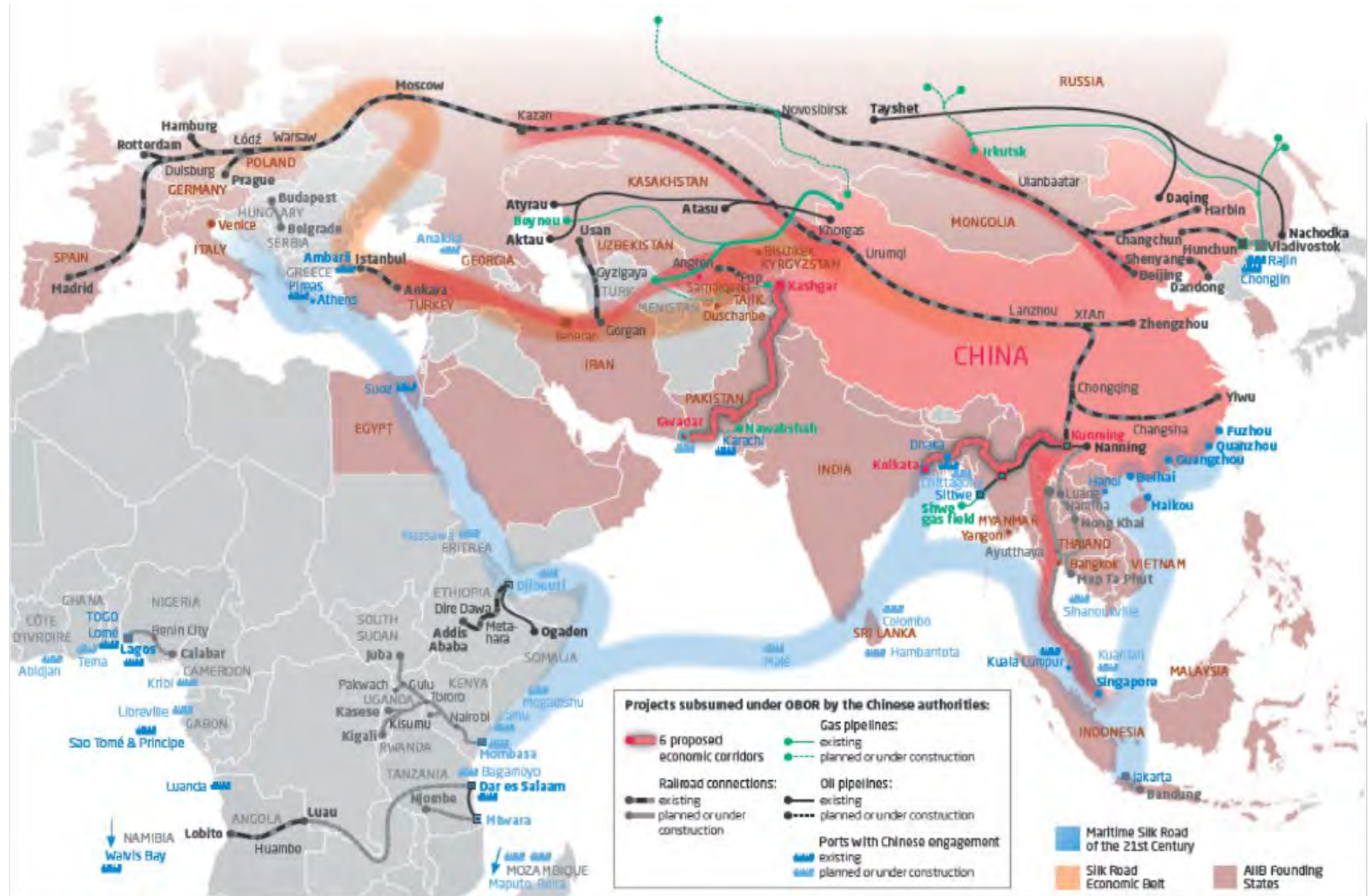
China's Growing Global Influence



Source: Reformatted from Lt. General Mike Minihan, "United States Indo Pacific Command," NDU WMD, July 7, 2020, <https://us-iti.bbcollab.com/collab/ui/session/playback/load/7cf6bb5c7aaa4aa9930d7bd7b8df0b00>; and FAS https://fas.org/wp-content/uploads/2020/09/PACOM2020_NDU-WMD-Brief2020_Minihan070720.pdf.

China's Belt and Road "Civil" Efforts

Source: Brian Wang, MERICS China Monitor, January 20, 2017, <https://www.nextbigfuture.com/2017/01/philippines-will-attend-chinas-one-belt.html>; and Office of the Secretary of Defense, *Annual Report to Congress Military and Security Developments Involving the People's Republic of China* 2017, May 15, 2018, p. 44, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF.



The Security Aspects of “One Belt, One Road”: 2021 – I

Key Takeaways

- Beijing uses OBOR to support its strategy of national rejuvenation by expanding global transportation and trade linkages, which are intended to support its development and deepen economic integration with nations along its periphery and beyond.
- The PRC’s overseas development and security interests under OBOR will drive the PRC towards expanding its overseas military footprint to protect those interests.

First announced in 2013, the PRC’s OBOR initiative is a signature foreign and economic policy advanced by Xi Jinping. Beijing uses OBOR to support its strategy of national rejuvenation by seeking to expand global transportation and trade linkages to support its development and deepen its economic integration with nations along its periphery and beyond. The PRC implements OBOR by financing, constructing, and developing transportation infrastructure, natural gas pipelines, hydropower projects, digital connectivity, and technology and industrial parks worldwide. PRC leaders have touted the economic benefits of OBOR and invited foreign partners to join, promising wealth and prosperity to those nations that participate. Since its creation, as many as 140 countries have signed OBOR cooperation documents, up from 125 countries from last year. OBOR-related spending is difficult to estimate because there is no comprehensive list of projects. However, public reporting indicates a steady decline in OBOR lending since its estimated peak in 2016-2017.

In support of its national strategy, the PRC pursues a range of goals through OBOR to include strengthening its territorial integrity, increasing its energy security, and expanding its international influence. Given that the Party views the PRC’s security and development interests as complementary, the PRC leverages OBOR to invest in projects along China’s western and southern periphery to improve stability and diminish threats along its borders. Similarly, OBOR projects associated with pipelines and port construction in Pakistan seek to decrease the PRC’s reliance on transporting energy resources through strategic choke points, such as the Strait of Malacca.

The PRC has continued to advance OBOR during the COVID-19 pandemic, while putting new emphasis on health as an area of engagement. The PRC conducted a virtual ministerial-level meeting in June with 25 other countries to discuss OBOR cooperation in a post-COVID-19 environment. The PRC has framed much of its pandemic support as part of its Health Silk Road, and offered financing to countries for medical equipment and technology.

The PRC attempts to use the economic influence it accrues through OBOR to encourage participating countries to support Beijing’s priorities and objectives on a range of other matters. The PRC applies military, intelligence, diplomatic, and economic tools to counter perceived threats to OBOR’s long-term viability, although the party-state lacks the expertise necessary to assess comprehensive risks in most OBOR participating countries. China’s leaders have tried to counteract negative perceptions of OBOR to attract potential investors as well as reduce suspicions of Beijing’s intentions. In the wake of domestic and international criticism of OBOR, the PRC has attempted to appear more responsive to partner-country input, and open to wider participation. In April 2019, China hosted leaders from 37 countries and delegates from over 150 countries to the second Belt and Road Forum in Beijing. During the forum, PRC leaders attempted to respond to criticism and concerns over corruption, debt sustainability, environmental effects, and the CCP’s underlying goals associated with OBOR.

As the PRC’s overseas development and security interests expand under OBOR, the CCP has signaled that its overseas military footprint will expand accordingly to protect those interests, which the CCP recognizes may provoke pushback from other states. Some of OBOR’s planned economic corridors would transit regions prone to violence, separatism, armed conflict, and instability, putting OBOR-related projects and PRC citizens working overseas at risk. OBOR activities have also generated local and popular concern about corruption, labor, and environmental issues, contributing to the security challenges. The PRC’s defense and security outreach has sought to extend its ability to project military power to safeguard its overseas interests, including OBOR, by developing closer regional and bilateral counterterrorism cooperation, supporting host-nation security forces, and other means.

The Security Aspects of “One Belt, One Road”: 2020 – II

The CCP seeks to create international conditions that are conducive to the PRC’s continued development and that are compatible with its aspirations for China’s rejuvenation as a “great modern socialist country.” CCP leaders believe that the PRC’s global activities, including the PLA’s growing global presence, contribute to creating a “favorable” international environment for China’s national rejuvenation. This evolving approach parallels the Party’s view that the initial decades of the 21st century represent a “period of strategic opportunity” to focus on building China’s composite national power.

The CCP has tasked the PLA to develop the capability to project power outside China’s borders and immediate periphery to secure the PRC’s growing overseas interests and advance its foreign policy goals. China is focusing efforts to develop security relationships with key countries along its periphery and beyond the Second Island Chain. In addition to promoting the One Belt, One Road (OBOR) initiative, China almost certainly will seek new cooperative security partnerships with foreign nations, including the expansion of the PLA’s global military attaché presence and access, and ensuring more reliable, cost-effective, and diverse sources of energy and other strategic resources.

The PRC probably will continue to expand the PLA’s global military presence through humanitarian assistance, naval escorts and port calls, UN peacekeeping operations (PKO), arm sales, influence operations, and bilateral and multilateral military exercises. Through these engagements, Beijing can strengthen and expand its diplomatic relationships to advance its foreign policy goals, to include shaping the international system to align with the PRC’s interests, and allow the PLA to gain operational experience.

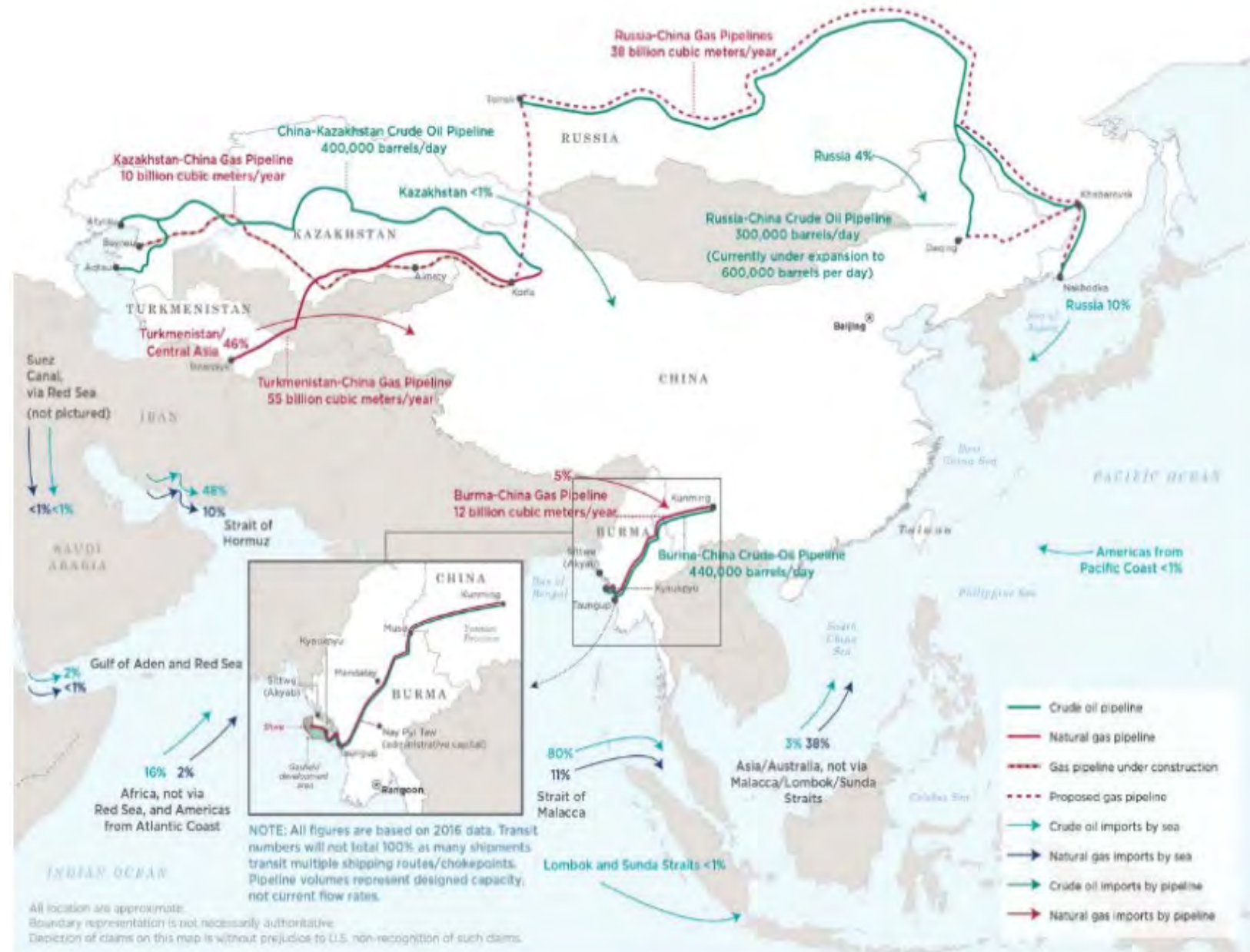
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China's Energy and Maritime Security

Source: Brian Wang, MERICS China Monitor, January 20, 2017, <https://www.nextbigfuture.com/2017/01/philippines-will-attend-chinas-one-belt.html>; and Office of the Secretary of Defense, *Annual Report to Congress Military and Security Developments Involving the People's Republic of China 2017*, p. 44, May 15, 2018, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF.



Overseas Basing and Access: 2021 – I

The PRC is seeking to establish a more robust overseas logistics and basing infrastructure to allow the PLA to project and sustain military power at greater distances.

- Beyond its base in Djibouti, the PRC is pursuing additional military facilities to support naval, air, ground, cyber, and space power projection. The PRC has likely considered a number of countries, including Cambodia, Myanmar, Thailand, Singapore, Indonesia, Pakistan, Sri Lanka, United Arab Emirates, Kenya, Seychelles, Tanzania, Angola, and Tajikistan, as locations for PLA facilities.
- A global PLA military logistics network and PLA military facilities could both interfere with U.S. military operations and support offensive operations against the United States as the PRC's global military objectives evolve.

The PRC is seeking to establish a more robust overseas logistics and basing infrastructure to allow the PLA to project and sustain military power at greater distances. Beijing may assess that a mixture of military logistics models, including preferred access to commercial infrastructure abroad, exclusive PLA logistics facilities with prepositioned supplies co-located with commercial infrastructure, and bases with stationed forces, most closely aligns with the PRC's overseas military logistics needs. Currently, the PRC uses commercial infrastructure to support all of its military operations abroad, including the PLA's presence in other countries' territories, such as at its base in Djibouti. Some of the PRC's OBOR projects could create potential military advantages, such as PLA access to selected foreign ports to pre-position the necessary logistics support to sustain naval deployments in waters as distant as the Indian Ocean, Mediterranean Sea, and Atlantic Ocean to protect its growing interests. As a means of creating numerous options, the PRC is attempting to develop access in multiple African countries on the continent's Atlantic, Indian Ocean, Red Sea, and Mediterranean coasts.

PRC official sources assert that military logistics facilities, to include its Djibouti base, will be used to provide international public goods like support to U.N. operations and HA/DR, and to secure the PRC's lines of communication, citizens, and assets abroad. Regardless, a global PLA military logistics network could both interfere with U.S. military operations and support offensive operations against the United States as the PRC's global military objectives evolve. Host nations can perform an essential role in regulating the PRC's military operations, as PRC officials very likely recognize that a stable long-term relationship with the host nation is critical to the success of their military logistics facilities.

– PRC military academics assert that bases abroad can enable forward deployment of PLA forces and support military conflict, diplomatic signaling, political change, bilateral and multilateral cooperation, and training. They also suggest that a military logistics network could enable intelligence monitoring of the U.S. military.

– In August 2017, the PRC officially opened its first PLA base in Djibouti. PLA Navy Marines stationed at the base are equipped with wheeled armored vehicles and artillery, but are currently dependent on nearby commercial ports due to the lack of an operational pier on base. The PRC continues to construct its own pier, which likely will be able to accommodate the PLA Navy's aircraft carriers, other large combatants, and submarines. PLA personnel at the facility have interfered with U.S. flights by lasing pilots and flying drones, and the PRC has sought to restrict Djiboutian sovereign airspace over the base.

Overseas Basing and Access: 2021 – II

Beyond its base in Djibouti, the PRC is very likely already considering and planning for additional military bases and logistics facilities to support naval, air, and ground forces projection. The PLA's approach likely includes consideration of many different sites and outreach to many countries, but only some will advance to negotiations for an infrastructure agreement, status of forces or visiting forces agreement, and/or basing agreement. Critical organizations involved in planning and negotiating for military logistics facilities are the Central Military Commission (CMC) Joint Staff Department, CMC Logistic Support Department, and service headquarters. The PRC's overseas military basing will be constrained by the willingness of potential host nations to support a PLA presence.

- The PRC has likely considered Cambodia, Myanmar, Thailand, Singapore, Indonesia, Pakistan, Sri Lanka, United Arab Emirates, Kenya, Seychelles, Tanzania, Angola, and Tajikistan as locations for PLA bases or military logistics facilities. The PRC has probably already made overtures to Namibia. Known focus areas of PLA planning are along the SLOCs from China to the Strait of Hormuz, Africa, and the Pacific Islands.
- In September and October, Cambodia demolished two U.S.-funded facilities on Ream Naval Base after declining a U.S. offer to pay to renovate one of them, which suggests that Cambodia may have instead accepted assistance from the PRC to develop the base. If the PRC is able to leverage such assistance into a presence at Ream Naval Base, it suggests that the PRC's overseas basing strategy has diversified to include military capacity-building efforts. Cambodia has publicly denied having signed an agreement to provide the PLA exclusive access to Ream Naval Base.

Shifts in China's Role in Asia

Shanghai Cooperation Organization – Background

The **Shanghai Cooperation Organization (SCO)**, or **Shanghai Pact**, is a Eurasian political, economic, and security alliance, the creation of which was announced on 15 June 2001 in Shanghai, China by the leaders of China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, and Uzbekistan; the Shanghai Cooperation Organization Charter, formally establishing the organization, was signed in June 2002 and entered into force on 19 September 2003. The original five members, with the exclusion of Uzbekistan, were previously members of the Shanghai Five group, founded on 26 April 1996. Since then, the organization has expanded its membership to eight states when India and Pakistan joined SCO as full members on 9 June 2017 at a summit in Astana, Kazakhstan.

