



CHINA 2049

THE FLIGHT OF A
PARTICLE BOARD
DRAGON

13 MAY 2022

About This Document

This report documents research and analysis conducted by the United States Army War College (USAWC) student team "Forecastica" as a group Strategic Research Requirement in support of completing a Master of Strategic Studies degree. The report's research, analysis, and production occurred over eight months, from October 2021 to May 2022, as a USAWC Senior Service College curriculum requirement. The Team consisted of the following: three US Army Colonels (O-6), one US Army Lieutenant Colonel (O-5), and one US Air Force Lieutenant Colonel (O-5): Paul Bonano, Johannes Castro, Eric Magistad, Stacy Slate, and Andrew Wiker.



Requirement

This report synthesizes and analyzes open-source documents to answer the following question posed by Mr. Thomas Greco, DCS G2 for the United States Army Training and Doctrine Command (Annex A):

How can China meet its national objectives to become the world's dominant power by 2049?

Key supporting questions included:

- What does domination mean to China?
- How does China envision domination on the world stage compared to its peers, adversaries, and weaker nations?
- What is China's strategy through competition?
- What are the areas of risk for the United States and China in this race?
- How will China measure success?
- How likely is China to accomplish its goal of being the world's dominant power, and where are China's vulnerabilities in attempting to achieve this?
- What are the implications for the United States if they do achieve domination?

Analytic Confidence

This estimate has an overall moderate analytic confidence. The questions asked were complex, and the analysts had sufficient time despite competing with the academic requirements of the USAWC core curriculum. Source reliability and corroboration were moderate to high. The analysts were not subject matter experts and worked individually and collaboratively to research and answer the questions. They used a combination of structured analytic techniques, including the nominal group technique. Team Forecastica evaluated analytic confidence using Peterson's Analytic Confidence Factors (Appendix 3).

Words of Estimative Probability

Forecastica's analysts used Kesselman's List of Estimative Words (Appendix 2) to express estimative probability in deciding the likelihood of China's success across a spectrum of actions they determined necessary to become the world's dominant power by 2049.

Source Reliability

Source reliability is annotated throughout the document as high (H), moderate (M), or Low (L) and was determined using the Trust Scale and Website Evaluation Worksheet (Appendix 4). Reliability annotations hyperlink primary sources.

The primary version of the "The Particle Board Tiger" estimate is the PDF electronic file. Following the final outbrief to Mr. Tom Greco on 13 May 2022, the Team will forward hard copy books. For additional copies of any of these products, please contact Dr. Kathleen Moore at kathleen.moore@armywarcollege.edu or Professor Kristian Wheaton at kristian.wheaton@armywarcollege.edu

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Short Form Analytical Report Hyperlinks by Key Findings Goal:

Goal 1: *Internal Security:*

1. [China Almost Certain To Fail Building Military Capable Of Defeating US](#)
2. [China Highly Likely To Fail Meeting Military Modernization Goals by 2035](#)
3. [China's Intelligitization Efforts Unlikely To Produce Military Advantage By 2049](#)
4. [Chinese Growth Likely to Peak in 2030 Before Significant Decline](#)
5. [Human Rights Suppression Will Almost Certain Continue for CCP to Remain in Power](#)
6. [US Regulator Move To Delist PRC Stocks From US Exchanges Poses Risks To Chinese Economic Growth](#)
7. [China's Food Security Is Important To Preserving Social Harmony And Economic Stability](#)
8. [China Highly Vulnerable to Energy Disruptions Through 2049](#)
9. [China's Use Of Force In Reunification With Taiwan Unlikely Before 2035](#)

Goal 2: *Regional Hegemony:*

10. [China Highly Unlikely To Replace United States As Southeast Asia's Security Partner Of Choice](#)
11. [China Likely To Resume Cooperation With India By 2027](#)
12. [China's Modernization Efforts Face Innovation Deficit Heading Into 2035](#)
13. [China's Public and Corporate Debt Threaten PLA Modernization](#)