The Heads of State Council (HSC) is the supreme decision-making body in the SCO, it meets once a year and adopts decisions and guidelines on all important matters of the organization. Military exercises are also regularly conducted among members to promote cooperation and coordination against terrorism and other external threats, and to maintain regional peace and stability. The SCO is the largest regional organization in the world in terms of geographical coverage and population, covering three-fifths of the Eurasian continent and nearly half of the human population.

Source: Wikipedia, accessed June 18, 2021,
https://en.wikipedia.org/wiki/Shanghai_Cooperation_Organization.



Shanghai Cooperation Organization – SCO View

Shanghai Cooperation Organization

The historical meeting of the Heads of State Council of the Shanghai Cooperation Organization was held on 8-9 June 2017 in Astana. On the meeting the status of a full member of the Organization was granted to the Republic of India and the Islamic Republic of Pakistan.

The SCO's main goals are as follows: strengthening mutual trust and neighborliness among the member states; promoting their effective cooperation in politics, trade, the economy, research, technology and culture, as well as in education, energy, transport, tourism, environmental protection, and other areas; making joint efforts to maintain and ensure peace, security and stability in the region; and moving towards the establishment of a democratic, fair and rational new international political and economic order.

Proceeding from the Shanghai Spirit, the SCO pursues its internal policy based on the principles of mutual trust, mutual benefit, equality, mutual consultations, respect for cultural diversity, and a desire for common development, while its external policy is conducted in accordance with the principles of non-alignment, non-targeting any third country, and openness.

The Heads of State Council (HSC) is the supreme decision-making body in the SCO. It meets once a year and adopts decisions and guidelines on all important matters of the organization. The SCO Heads of Government Council (HGC) meets once a year to discuss the organization's multilateral cooperation strategy and priority areas, to resolve current important economic and other cooperation issues, and also to approve the organization's annual budget. The SCO's official languages are Russian and Chinese.

In addition to HSC and HGC meetings, there is also a mechanism of meetings at the level of heads of parliament; secretaries of Security Councils; ministers of foreign affairs, defence, emergency relief, economy, transport, culture, education, and healthcare; heads of law enforcement agencies and supreme and arbitration courts; and prosecutors general. The Council of National Coordinators of SCO Member States (CNC) acts as the SCO coordination mechanism.

The organization has two permanent bodies — the SCO Secretariat based in Beijing and the Executive Committee of the Regional Anti-Terrorist Structure (RATS) based in Tashkent. The SCO Secretary-General and the Director of the Executive Committee of the SCO RATS are appointed by the Council of Heads of State for a term of three years. Vladimir Norov (Uzbekistan) and Jumakhon Giyosov (Tajikistan) have held these positions, respectively, since 1 January 2019.

Thus, currently:

- the SCO comprises eight member states, namely the Republic of India, the Republic of Kazakhstan, the People's Republic of China, the Kyrgyz Republic, the Islamic Republic of Pakistan, the Russian Federation, the Republic of Tajikistan, and the Republic of Uzbekistan;
- the SCO counts four observer states, namely the Islamic Republic of Afghanistan, the Republic of Belarus, the Islamic Republic of Iran and Mongolia;
- the SCO has six dialogue partners, namely the Republic of Azerbaijan, the Republic of Armenia, the Kingdom of Cambodia, the Federal Democratic Republic of Nepal, the Republic of Turkey, and the Democratic Socialist Republic of Sri Lanka.



Shanghai Cooperation Organization: US View – I

Beijing has sought, in the words of General Secretary of the CCP Xi Jinping, to “build a robust regional security barrier” through the SCO, extending China’s defensive perimeter farther to its west.³² It has pursued this objective by increasing intelligence sharing and enhancing the capabilities of the member countries’ law enforcement agencies to quell internal unrest and prevent terrorist and separatist activities. For example, since 2014, China’s Ministry of Public Security has trained SCO officials[‡] at its China National Institute for SCO International Exchange and Judicial Cooperation in areas such as counterterrorism and combatting transnational crime.³³ Military exercises between China and other SCO members, ...also support capacity building for stability maintenance and counterterrorism.

Beijing has used the SCO to build its capacity to project military force into Central Asia. Through diplomatic agreements with member countries, the Chinese government has been able to use the SCO to build a foundation for growing its power projection capabilities, with implications not only for a future crisis in Central Asia but also for conflicts in other regions. Central Asia’s proximity to China and the generally favorable views of Central Asian governments toward Beijing have made the region an ideal testing ground for China to practice carrying out counterterrorism as well as other more conventional military operations beyond its borders.³⁴ Under the auspices of the SCO and related agreements, Beijing has established arrangements for visiting forces participating in exercises; conducted small-scale, real-world operations; carried out a variety of bilateral and multilateral exercises...

The SCO’s agreement on military exercises provides the essential legal authority for Beijing to deploy troops to Central Asia for military exercises. In 2007, the SCO signed the Agreement of the Shanghai Cooperation Organization Member States on Joint Military Exercises, which articulates the legal rights and responsibilities of a SCO member’s military forces that are visiting another member country for an exercise...

Beijing has also gained key experience through SCO exercises in negotiating the rights for overflight and the use of foreign airfields, the transit of a third country by land, and host country logistics support. All of these skills are essential building blocks for power projection. ...Agreements made in peacetime for training exercises do not guarantee that similar arrangements can be achieved during a crisis. Nonetheless, they provide Beijing with important experience in coordinating with third countries that is necessary for expeditionary operations. These developments also suggest some foreign capitals are growing more comfortable with Chinese forces being present in or passing through their territory— itself a new phenomenon.



Shanghai Cooperation Organization: US View – II

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Under the auspices of the SCO and related agreements, Beijing has established arrangements for visiting forces participating in exercises; conducted small-scale, real-world operations; carried out a variety of bilateral and multilateral exercises; and dispatched its paramilitary police force, the People's Armed Police,... beyond China's borders to conduct patrols alongside military personnel from Central Asian states. From their earliest incarnation, SCO exercises have included a mix of military and these paramilitary forces, which have since been moved under the Central Military Commission as an auxiliary military force of the People's Liberation Army (PLA), in reforms that began in 2016. The People's Armed Police's participation in these earliest exercises was likely managed by the PLA and has acted as a precursor to the more robust force deployment by the PLA seen in exercises in later years. These activities have expanded China's presence and influence in Central Asia and have given Beijing experience it could use to deploy military force to other regions.

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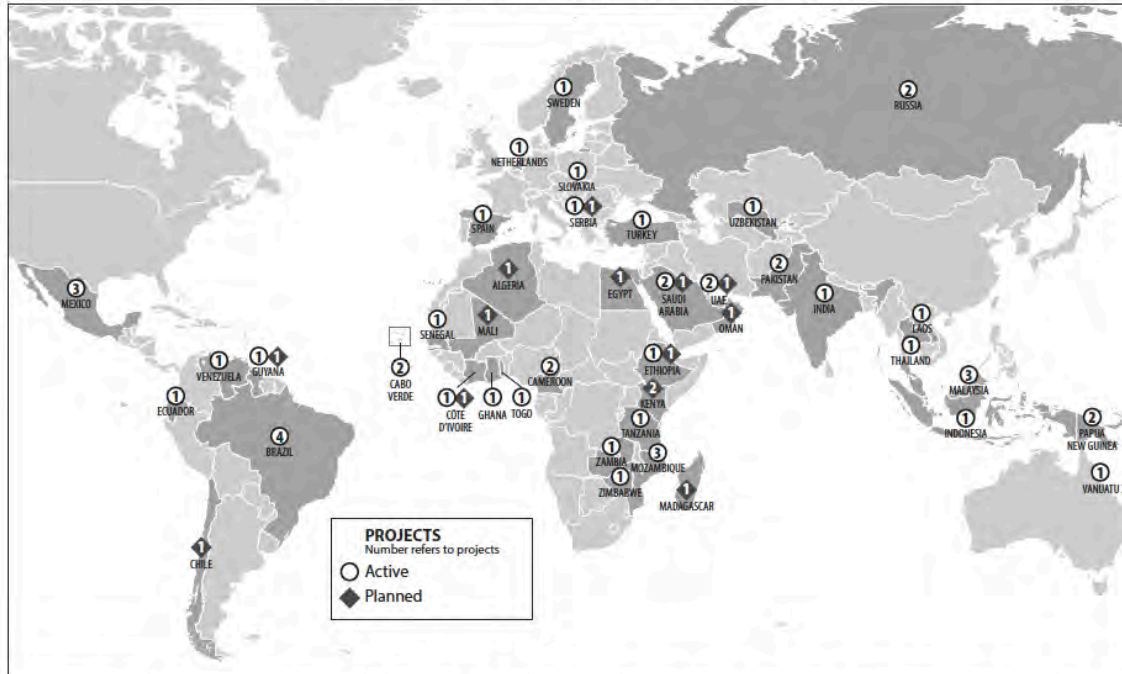
Isaac B. Kardon, assistant professor at the U.S. Naval War College, noted in testimony to the Commission in 2019 that this agreement provides China with a model for at least a temporary status of forces agreement. He added that some Chinese scholars have pointed to this agreement as a template China can use for future basing agreements farther abroad.³⁶ Beijing may have established its People's Armed Police outpost and operations in Tajikistan under a similar agreement. ...

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Huawei's Overseas Cloud Computing Projects

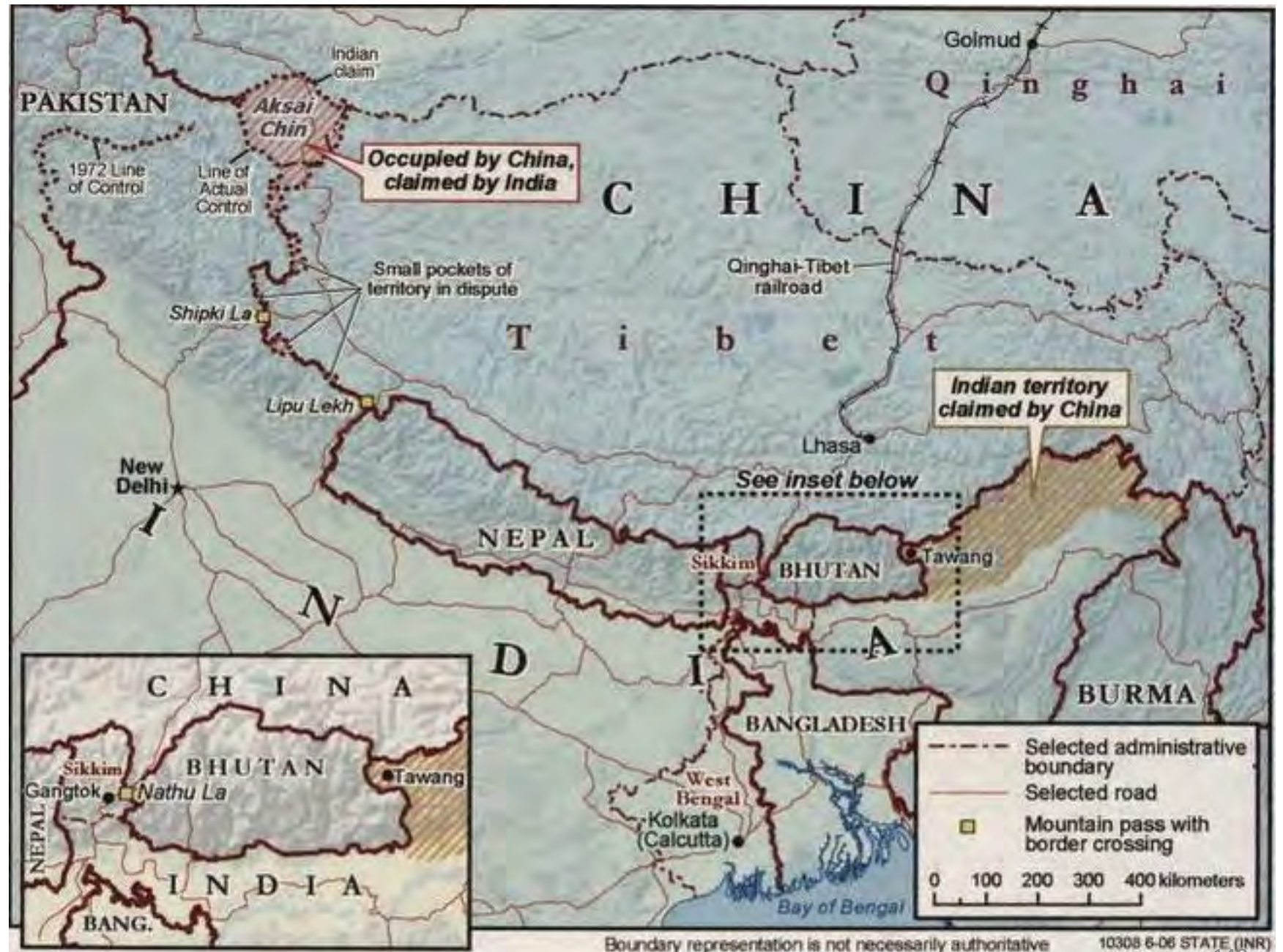
Figure 3: Huawei's Overseas Cloud Computing Projects



Source: Reconnecting Asia Project, "Reconnecting Asia Huawei Cloud & e-Government Data," Center for Strategic and International Studies, April 2021.
Note: "Planned" indicated projects that have been signed through a contract or memorandum of understanding.

Phase One Commitment	Commitment Target	Interim Result	Outstanding Concerns
Liberalize Financial Services	China agreed to remove investment restrictions, reduce regulation, and review pending license applications of U.S. companies in its domestic banking, credit rating, electronic payments, asset management, insurance, and securities industries.	In 2020, China committed to allow U.S. credit ratings agencies to acquire majority ownership in existing joint ventures and review U.S. companies' applications for credit rating services for onshore securities. In 2021, China approved U.S. firms owning a majority stake in wealth management joint ventures and having sole ownership over fund management companies. ²³⁸	Many of Beijing's financial services commitments are restatements or minor improvements on pledges in progress. U.S. financial services firms report licensing requirements can be excessively onerous, hindering entry into and expansion within the Chinese market. ²³⁹
Increase Agricultural Market Access	China agreed to permit the import of beef, pork, and processed meat that passes inspection by the U.S. Food and Drug Administration Food Safety and Inspection Service. Beijing also committed to reduce the review and approval period for genetically modified products to "no more than 24 months," down from the prior approval period of five to seven years.	According to former trade negotiator Darci Vetter, provisions on U.S. meat, poultry, and specialty dairy products appeared promising in terms of increasing market access. The deal text also pledged to reduce burdensome registration, licensing, and bureaucratic processes for U.S. agricultural exporters. ²⁴⁰	Trade association BIO expressed continuing concerns regarding U.S. biotech developers' lengthy wait for product approvals, as Chinese regulators will not begin the approvals process until U.S. regulators have completed their review. ²⁴¹

Chinese and Indian Border Claims



Source: State/INR, 6-2006.

China and Disputed Kashmir Region

Source: Charles L. Carter , “Reading the Tea Leaves : Understanding Chinese Deterrence Signaling,” JFQ 103, 4th Quarter 2021, p. 43.

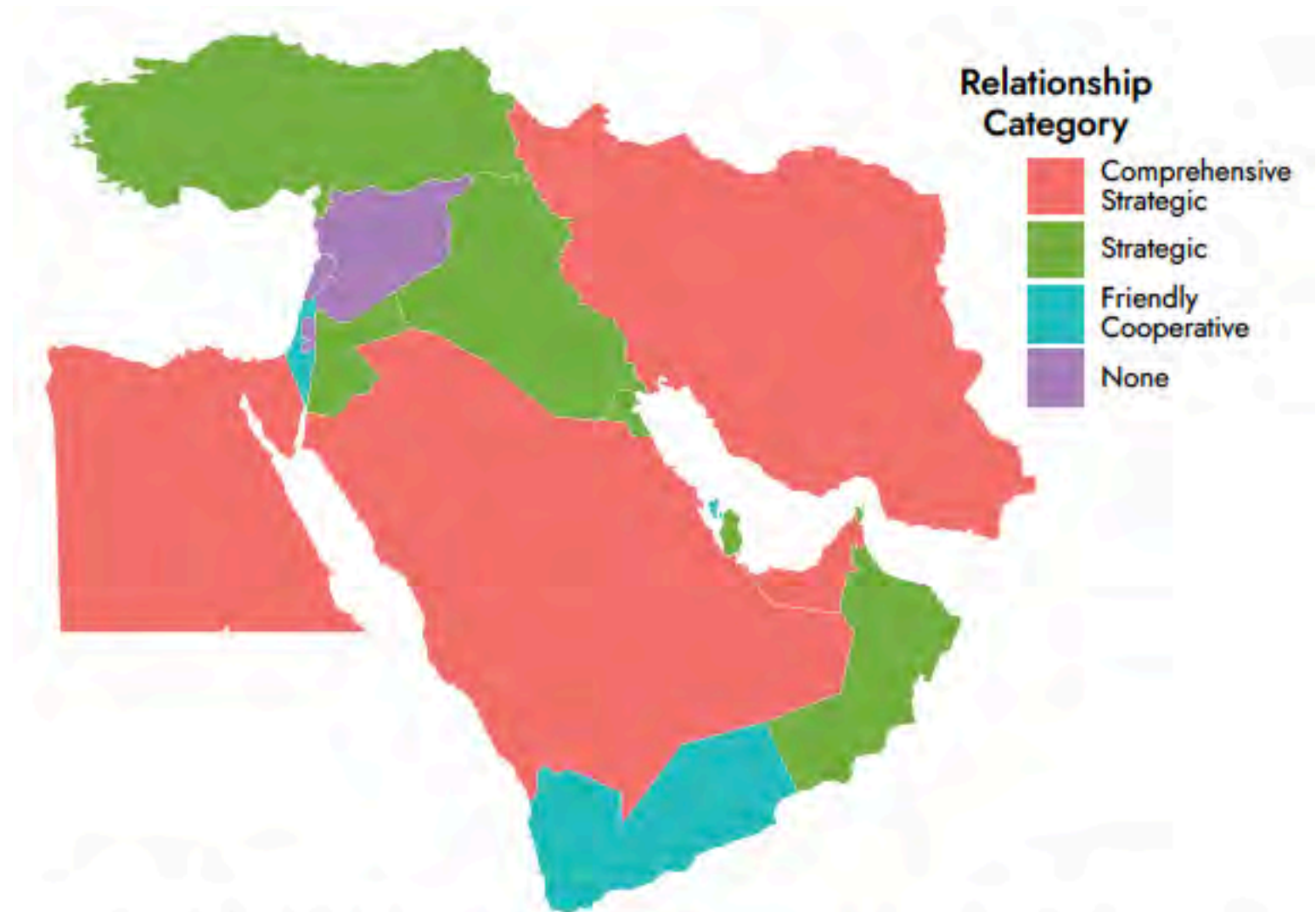


Source: Central Intelligence Agency, University of Texas at Austin Perry-Castañeda Library Map Collection, 2004, altered to show rough location of conflict in Galwan Valley.

Shifts in China's Role in the Middle East

Chinese Strategic Partnerships in the Middle East

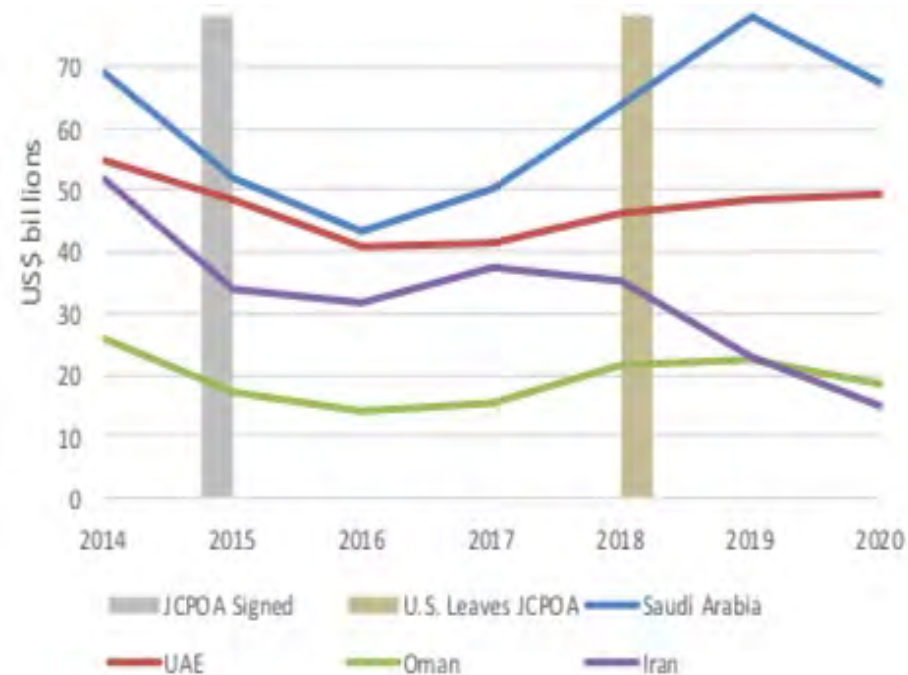
Source: Thomas Lynch, *Strategic Assessment 2020*, NDU, 2020, pp. 276.



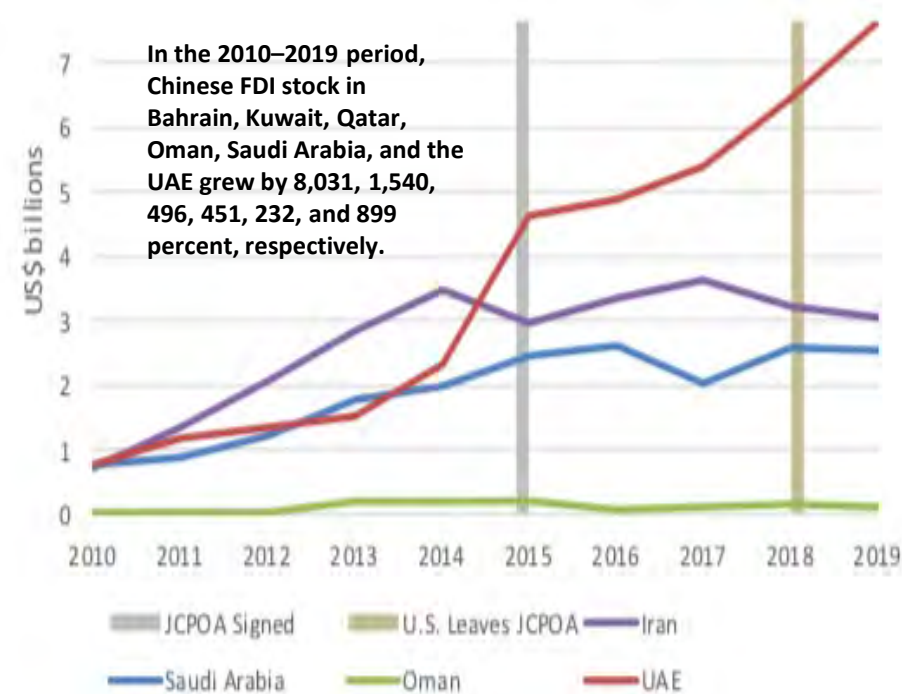
Sources: Kenneth Allen, Phillip C. Saunders, and John Chen, *Chinese Military Diplomacy, 2003–2016: Trends and Implications* (Washington, DC: NDU Press, 2017); Jonathan Fulton, *China's Changing Role in the Middle East* (Washington, DC: Atlantic Council, 2019), 4; "Foreign Minister Yang Jiechi, Lebanese Foreign Minister Mansour Exchange Congratulatory Messages on the 40th Anniversary of Diplomatic Ties Between the Two Countries," Chinese Embassy in Lebanon, November 9, 2011, available at <<http://www.china-embassy.org/eng/zgyw/t876100.htm>>.

China's Trade and FDI in the Middle East

China's Trade with Select Middle East Countries, 2014–2020



China's FDI Stock in Select Middle East Countries, 2010–2019



Source: China General Administration of Customs via CEIC Database and China Ministry of Commerce via CEIC Database as reproduced in Will Green and Taylore Roth, *China-Iran Relations: A Limited but Enduring Strategic Partnership*, U.S.-China Economic and security Review Commission, June 28, 2021, p. 10.

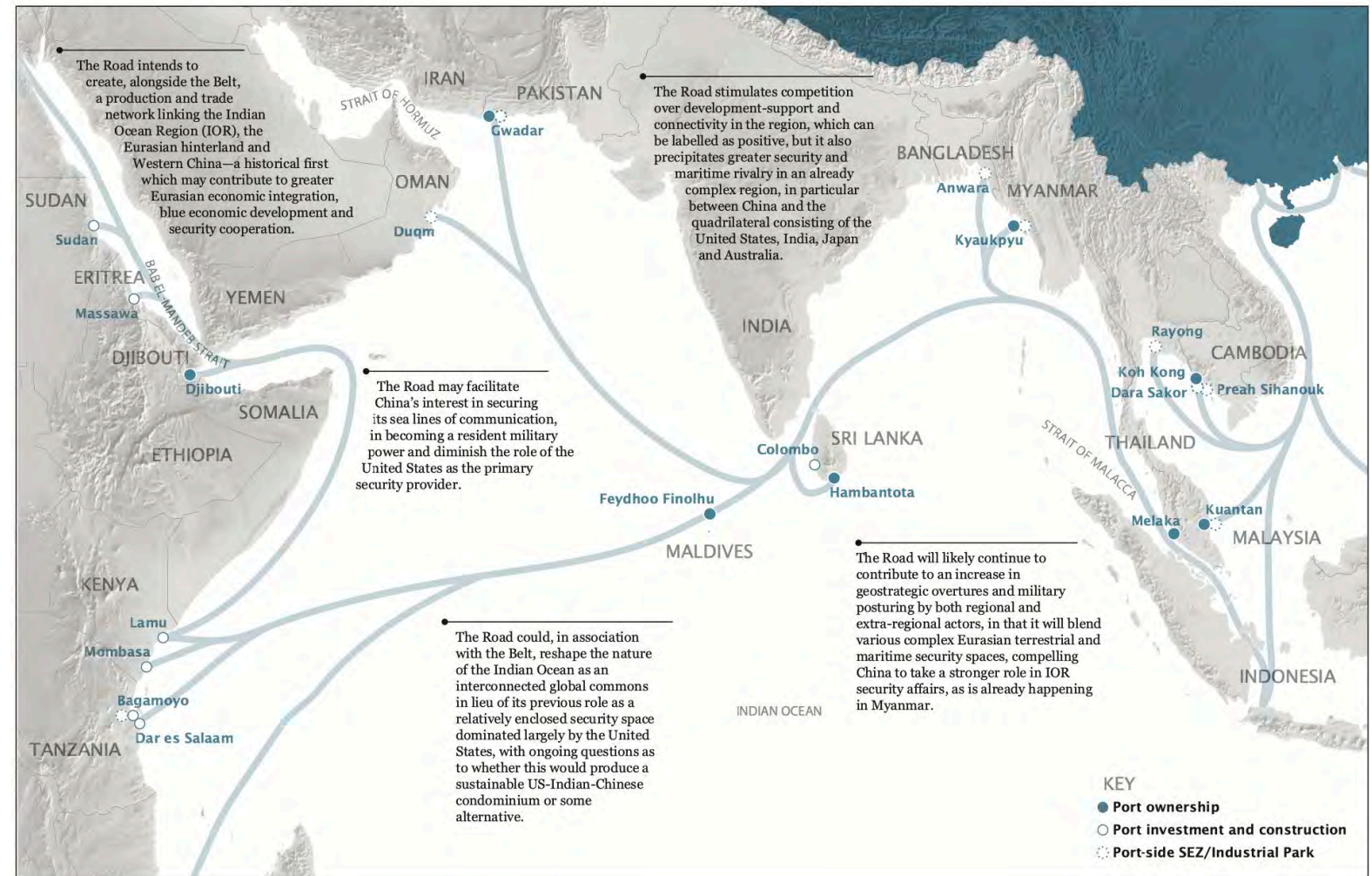
Shifts in China's Role in the Indian Ocean and Red Sea

The Naval “Belt and Road” in the Indian Ocean Area

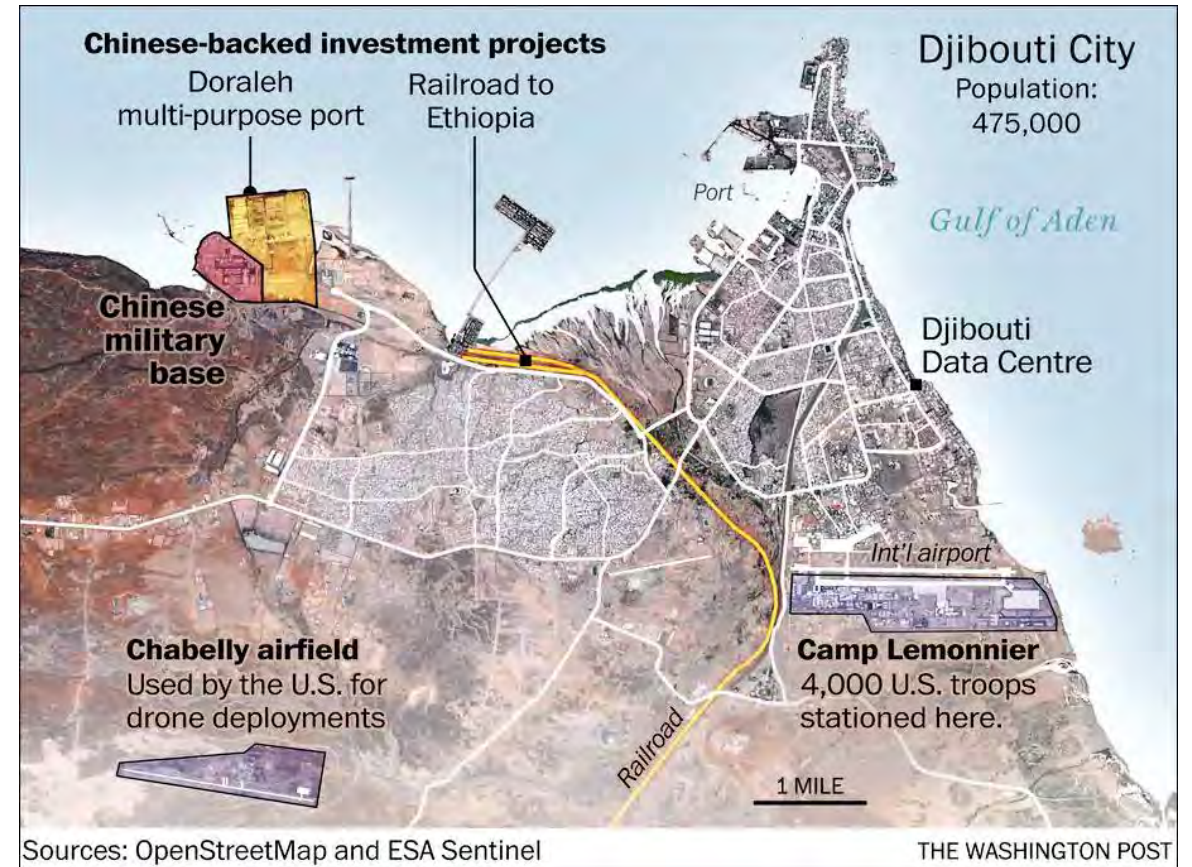
Table 1.1. Chinese sea port ownership in the South China Sea and Indian Ocean Region since October 2013

Year	Region	Host state	Port	Lease period
2015	Indian Ocean	Pakistan	Gwadar	40 years
2015	Indian Ocean	Myanmar	Kyaukpyu	50 years
2015	South China Sea	Malaysia	Kuantan	60 years
2016	Indian Ocean	Djibouti	Obock	10 years
2016	South China Sea	Malaysia	Melaka Gateway	99 years
2017	Indian Ocean	Sri Lanka	Hambantota	99 years
2017	South China Sea	Brunei	Muara	60 years
2017	Indian Ocean	Maldives	Feydhoo Finolhu	50 years

Note: Transparency issues mean that data on the year of agreement and lease period may be inaccurate.



Chinese Port Access and Bases in Indian Ocean/Red Sea



Source: Open street Map; ESA Sentinel; *Washington Post*; and Juan Cole, "The Dragon Arrives: 1st Chinese overseas Military Base in Djibouti," *Informed Comment*, August 2, 2017.

China's (and Asia's) Growing Strategic Dependence on Petroleum Imports

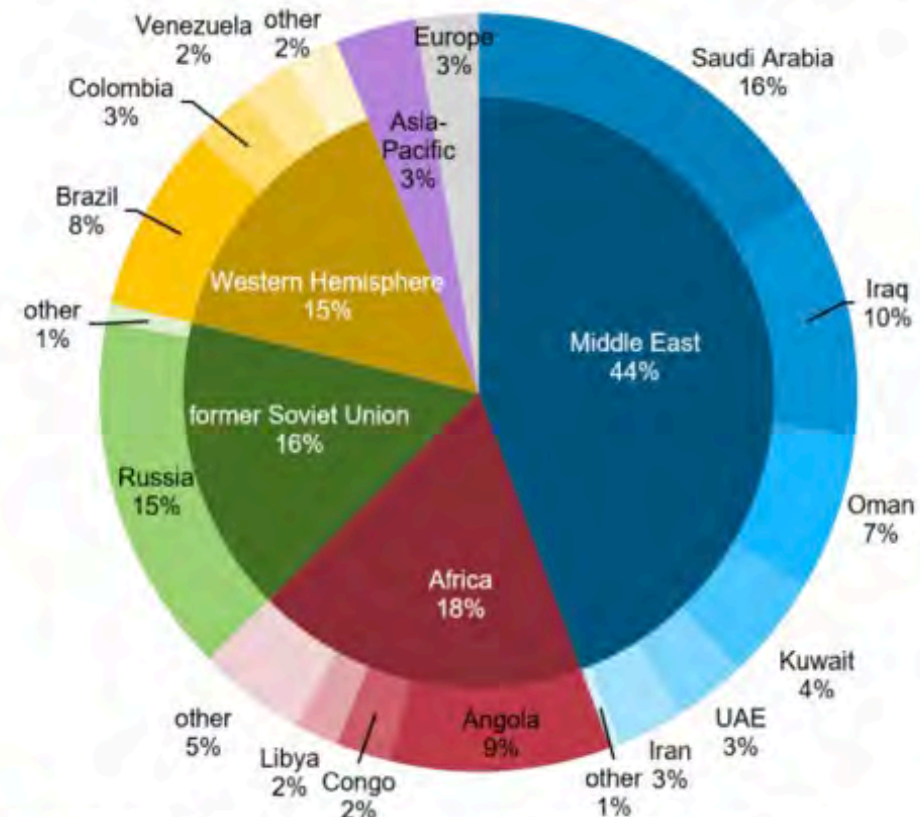
China's Strategic Dependence on Gulf and Other Crude Imports in 2019

China's Top Crude Suppliers 2019

Country	Volume (1,000 barrels/day)	Percentage of Imported Crude Oil
Saudi Arabia	1,669	16
Russia	1,555	15
Iraq	1,037	10
Angola	949	9
Brazil	804	8
Oman	678	7
Kuwait	454	4
UAE	306	3
Iran	296	3
Colombia	263	3
Others	2,120	21
Total	10,131	99

Numbers may not equal 100, as figures have been rounded.

China's crude oil imports by source, 2019



Source: FACTS Global Energy Services, *China Oil Monthly*, February 2020
 Note: Total may not equal 100% because of independent rounding.

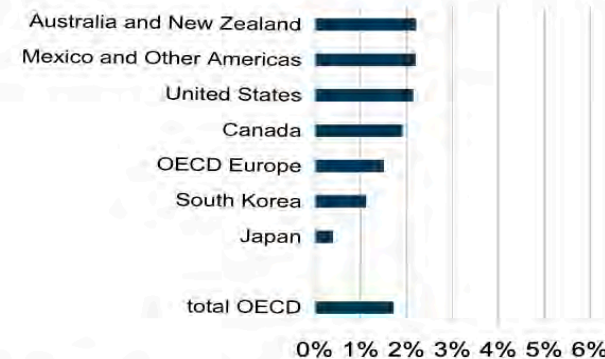
Chinese and Asian Economic Growth Mean Massive Increases in Energy Demand and in Flow of Imports from MENA

The regions with the fastest-growing economies in the IEO2021 Reference case are non-OECD countries in Asia. India's growth is greatest, but the WEPS regions⁷ of Other non-OECD Asia, Africa, China, and Other non-OECD Europe and Eurasia remain leaders in economic growth as well. Although China continues to grow at an average rate equal to Africa and Other non-OECD Europe and Eurasia, its growth notably slows throughout the projection period. Together, these top five growth regions were home to 70% of the world's population in 2020 and 44% of GDP. By 2050, these shares grow to 73% and 59%, respectively.