Goal 3: *Global Influence:*

14. [China Highly Likely To Exploit Russian Decline To Further Global Dominance](#)
15. [Chinese Likely to Achieve Goal of Global Influencer By 2049](#)
16. [China's Geopolitical and Economic Initiatives Likely to Expand Global Influence](#)
17. [China Highly Likely to Shape International Perception through Discourse Power](#)
18. [China Likely to Lead Global Digital Economy by 2030 Through 5G Dominance](#)
19. [Developing Nations Highly Likely to Use Chinese IT Infrastructure by 2035](#)
20. [China's Iron Silk Road Unlikely To Deliver Economic Prosperity By 2049](#)
21. [Chinese Covid Response Likely Used To Further Health Silk Road Expansion In Developing Countries](#)
22. [U.S And Allies Expected To Experience Trade Issues Over Rare Earth Minerals Over Next 10 Years](#)
23. [China's Clean Energy Investment Furthers Likelihood Of 2030 Goal](#)
24. [China Will Likely Curb Worsening Climate Change Impacts Through Future Green Energy Efforts By 2030](#)
25. [Chinese Payment System Gains Momentum But Unlikely To Be A Viable Alternative To Existing Financial Institutions](#)

- 26. [Remote Chance of Chinese Renminbi Becoming Global Reserve Currency Within Ten Years](#)
- 27. [China's Initiatives Increase Likelihood Of Arctic Dominance By 2049](#)
- 28. [China Highly Likely to Increase African Trade to Stimulate Future Growth](#)
- 29. [Growing China-Iran Partnership Certain To Increase Middle East Tensions](#)

Executive Summary

2049 and China's National Rejuvenation

China is likely (56-70 percent) to achieve dominance by 2049, using its influence in economic, information, and emerging technologies to maintain internal security, become a regional hegemon and reinforce its global brand. Despite the long-time horizon and increasingly negative economic indicators, the country's record of consistently meeting its 5-year goals or successfully broadcasting a narrative of achievement will enable Beijing to increase its global power. This consistency leads to strength in some areas and weakness in others.

As part of its rejuvenation, China will **likely** seek to accomplish three distinct goals. Each goal has ten subgoals supporting the larger objectives, each mapped to various ways and tools.

Key Judgments

China will succeed in certain areas but fail in others and experience varying degrees of regional and global influence in the following areas:

1. The CCP will consolidate and grow its power through social control measures managing dissent and challenges to its authority.
2. The PRC will diversify its energy sources to meet growing demand while reducing vulnerability to energy supply disruptions.
3. Beijing will establish its leadership in multinational organizations to position itself as a trusted leader and defender of a revised international order

Key Findings

Based on our research, China's definition of dominance includes having the capabilities to:

Defend their national interests.

Deflect counterinfluence within their domestic, regional, and global spheres of influence.

Influence global norms and standards to match their needs.

There are three Chinese focus areas to achieve dominance:

China maintains **internal security** through overall economic "common prosperity," establishing food and energy security, preventing domestic political dissent against the Chinese Communist Party (CCP), and reestablishing control over its historical territory, including Taiwan and the 9-dash line.

Beijing asserts its **regional hegemony** (a Monroe Doctrine 2.0) to become a regional influencer with a strong military supported by a robust Anti-Access, Area Denial (A2AD) capability to deter adversary military interventions into the East and South China seas.

China develops **global influence** by becoming a leader in multinational organizations (MNOs) and a global partner of choice with the capability to shape international standards and norms.

The country will utilize three primary tool categories to achieve dominance in the focus areas. **Money** represents the vehicle by which Beijing finances its dominance trajectory. **Influence** is the tool used to raise its global profile and strengthen partnerships. China will use **technology** to control its population and modernizes its army while providing advanced export opportunities.