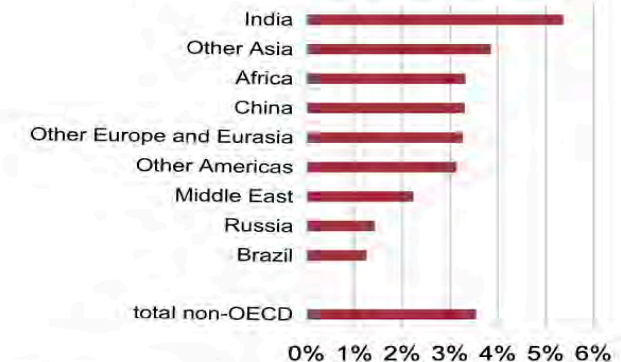
Economic growth varies widely among Asian regions in the IEO2021 Reference case. Most notably, the projected GDP growth rate in China slows considerably compared with its growth rate from 2000 to 2010, when GDP increased by an average of over 10% per year. We also project slower economic growth for Japan and South Korea, illustrating the interconnectedness of Asian economies, as the decline in Chinese demand and trade for intermediate and finished goods, in addition to other structural and demographic factors, affects economic growth in these neighboring countries.

Source: EIA, International Energy Outlook 2021, October 2021, <https://www.eia.gov/outlooks/ieo/consumption/sub-topic-01.php>.

Average annual percentage change in GDP, OECD 2020–2050

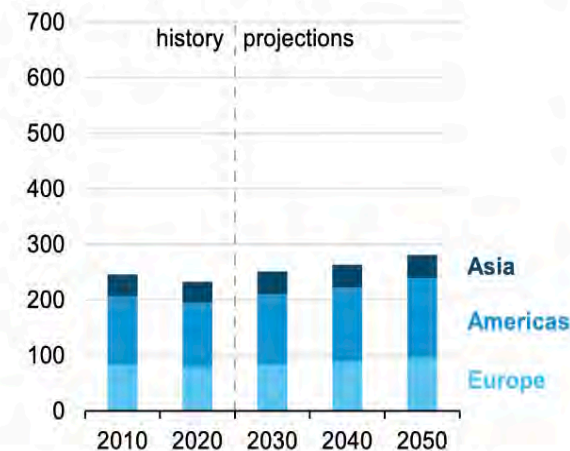


Average annual percentage change in GDP, non-OECD 2020–2050

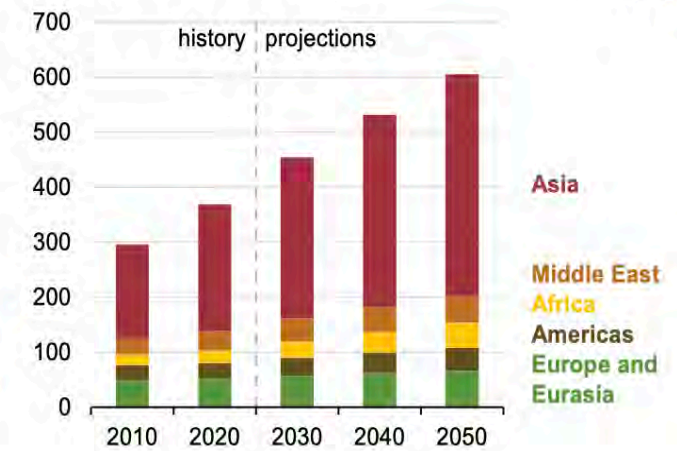


Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case

OECD energy consumption by region
quadrillion British thermal units



Non-OECD energy consumption by region
quadrillion British thermal units



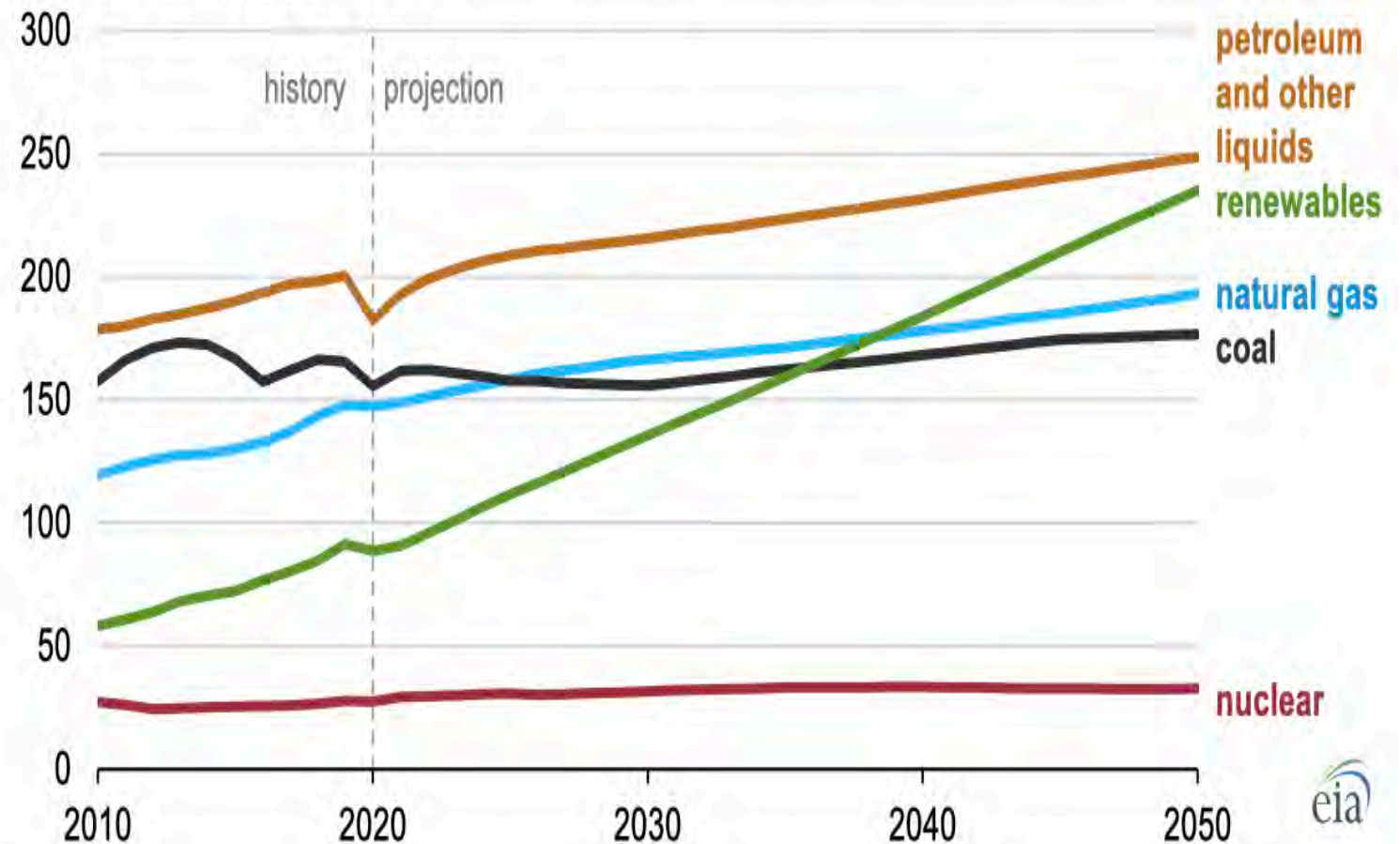
Rising Global and Asian Dependence on Liquid Fuels Through 2050

Oil and natural gas production will continue to grow, mainly to support increasing energy consumption in developing Asian economies.

Driven by increasing populations and fast-growing economies, consumption of liquid fuels will grow the most in non-OECD Asia, where total consumption nearly doubles by 2050 from 2020 levels in the Reference case.

Because these countries will consume more liquid fuels than they produce in the Reference case, we project that non-OECD Asia will supplement local production with increased imports of crude oil and finished petroleum products. The increased imports will primarily be supported by increased production in the Middle East. In the Reference case, by 2050, non-OECD Asia will become the largest importer of natural gas, and Russia will become the largest net exporter of natural gas.

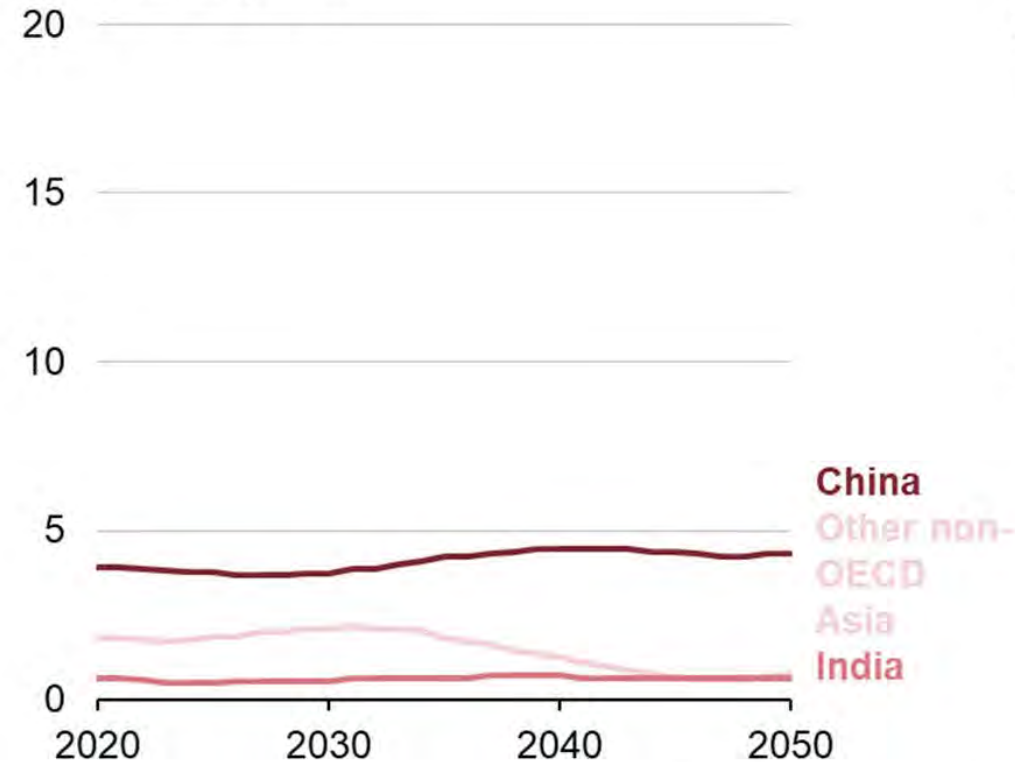
Global primary energy consumption by source, IEO2021 Reference case (2010–2050)
quadrillion British thermal units



China and Asia's Growing Strategic Dependence on MENA and Russian Crude Imports Through 2050

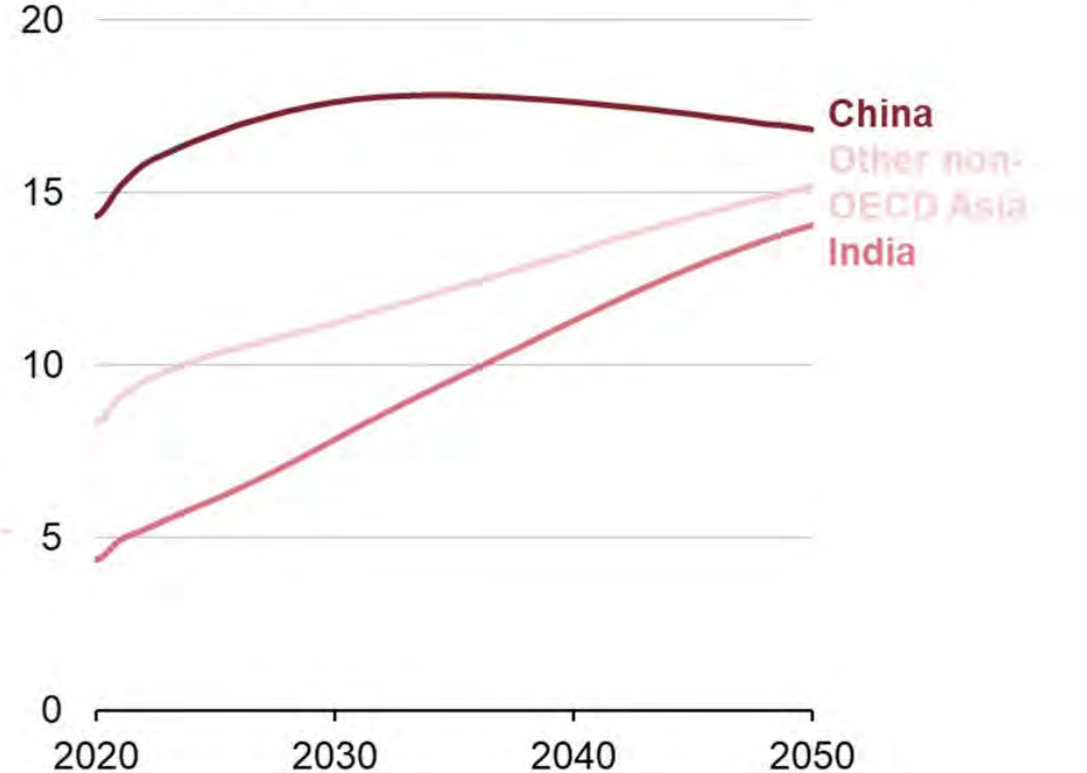
Crude oil production by select regions

million barrels per day



Total liquid fuels consumption by select regions

million barrels per day

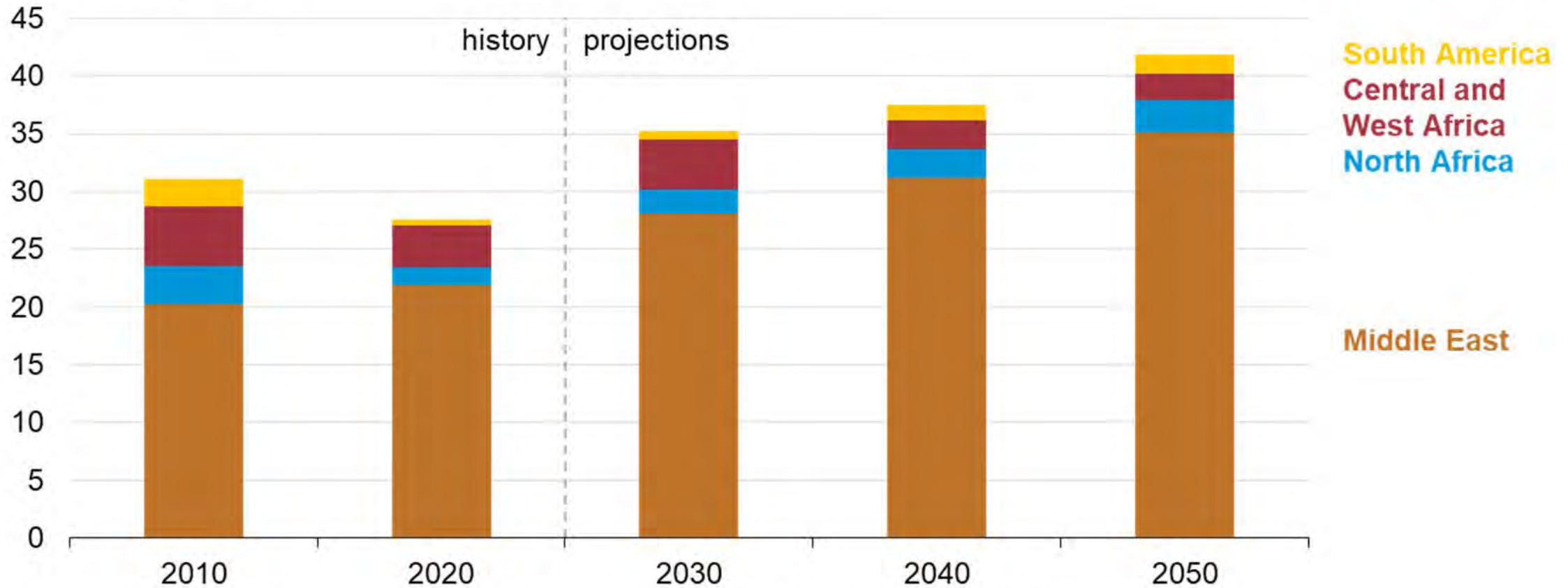


Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case

Rising Chinese and Asian Crude Imports Must Come from Gulf and MENA – I

OPEC crude oil and lease condensate production by select regions

million barrels per day

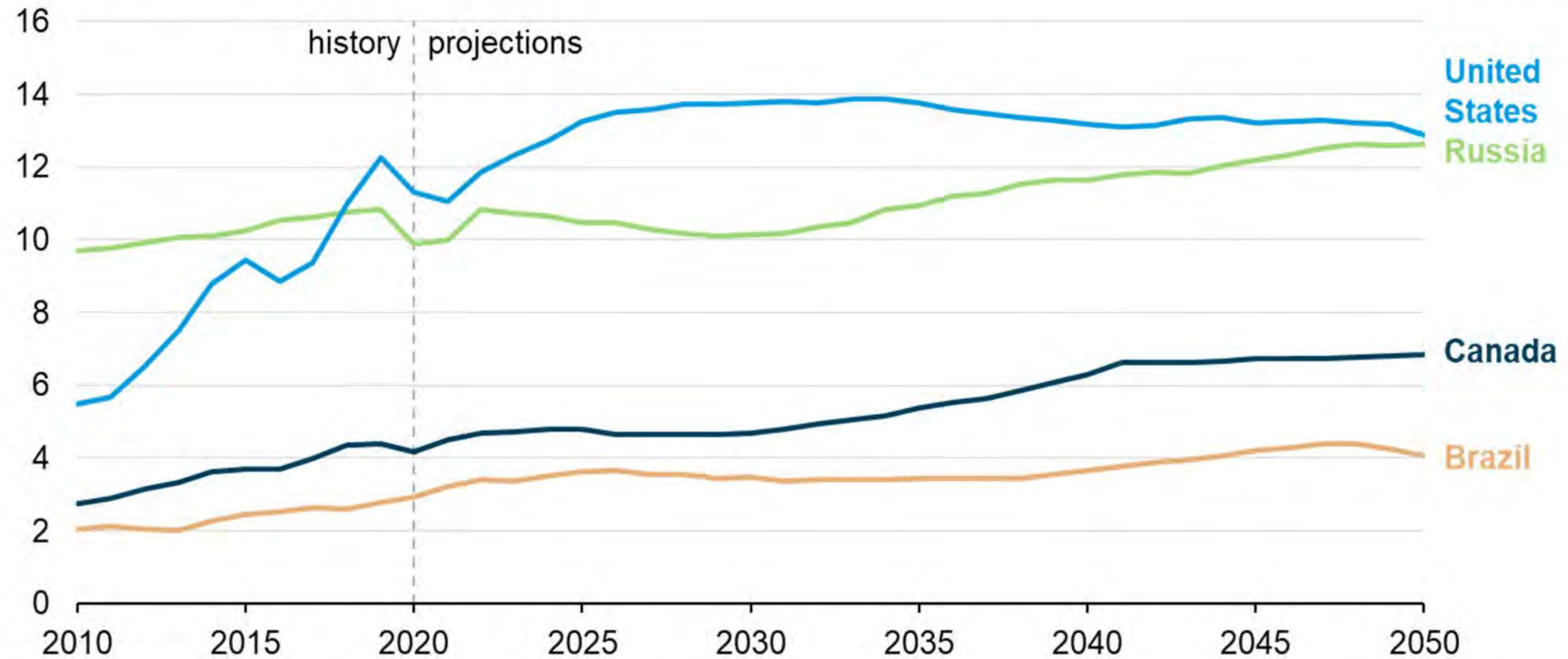


Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case

Rising Asian Crude Imports Must Come from Gulf and MENA – II

Non-OPEC crude oil and lease condensate production by select regions

millions of barrels per day

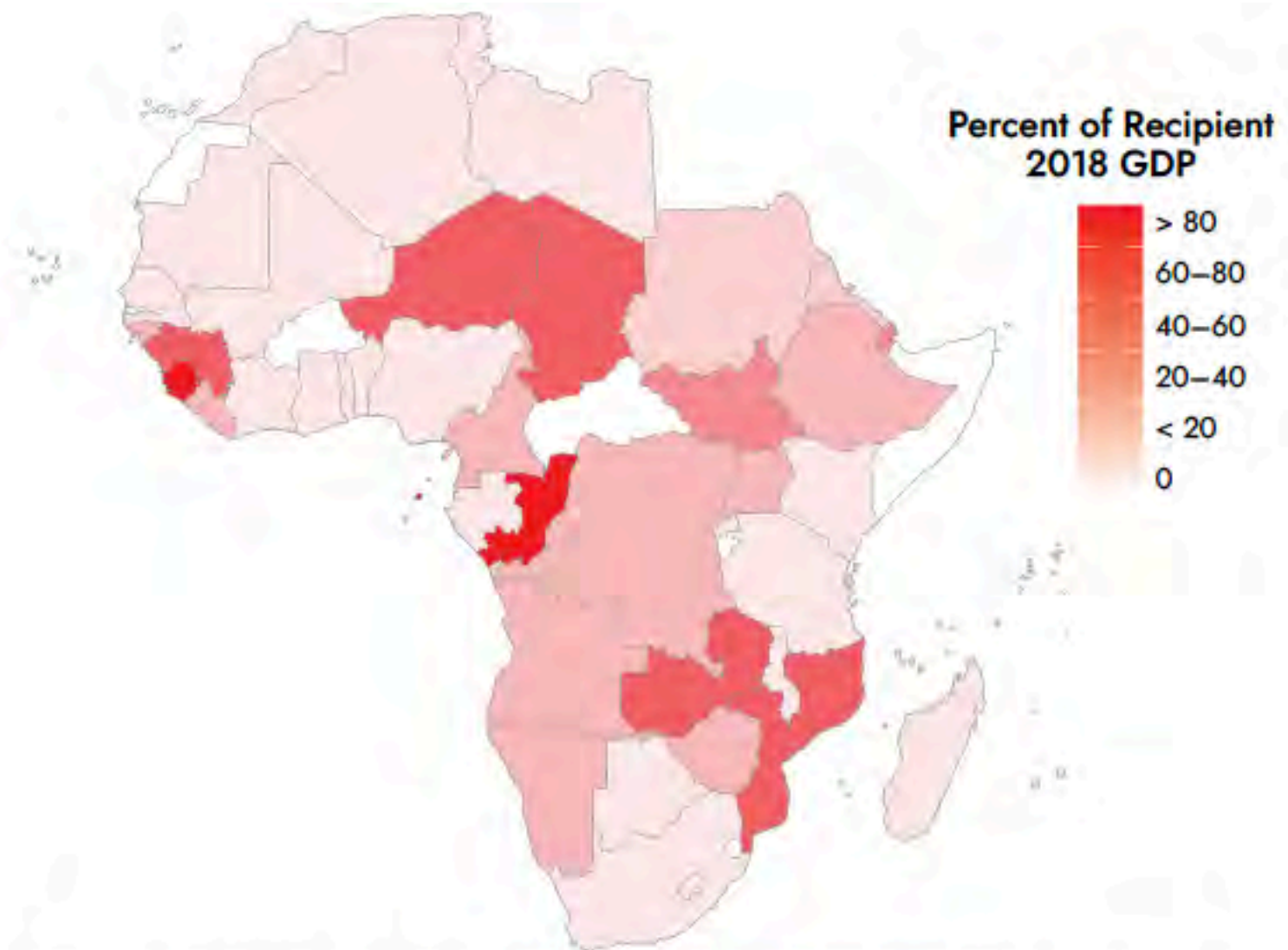


Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case



Shifts in China's Role in Africa

Chinese Investment and Construction in Africa 2005-2018 as Percent of Recipient GDP



Source: Thomas Lynch, *Strategic Assessment 2020*, NDU, 2020, pp. 278.

Sources: GDP data retrieved from World Bank Databank, available at <<https://databank.worldbank.org/home.aspx>>. Eritrea GDP is from 2011 and South Sudan GDP is from 2015, the last years data were available. Chinese investment data are from Derek Scissors, "China Global Investment Tracker," American Enterprise Institute, available at <<https://www.aei.org/china-global-investment-tracker/>>.

China's Trade and FDI Flows with Africa: 2003-2018

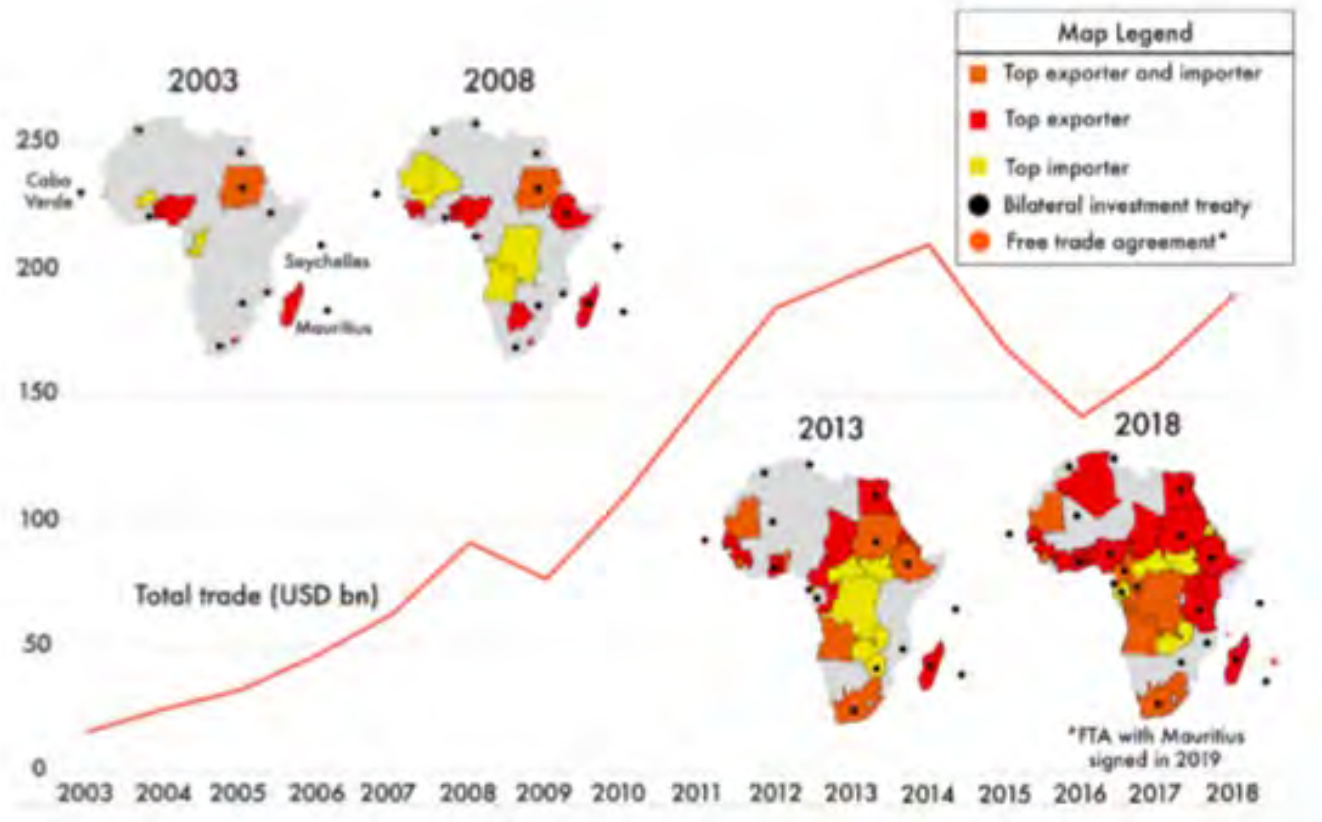


Figure: Cumulative China-Africa FDI Flows, 2009-2018^{16.4}

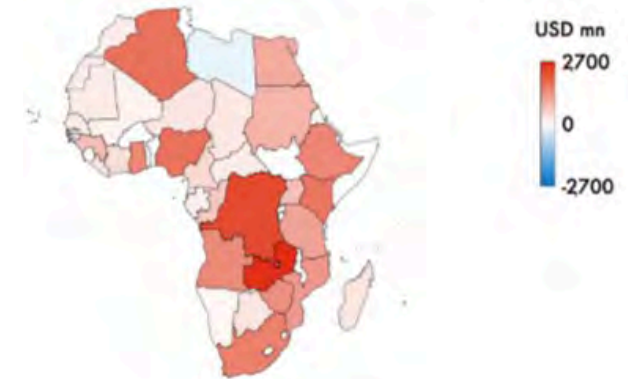
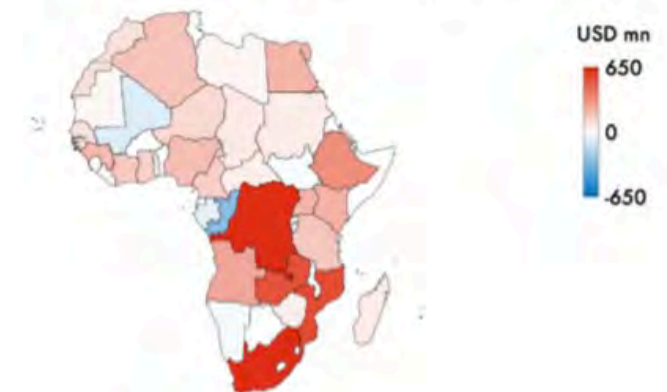
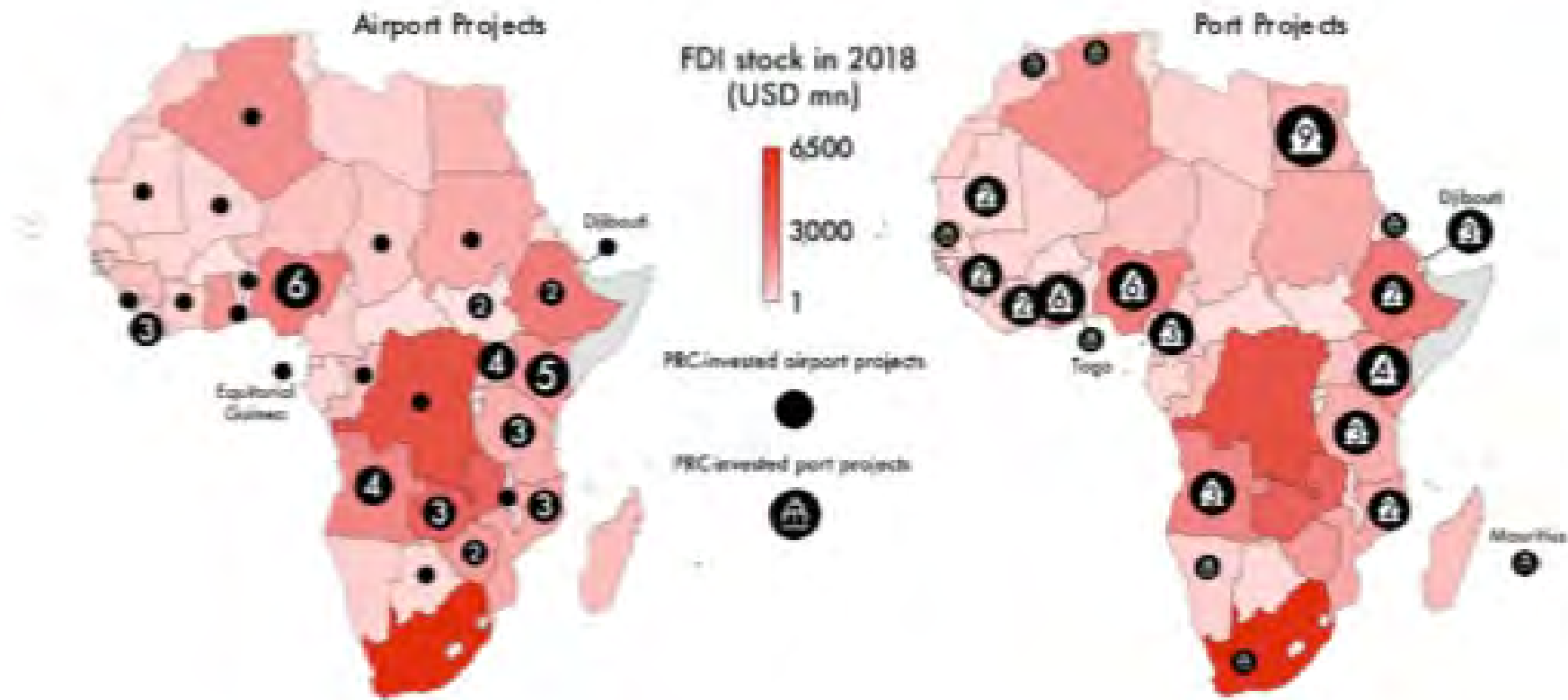


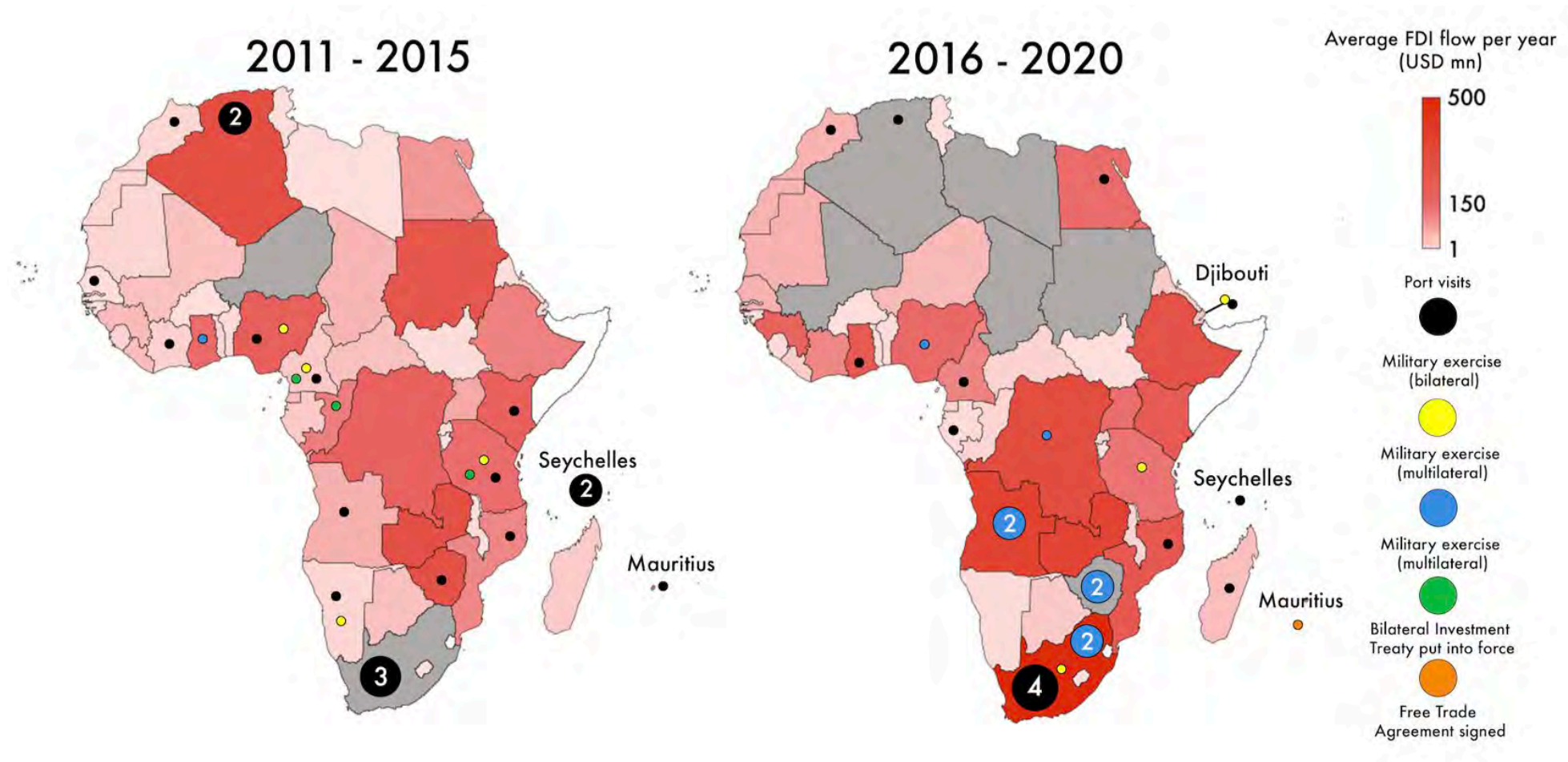
Figure: China-Africa FDI Flows, 2018^{16.5}



Chinese-invested Airport and Port Infrastructure Projects in Africa



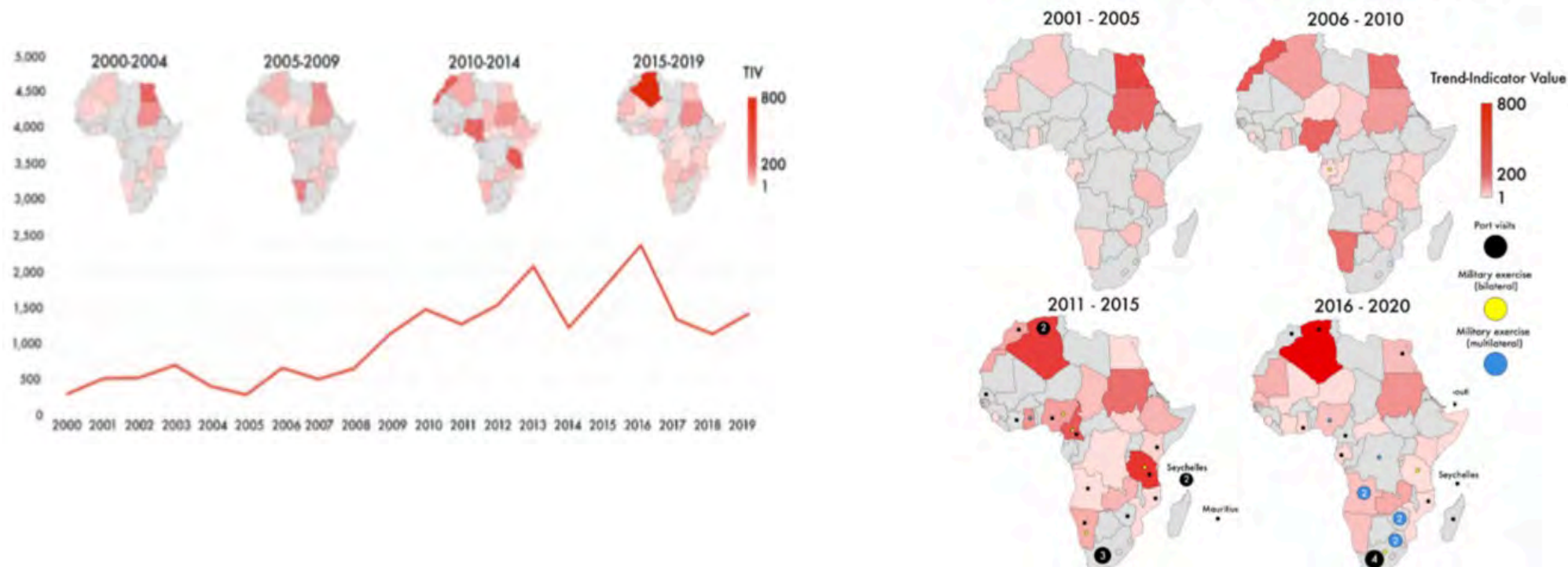
China's FDI and Military Exercises in Africa: 2001-2020



Source: Bruyere and Picarsic, *Two Markets, Two Resources*, U.S.-China Economic and Security Review Commission, November 2020, p. 54.

China's Arms Transfers to Africa (Trend Indicator Value)

Figure: Chinese Arms Transfers to Africa & Military Exercises (over time)⁽¹⁾

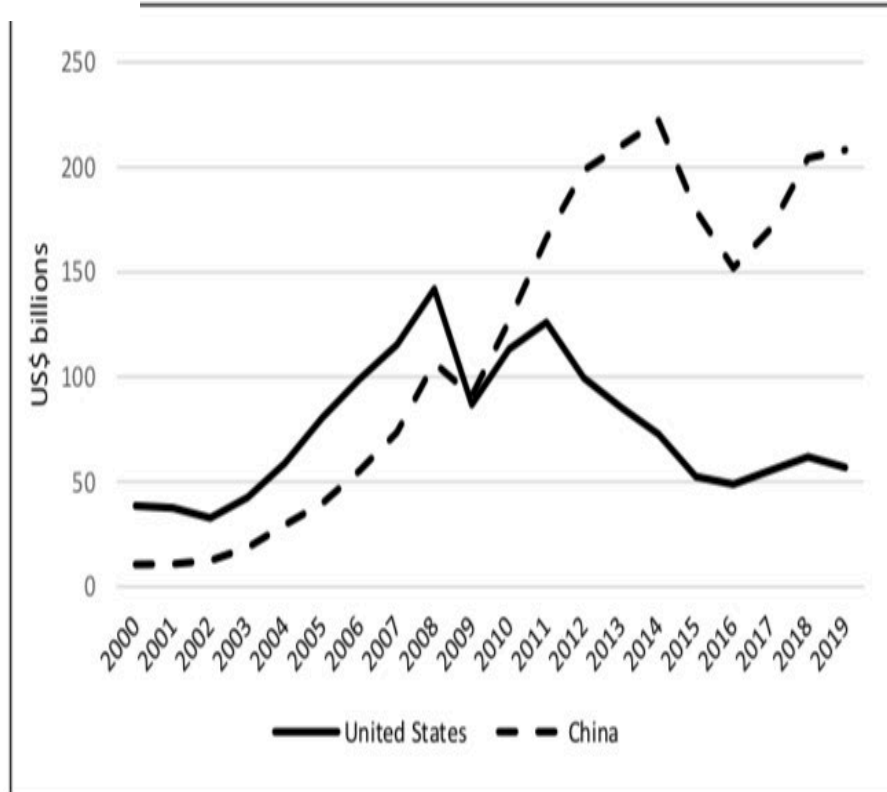


China's conventional military footprint in African countries remains, as is true globally, relatively limited. China has provided the African Union some \$100 million in military aid to support the establishment of an African Standby Force... China has also invested in military logistics and training facilities in Cameroon, Somalia, and Tanzania as well as in consistent security cooperation with Angola, the DRC, and Zimbabwe... Djibouti is home to a PLA Army Support Base, the Chinese military's first overseas base. Recent U.S. Department of Defense reporting suggests that the PLA may have designs on establishing similar, formal basing structures in Angola, Kenya, the Seychelles, and Tanzania.

Peacekeeping offers an exception to this limited footprint...China engages actively in peacekeeping efforts in Africa, part of a general expansion in its global peacekeeping presence over the past ten years... China's contributions to UN missions in Africa date back to a 1989 peacekeeping operation in Namibia... Today, China deploys peacekeepers to the Central African Republic, DRC, Mali, Sudan, South Sudan, and Western Sahara, constituting the largest contributor of peacekeeping forces to the continent of any current Security Council member. Past earlier efforts have included anti-piracy missions as well as security monitoring in Liberia.

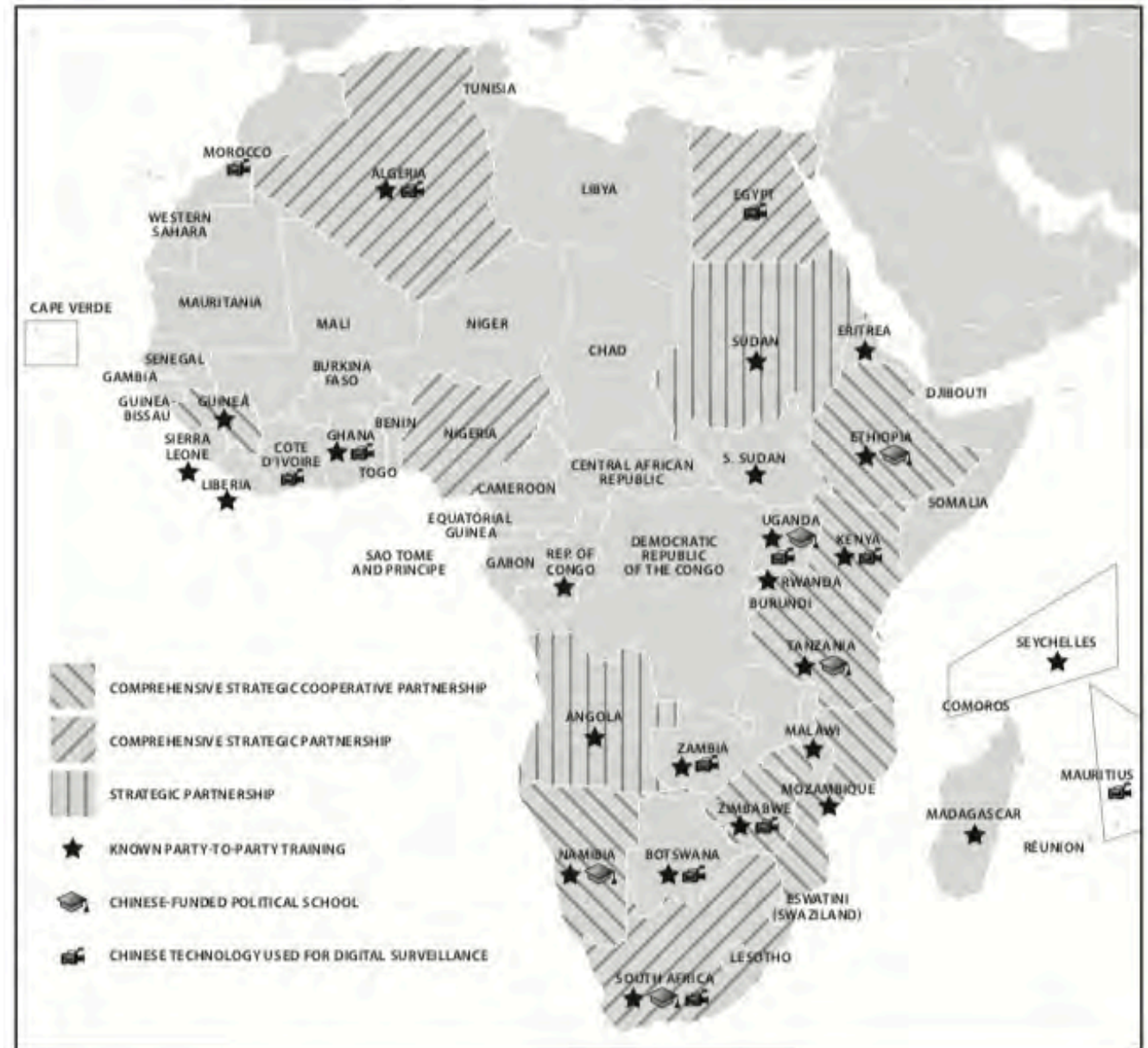
Chinese Strategic Partnerships in Africa – I

U.S. and Chinese Bilateral Goods Trade with Africa, 2000–2019



Note: Figures include total goods exports and imports. U.S. and Chinese aggregations of African trade data may include minor differences in trade partners.

Source: China General Administration of Customs via CEIC Database; U.S. Census Bureau, *Trade in Goods with Africa*.



Chinese Strategic Partnerships in Africa – II

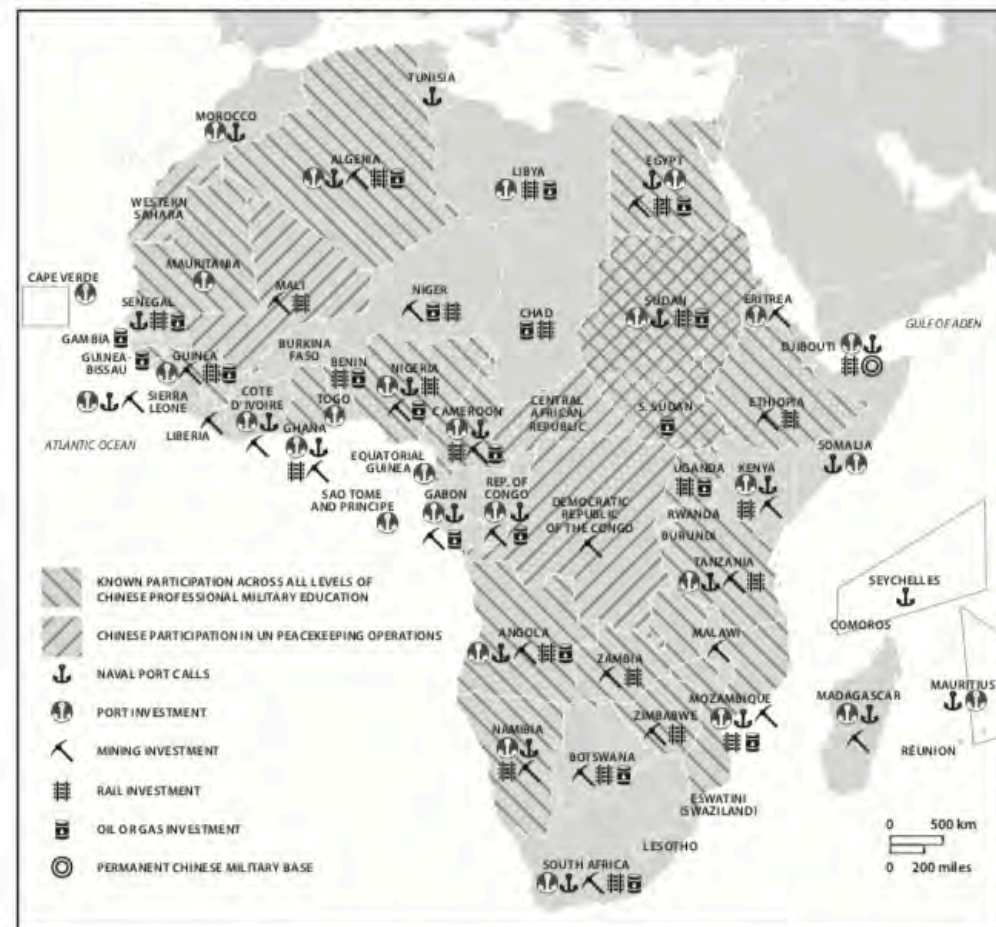
PLA Power Projection in the Atlantic Ocean and Western Hemisphere—Continued



Note: Port calls, bilateral exercises, and high-level contacts between militaries included in the map are from 2010–2020. Only the countries and territories in the darker shade are analyzed for the purposes of this map.

Source: Created for the U.S.-China Economic and Security Review Commission; Various.¹⁸⁰

China's Economic and Security Activities in Africa

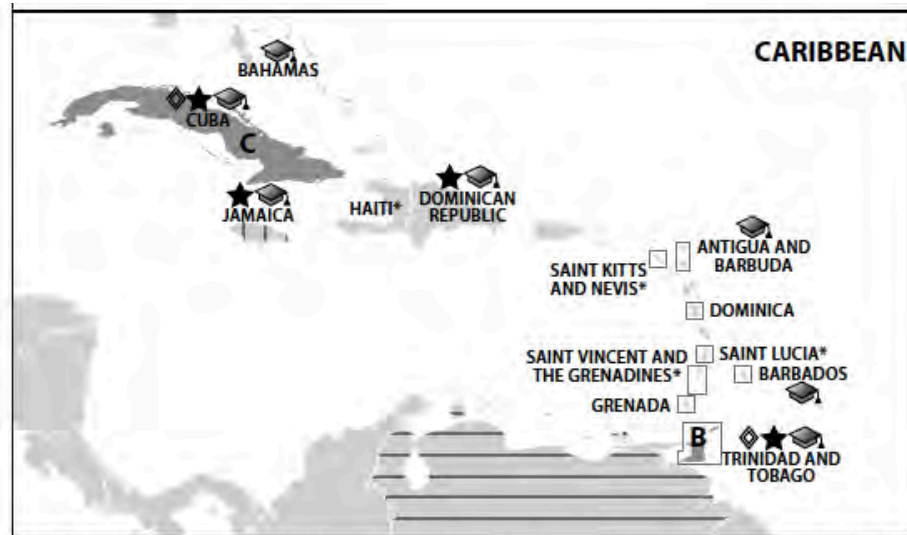


Note: Investment includes projects that are built, planned, and in negotiation.

Source: Various.²⁹⁶

Shifts in China's Role in Latin America

China's Rising Role in Latin America – I



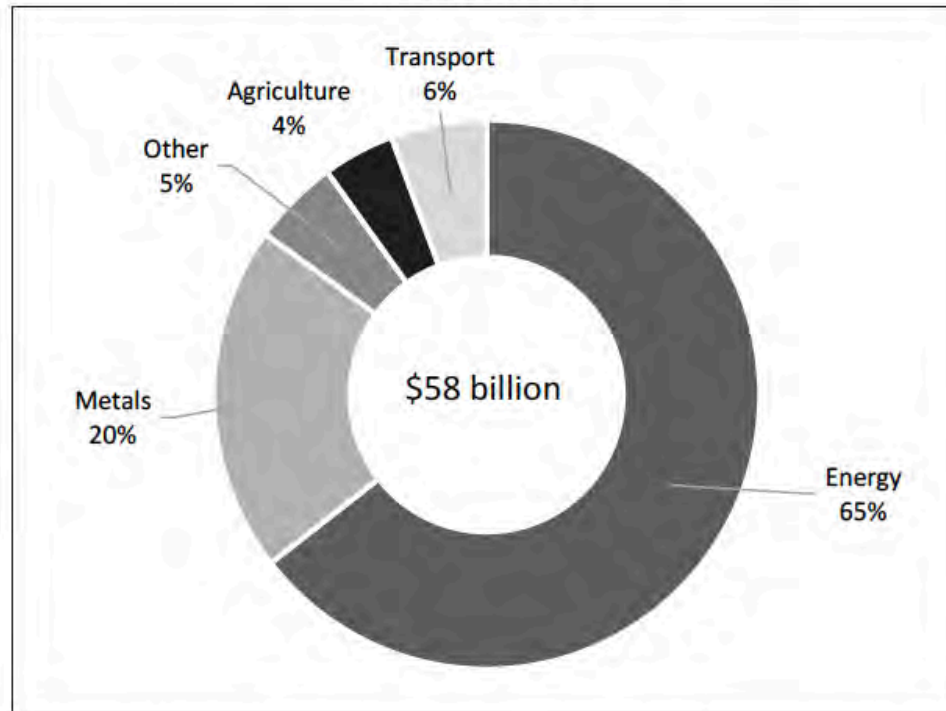
Note: Data for "Known Party-to-Party Meetings" are collected for the years 2019–2021.
Source: Various.¹²

Figure 1: China's Main Diplomatic Partners in Latin America and the Caribbean



China's Rising Role in Latin America – II

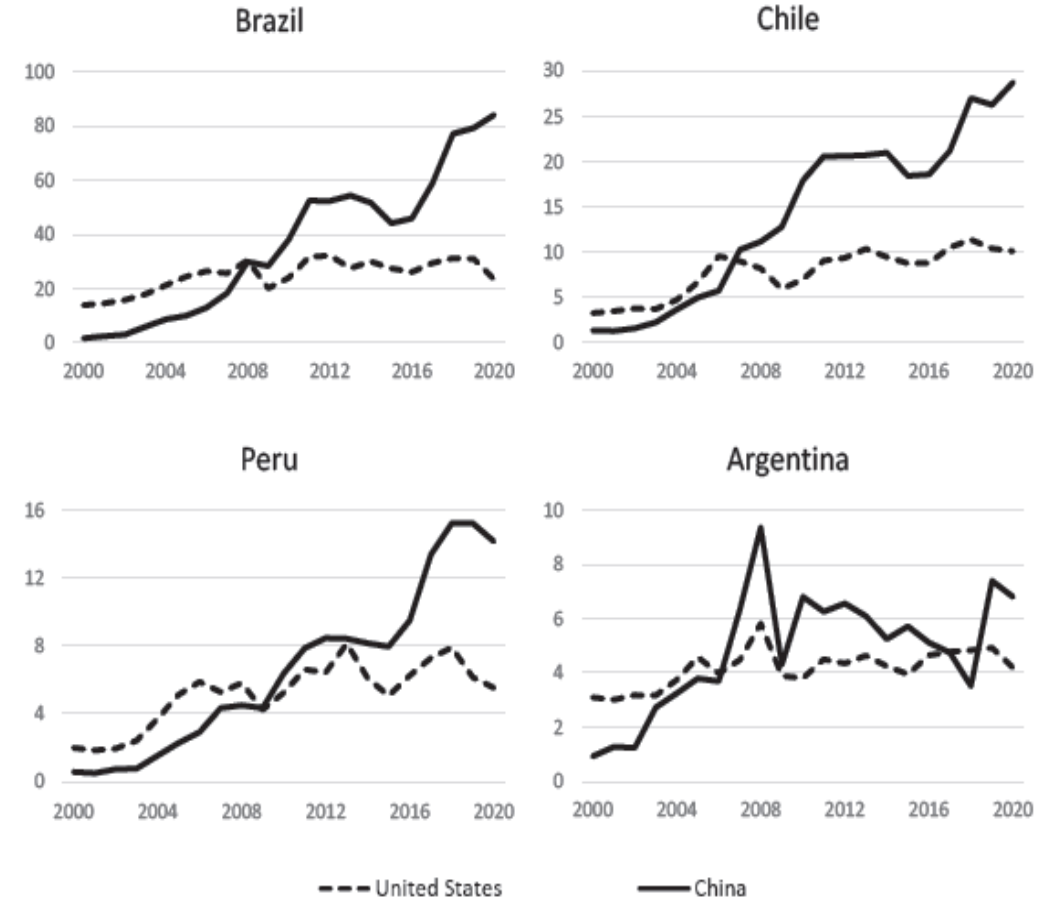
Figure 3: Cumulative Chinese FDI to Latin America and the Caribbean by Sector, 2016–2020



Note: "Other" includes chemicals, finance, logistics, real estate, technology, and utilities. Because 2020 economic data are skewed due to disruptions associated with the COVID-19 pandemic, this figure aggregates data between 2016 and 2020 to demonstrate trends in Chinese investment in Latin America and the Caribbean over multiple years.

Source: American Enterprise Institute, "China Global Investment Tracker," 2021.

Figure 4: Chinese and U.S. Imports from Select Latin American Countries, 2000–2020 (US\$ billions)



Source: U.S. Census Bureau, *Trade in Goods Brazil*; U.S. Census Bureau, *Trade in Goods Chile*; U.S. Census Bureau, *Trade in Goods Peru*; U.S. Census Bureau, *Trade in Goods Argentina*; United Nations, "UN Comtrade Database."

China's Rising Role in Latin America – III

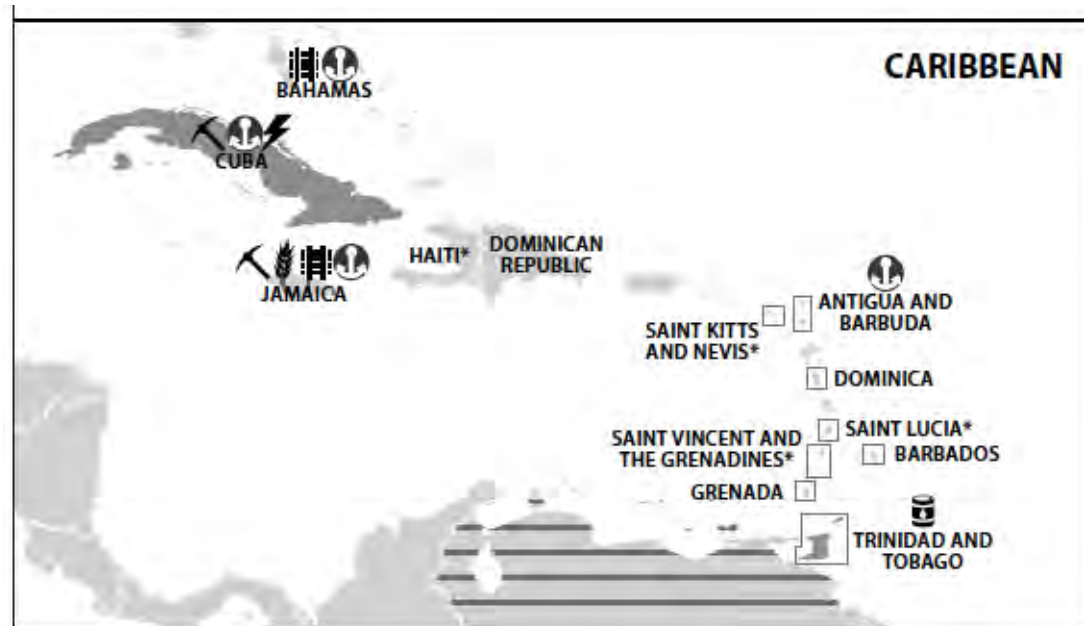
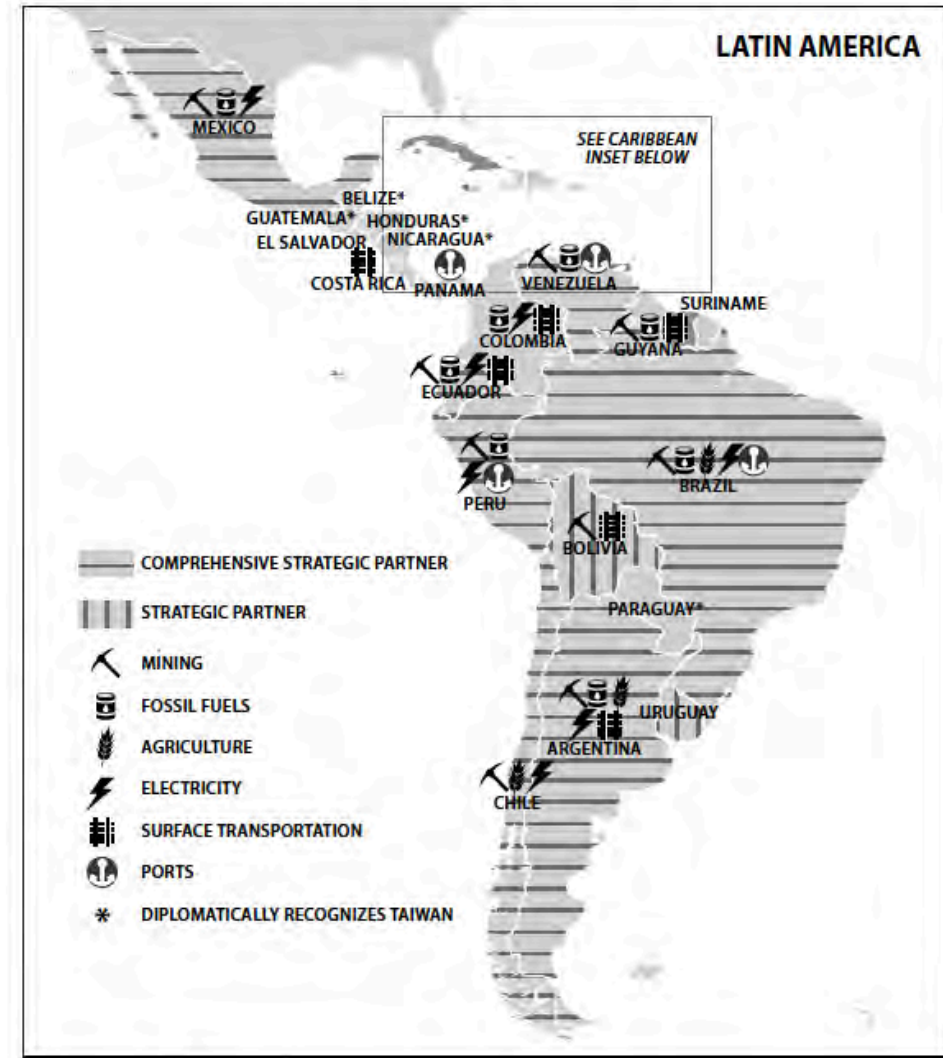


Figure 5: Select Chinese Investments and Financing in Latin America and the Caribbean, 2005–2020



**China's Arms Imports and
Exports Do Not Yet Reflect Its
Progress in Military
Technology and Industry**

DoD Estimate of Chinese Sales: 2021

The PRC is the world's fifth-largest arms supplier, and sells major systems such as UAVs, submarines, and fighter aircraft to customers like Saudi Arabia, the UAE, and Pakistan.

- **Armed UAVs.** The PRC has supplied its strike-capable Caihong or Wing Loong families of UAVs to at least Pakistan, Iraq, Saudi Arabia, Egypt, the UAE, Algeria, Serbia, and Kazakhstan.

- **Precision-Strike Weapons.** As of 2017, the PRC had sold export variant ballistic missile systems, including the M20, BP-12, and Joint Attack Rocket and Missile System (JARM), as well as long-range satellite-guided rocket systems. Although China typically does not disclose the countries purchasing these types of arms, as of 2017, Qatar displayed a JARM TEL.

- **Naval Combatants.** The PRC is a major supplier of naval vessels, highlighted by Pakistan's purchase of eight Yuan-class submarines for more than \$3 billion. Thailand also purchased one Yuan class submarine in 2017 and is interested in purchasing two more. As of December 2020, the PRC has not delivered any Yuans, though it delivered two Ming class submarines to Bangladesh in 2016. In September 2019, the PRC agreed to its first-ever sale of an LPD-class amphibious ship to Thailand.

The PRC's arms sales operate primarily through state-run export organizations such as the Aviation Industry Corporation of China (AVIC) and North Industries Corporation (NORINCO). Arms transfers also are a component of the PRC's foreign policy, used in conjunction with other types of assistance to complement foreign policy initiatives undertaken as part of the PRC's One Belt, One Road initiative.

Many developing countries buy PRC weaponry because they are less expensive than other comparable systems. Although some potential customers consider arms made by the PRC to be of lower quality and reliability, many of the PRC's systems are offered with enticements such as donations, and flexible payment options, which make them appealing options for buyers.

Source: Excerpted from Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2021*, November 3, 2021, p. 138-139.

China's Weapons Imports: 2010-2020

(Figures are SIPRI Trend Indicator Values (TIVs) expressed in Nominal \$US millions)

SIPRI has developed a unique pricing system to measure the volume of deliveries of major conventional weapons and components using a common unit—the SIPRI trend-indicator value (TIV). **The TIV of an item being delivered is intended to reflect its military capability rather than its financial value. This common unit can be used to measure trends in the flow of arms between particular countries and regions over time—in effect, a military capability price index.** Therefore, it is important to ensure that the pricing system remains consistent across both the weapon systems covered and over time, and that any changes introduced are backdated.

Each weapon that falls within the SIPRI definition of major conventional arms (see box 1) is given a TIV. The TIV is derived from the known unit production costs of a core set of weapons. The TIV for a weapon whose unit production cost is unknown is calculated by making a comparison with core weapons based on the following elements: size and performance characteristics (i.e. weight, speed, range and payload); types of electronics, loading or unloading arrangements, engine, tracks or wheels, armament, and materials; and finally the era in which the weapon was produced.

Weapons that have previously been used by another armed force (i.e. surplus weapons) are given a value equal to 40 per cent of that of a new weapon. Used weapons that have been significantly refurbished or modified by the supplier before delivery are given a value of 66 per cent of the value when new. The overall volume of arms exports from a particular state in any given year is then calculated by adding together the TIVs for the weapons and components delivered. Since year-on-year deliveries can fluctuate, SIPRI uses 5-year moving averages to provide a more stable measure for trends in international arms transfers.

The SIPRI TIV is often misinterpreted as a financial value. However, it neither reflects the actual price paid for weapons nor represents current dollar values for arms transfers. The TIV should therefore not be compared directly with gross national product (GNP), gross domestic product (GDP), military expenditure, sales values or the financial value of arms export licenses. However, TIVs can be used as the raw data for calculating trends in international arms transfers over periods of time; indicative global percent-ages for suppliers and recipients; and percentages for the volume of transfers to or from particular states.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Belarus				170								170
France	158	171	204	214	179	201	158	140	121	126	98	1770
Germany	3	3	3	11	11	15	7	11	15	15	15	109
Russia	685	746	598	694	602	780	691	1011	1696	1108	600	9209
Switzerland	65	65	65	65	65	65	65	33	33			520
Ukraine			632	66	150	96	90	103	78	78	78	1370
United Kingdom	70	70	70	70	70	70	60	40	20	20	20	580
Uzbekistan						34	68					102
Total	981	1055	1571	1289	1077	1262	1139	1338	1962	1347	811	13831

China's Arms Trade: 2007-2019

Notes: (1) An asterix (*) indicates a value between \$0.00003 and \$0.05 billion

(2) World exports and imports, based chiefly on World Bank and UN Statistical Division data, are not equal

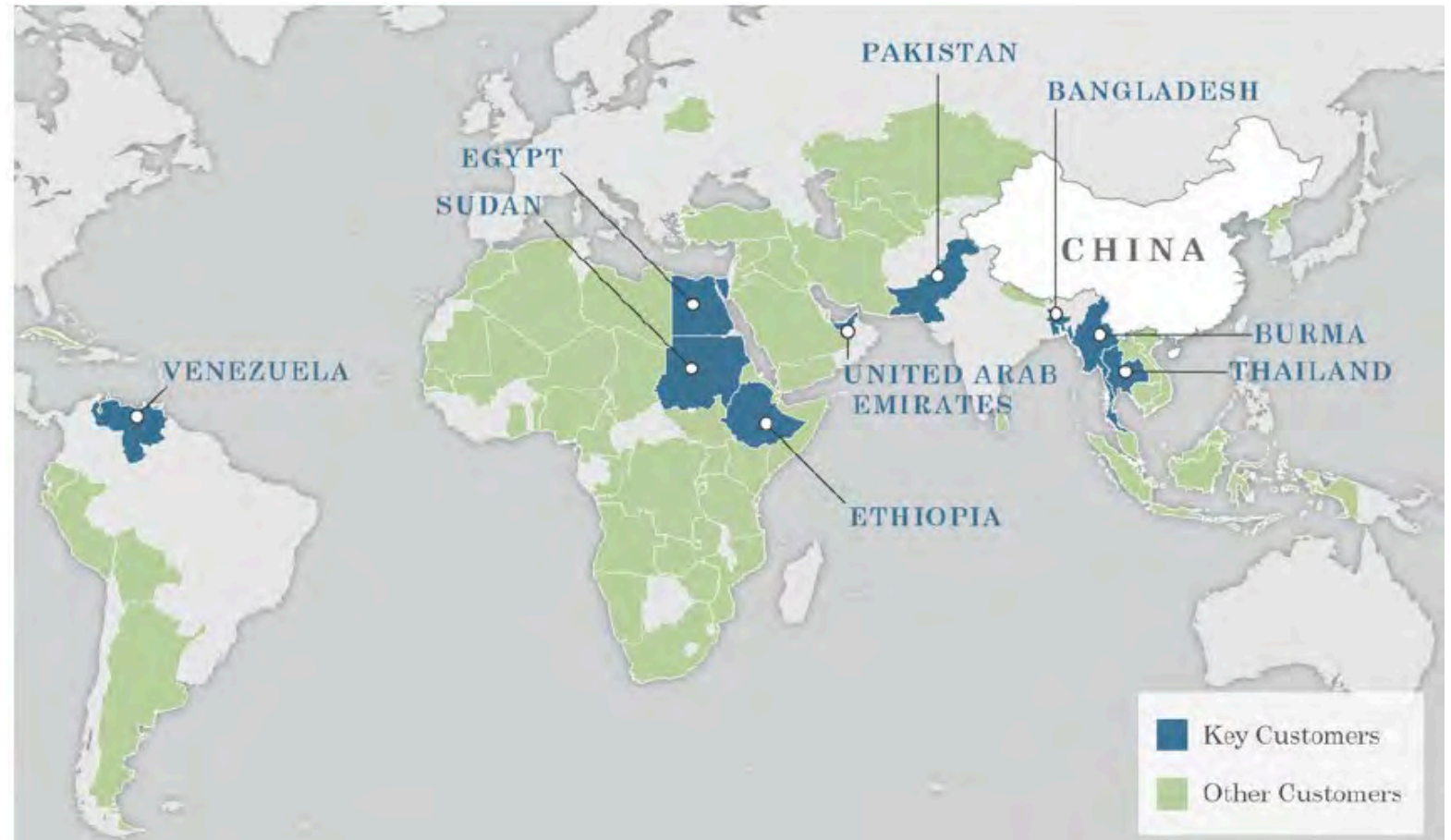
(3) Arms trade values include only trade among countries covered by WMEAT and unspecified or multinational entities

		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Mean
China	Arms exports (goods & services)	1.8	2.2	1.6	3.4	1.8	2.0	2.6	2.1	5.0	2.8	4.0	-
China	Arms imports (goods & services)	0.8	1.5	1.1	1.2	0.7	1.1	1.0	1.2	0.6	0.7	1.1	-
China	All exports (goods & services)	1,666.1	1,936.2	1,648.0	2,098.1	2,571.1	2,781.2	3,013.3	3,131.0	3,001.6	2,832.5	3,114.6	-
China	All imports (goods & services)	1,330.5	1,558.2	1,401.6	1,846.1	2,358.3	2,521.4	2,745.2	2,879.6	2,618.5	2,550.6	2,870.2	-
China	Arms exports as % of all exports	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	-
China	Arms imports as % of all imports	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-
China	Arms balance as % of trade balance	0.3%	0.2%	0.2%	0.9%	0.5%	0.3%	0.6%	0.3%	1.2%	0.8%	1.2%	-

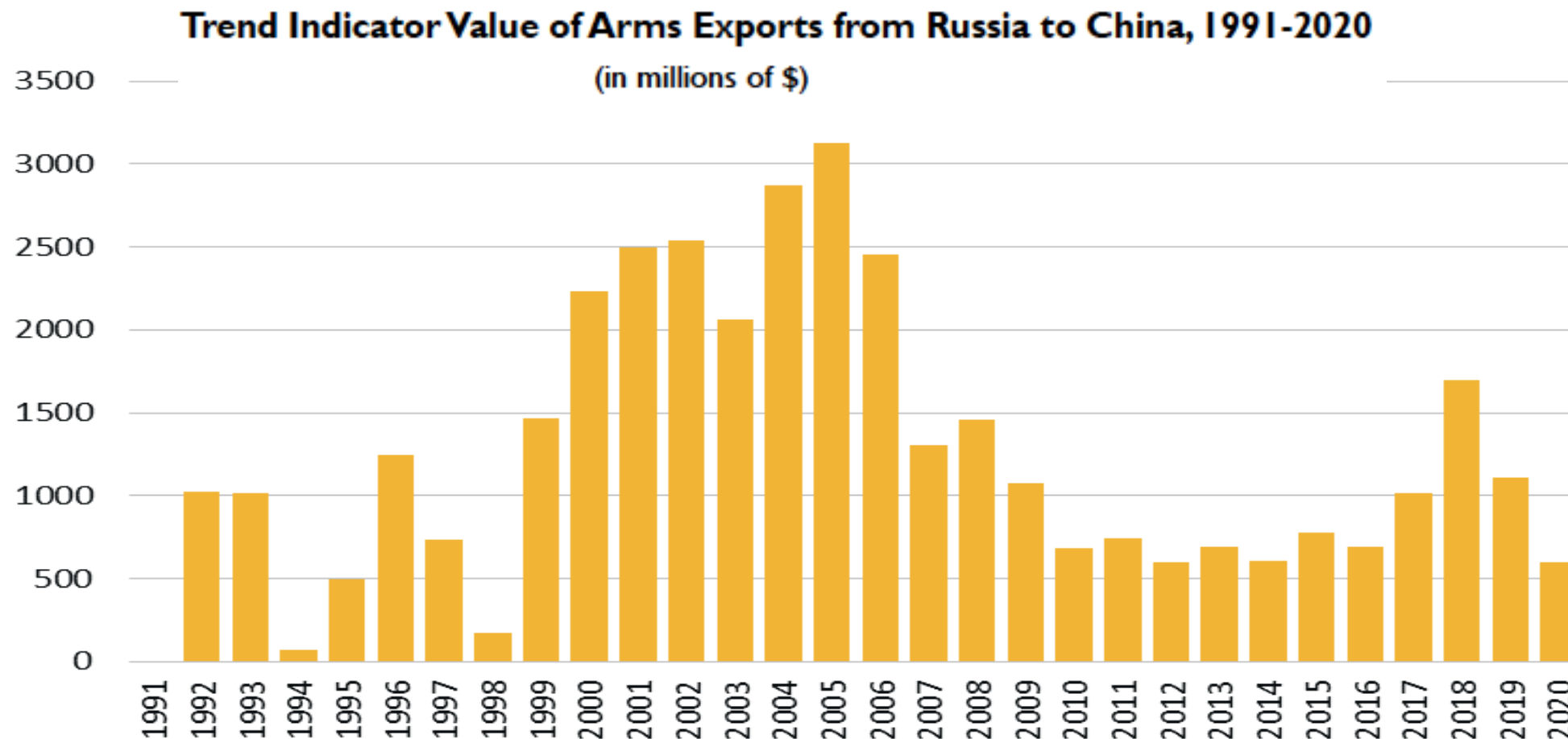
China's Key Arms Customers 2002-2007

Other Customers				
Algeria	Congo, Republic of	Kuwait	North Korea	Timor-Leste
Angola	Cuba	Laos	Peru	Turkey
Argentina	Djibouti	Lebanon	Qatar	Turkmenistan
Belarus	Ecuador	Libya	Rwanda	Uganda
Benin	Equatorial Guinea	Malaysia	Saudi Arabia	Uzbekistan
Bolivia	Eritrea	Mali	Senegal	Vietnam
Burundi	Ghana	Mauritania	Seychelles	Yemen
Cambodia	Indonesia	Morocco	Somalia	Zambia
Cameroon	Iran	Mozambique	South Africa	Zimbabwe
Chad	Iraq	Namibia	South Sudan	
Congo, Democratic Republic of	Jordan	Nepal	Sri Lanka	
	Kazakhstan	Niger	Syria	
	Kenya	Nigeria	Tanzania	

Over 65 countries have been recipients of Chinese arms since 2002.



China's Weapons Imports from Russia: 1991-2020 – I



CRS estimate using data from SIPRI Arms Transfers Database.

Notes: A '0' indicates a value of deliveries less than \$0.5 million. TIVs are a unique system developed by SIPRI to measure the volume of conventional weapons using a common unit to allow comparison over time. They represent the transfer of military resources rather than sales prices for arms transfers

Source: Andrew S. Bowen, *Russian Arms Sales and Defense Industry*, Congressional Research Service R46937, 14/10/21, p. 15..

China's Weapons Imports from Russia: 1991-2020 – II

China is Russia's second-largest arms export client, importing 18% of all Russian arms from 2016 to 2020.¹¹⁶ Russian arms were crucial to the development of China's military and defense industry. Russian exports reached a peak in the mid-2000s, when China relied on Russian systems to modernize its military capabilities. During this period, Russia supplied China with Su-27S and Su-30MK FGA; numerous classes of missiles, radars, SAM systems, helicopters, Project-956 Sovremenny class destroyers; and Project 636 Varshavyanka submarines. Although capable, these systems were Russia's older, second-best ones and did not include more-advanced technologies... Many indigenous Chinese systems are based on Russian designs, and Russian weapons and technologies were particularly important for the development of China's navy and air force...

After 2006, Russian arms exports to China dropped dramatically. Analysts have identified several reasons for this shift,... including that China's reliance on Russian weaponry weakened as China's own defense industry matured and developed. China became unwilling to accept older technology as it became increasingly able to produce many of the systems it previously imported, which some analysts argued was the product of reverse engineering while others noted the possibility of joint production agreements between Russia and China...

In 2012, China and Russia agreed to increase military cooperation, including in arms sales. Arms sales between the two countries picked up dramatically after 2015. Russia and China signed a road map for military cooperation in 2017, and joint military exercises in 2021 highlighted an increased cooperative relationship... Geopolitical considerations (including after Russia's invasion and occupation of Ukraine's Crimea region in 2014) appear to have contributed to a mutual desire to increase military cooperation and arms sales, despite ongoing complications...

Most recently, Russian exports to China focus on a smaller number of deals for advanced systems, including the S-400 and Su-35S... Each country relies on the other for key components; Russia relies on China for machine tools and electronic components, and China relies on Russia for fighter engines, air defense systems, missiles, submarine technology, and heavy helicopters... China's interest is gaining access to technologies and expertise that it struggles to produce and replicate domestically... Going forward, most analysts predict a move away from arms sales to more joint production and development. As one expert notes, "China's growing industrial potential in the defense sector is likely to change the nature of defense cooperation from transactional arms sales to more joint development, defense services, and transfer of technology"... As a result, Russia's technological advantage over China is likely to weaken in the future, especially as China's defense industry continues to develop.

China's Weapons Imports from Russia: 1991-2020 – III

(Major Russian Arms Orders and Deliveries to China)

Quantity	Weapon System	Year Ordered	Year Delivered	Deal Value	Additional Information	Quantity	Weapon System	Year Ordered	Year Delivered	Deal Value	Additional Information
72	AK-176 76mm Naval Gun	2010	2013-2020								
200	Kh-59MK ASM	2004	2008-2015			32	Mi-17IE Transport Helicopter	2009	2010-2011		
120	MR-90 Fire Control Radar	2004	2005-2018			123	AL-31 Turbofan Engine	2011	2013-2016	\$500 million	AL-31FN version for J-10 combat aircraft produced in China; probably including spare engines
54	Mi-17IE Transport Helicopter	2005	2007-2012								
9	Ka-27PL ASW Helicopter	2006	2009-2010								
9	Ka-31 Airborne Early Warning Helicopter	2006	2010-2011								
122	AL-31 Turbofan Engine	2009	2009-2012		AL-31FN version for J-10 combat aircraft produced in China; probably including spare engines	125	AL-31 Turbofan Engine	2011	2013-2017		AL-31F version for J-15 combat aircraft produced in China
55	D-30 Turbofan Engine	2009	2009-2012		For H-6K bomber aircraft produced in China and possibly for modernization of Il-76 transport aircraft	184	D-30 Turbofan Engine	2011	2012-2017		For H-6K bomber aircraft and Y-20 transport aircraft produced in China and for modernization of Il-76 transport aircraft

Source: CRS, using data from SIPRI Arms Transfers Database.

Notes: ASM = anti-ship missile; ASW = anti-submarine warfare; BVRAAM = beyond visual range anti-air missile; FGA = fighter/ground attack aircraft; SAM = surface-to-air missile.

Source: Andrew S. Bowen, *Russian Arms Sales and Defense Industry*, Congressional Research Service R46937, 14/10/21, pp. 28-29.

China's Weapons Imports from Russia: 1991-2020 – IV

(Major Russian Arms Orders and Deliveries to China)

Quantity	Weapon System	Year Ordered	Year Delivered	Deal Value	Additional Information	Quantity	Weapon System	Year Ordered	Year Delivered	Deal Value	Additional Information
5	IL-76M Transport Aircraft	2011	2013-2015			7	IL-76M Transport Aircraft	2015	2017-2019		
52	Mi-17IE Transport Helicopter	2012	2012-2014			240	R-77 BVRAAM	2015	2017-2019		
80	AL-31 Turbofan Engine	2014	2017-2020		AL-31F-M2 version for J-20 combat aircraft produced in China	24	Su-35S FGA	2015	2016-2018	\$2 billion	
300	48N6 SAM	2015	2018-2019		Part of \$3 billion deal for eight S-400 SAM systems	125	AL-31 Turbofan Engine	2016	2016-2020		AL-31FN version for J-10 combat aircraft produced in China
8	S-400 Triumf SAM System	2015	2018-2019	\$3 billion		68	Mi-17IE Transport Helicopter	2019	2020		
10	AL-31 Turbofan Engine	2015	2016-2018			18	Mi-17V-7 Transport Helicopter	2019	2020		
7	IL-76M Transport Aircraft	2015	2017-2019			18	Mi-171Sh Transport Helicopter	2019	ongoing		

Source: CRS, using data from SIPRI Arms Transfers Database.

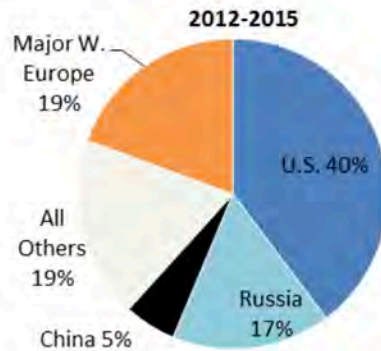
Notes: ASM = anti-ship missile; ASW = anti-submarine warfare; BVRAAM = beyond visual range anti-air missile; FGA = fighter/ground attack aircraft; SAM = surface-to-air missile.

Source: Andrew S. Bowen, *Russian Arms Sales and Defense Industry*, Congressional Research Service R46937, 14/10/21, pp. 28-29.

China's Worldwide Arms Exports: 2008-2015

(Figures are based on CRS Estimates of Market Value in \$US millions)

Arms Transfer Agreements Worldwide
(supplier percentage of value)



Supplier	Worldwide Deliveries Value 2012-2015	Percentage of Total to Developing World
United States	64,640	69.63%
Russia	38,100	91.60%
France	20,400	68.14%
United Kingdom	10,900	50.46%
China	9,600	98.96%
Germany	6,800	57.35%
Italy	6,800	63.24%
All Other European	25,500	46.27%
All Others	16,700	39.52%
TOTAL	199,440	67.89%

China's Comparative Weapons Deliveries to the Developing World: 2008-2015

Source: U.S. government.

Note: Developing nations category excludes the United States, Russia, Europe, Canada, Japan, Australia, and New Zealand. All data are for calendar years given. * Major West European includes France, United Kingdom, Germany, and Italy totals as an aggregate figure. Data relating to surface-to-surface and anti-ship missiles by foreign suppliers are estimates based on a variety of sources having a wide range of accuracy. As such, individual data entries in these two weapons delivery categories are not necessarily definitive.

Source: Catherine A. Theohary, *Conventional Arms Transfers to Developing Nations, 2008-2015*, Congressional Research Service, p. 51, December 19, 2021, <https://fas.org/sgp/crs/weapons/R44716.pdf>.

Weapons Category	U.S.	Russia	China	Major West European*	All Other European	All Others
2008-2011						
Tanks and Self-Propelled Guns	348	630	490	360	550	50
Artillery	155	110	340	140	600	190
APCs and Armored Cars	188	570	620	420	1,630	580
Major Surface Combatants	0	2	3	5	5	4
Minor Surface Combatants	0	8	113	64	52	118
Guided Missile Boats	0	2	0	0	0	4
Submarines	0	2	0	4	1	0
Supersonic Combat Aircraft	58	170	30	40	130	50
Subsonic Combat Aircraft	0	0	20	50	20	80
Other Aircraft	62	20	130	50	160	40
Helicopters	35	270	20	150	70	50
Surface-to-Air Missiles	1,088	8,160	2,080	360	650	500
Surface-to-Surface Missiles	1,285	70	0	0	0	10
Anti-Ship Missiles	133	260	80	80	10	50
2012-2015						
Tanks and Self-Propelled Guns	76	430	130	80	390	10
Artillery	232	130	250	40	630	430
APCs and Armored Cars	1	680	760	960	920	460
Major Surface Combatants	0	3	6	13	2	4
Minor Surface Combatants	0	8	19	67	67	86
Guided Missile Boats	0	0	2	2	0	7
Submarines	0	4	0	8	0	2
Supersonic Combat Aircraft	45	100	20	20	20	40
Subsonic Combat Aircraft	0	0	0	20	10	30
Other Aircraft	35	20	50	130	260	50
Helicopters	2	280	40	140	30	50
Surface-to-Air Missiles	346	6,300	1,310	1,130	240	630
Surface-to-Surface Missiles	163	80	10	0	0	0
Anti-Ship Missiles	116	40	110	210	0	20

China's Weapons Exports: 2010-2020

(Figures are SIPRI Trend Indicator Values (TIVs) expressed in Nominal \$ US millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Afghanistan								1				1
Algeria	18				68	245	496	17	57	24	3	928
Angola						1	15			15	42	72
Argentina	1											1
Bahamas								0				0
Bahrain							4					4
Bangladesh	13	81	151	488	201	450	262	205	92	637	27	2605
Belarus							2	1	1			4
Benin	0			0								0
Bolivia		21			20		4		1			46
Burundi			5									5
Cambodia			15	39					2	1		57
Cameroon			9	118	85							212
Central African Republic									1			1
Chad	16			39								55
Cote d'Ivoire								4				4
Djibouti					8	1	4			0		13
DR Congo						1						1
Ecuador	8											8
Egypt	35		1	1	1		6	18	18			81
Ethiopia			2	50	2				2	2		57
Gabon										25		25
Ghana	2	56		22		13	8					102
Indonesia	2	8	64	73	34	38	40	34	16	21	16	347
Iran	60	50	29	9	9	9						168
Iraq						27	27					54
Jordan	2				1		24					27
Kazakhstan							9		23			32
Kenya	13				7	10	11					40
Kyrgyzstan										1		1
Laos			15	15		1		2	51	9		93

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Malaysia												
Mali								4				4
Mauritania							34			25		59
Morocco	221	34	34									289
Mozambique					4		2					5
Myanmar	5	277	251	189	63	180	215	119	94	47		1439
Namibia			52	9			3	34				98
Nepal								8	1	14		23
Niger								3				3
Nigeria	156				57	22	36				57	328
Pakistan	745	599	602	735	469	548	719	644	436	416	543	6455
Peru	1					13						14
Qatar								29	88			118
Rwanda								1	3			4
Saudi Arabia						35	15	35	40	40	40	205
Senegal							16	20				36
Serbia											11	11
Seychelles		4			10							14
Sierra Leone		2				0	1					4
Slovakia								13				13
Somalia								2				2
South Sudan					12							12
Sri Lanka	4								1	59		65
Sudan	17	18	29	28	32	35	20	44	32			254
Syria	15				5							20
Tajikistan									3	1		4
Tanzania		76	113	118	14	20		2				342
Thailand		2	18	22	7	1	77	131	52	97	9	415
Timor-Leste	18											18
Trinidad and Tobago						16						16
Turkey	35	35	35									105
Turkmenistan							230	4				234
UAE				15	15	15	15	37	46	12	11	166
United Wa State (Myanmar)*					2							2
Uzbekistan					15				107			122
Venezuela	89	8	51	97	74	100	76					494
Zambia			51				33	33			1	117
Total	1475	1271	1526	2067	1212	1780	2410	1438	1169	1472	760	16580

Source: Stockholm International Peace Research Institute (SIPRI), Arms Transfer Database, https://armstrade.sipri.org/armstrade/html/export_values.php, accessed June 6, 2021.