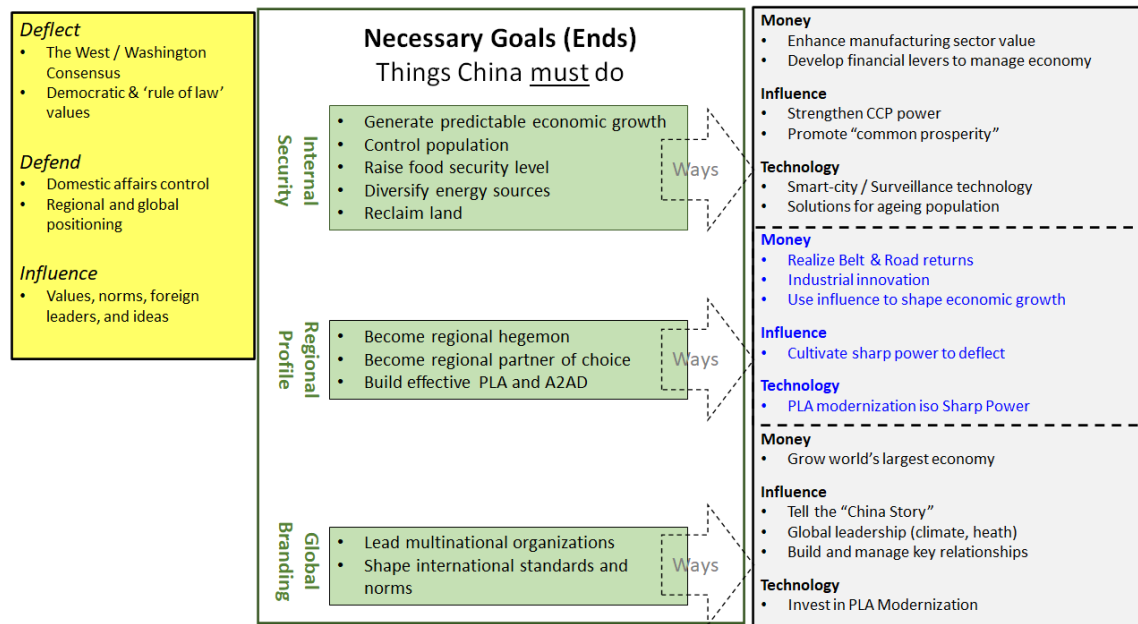


Figure 1: CCP goals, subgoals, and ways/tools.

Goal 1: Internal Security

China must do five things to maintain an internal sense of security.

First, it must generate predictable economic growth to achieve economic prosperity and demonstrate the effectiveness of the socialist government by improving the lives of the estimated 25 percent of its citizens living below the World Bank poverty line for upper-middle-income countries. To generate growth, Beijing will **likely** take steps to transition its economy from low-value manufacturing to higher-value exports. As its low-wage labor advantage decreases due to changing demographics and the growth of its middle class, China will likely exercise financial levers (e.g., currency manipulation) to compete with other nations' lower-cost manufacturers.

Despite decades of robust economic growth, Beijing faces challenges using its traditional levers with respect to manufacturing and finance. Strict capital controls regulating investment inflows limit opportunities for Chinese manufacturers to access non-government capital to expand operations. Furthermore, as the country becomes more dependent on imports to support population demands, the CCP will likely need to adjust exchange rate levers, possibly reducing its export edge against similar goods produced by nation-state competitors. If the RMB strengthens too much, export growth will suffer. Over the long term, China's manufacturing productivity and economic health will **likely** decline, forcing the CCP to transition from holding an *absolute advantage* in all manufacturing activity to a *comparative advantage* in specific industries.

China's ambitious overseas lending program also comes at the expense of internal growth and spending on social programs. Beijing has stressed the need to boost domestic demand but failed to expand domestic bank lending and investment in domestic infrastructure as a percentage of its GDP. Its export competitiveness relies on the relatively low share their workers retain of what they produce (i.e. savings). High Chinese savings rates support overseas investment but sacrifice domestic consumption and spending power. While its export capacity is strong, the PRC is an economy in transition.

China is **likely** to achieve its 2049 economic growth objectives. China is **likely** to surpass the US as the world's largest economy over the next decade. However, it is unclear if they can sustain the position through 2049. Western decoupling may ultimately doom Beijing's technological solution as US exclusions prevent the import of manufacturing components and foreign talent critical to economic growth.

The Chinese Communist Party (CCP) must consolidate and grow its power by implementing control measures to manage dissent and challenges to its authority.

To overcome potential challenges to party rule, the CCP will **likely** enhance and broadcast its narrative of the China Dream and Common Prosperity to promote national pride and combat Western influence on its citizens while tempering demands for individual freedoms. The PRC is **likely** to increase its internal security spending (currently USD 192 billion) to control its population through policing, information control, smart-city surveillance technologies, and social credit scores. By limiting individual human rights and removing opposition to party rule, the CCP can strengthen its control over the population and minimize dissent.

China is **almost certain** to achieve this goal. As the middle class grows and demands more individual freedoms, the CCP must balance maintaining control and easing human rights restrictions. However, its vast deployment of surveillance technology as part of smart cities combined with machine learning provides the CCP with the ability to rapidly identify challenges to its authority.

China must raise its food security level and become a net importer of food to meet the population's nutritional demands and the increasing desire for a higher quality of food by the growing middle class.

Food security is closely linked to national security, energy security, and economic security in a globalized world. The country seeks self-sufficiency amid covid-related disruptions to the global agricultural supply chain and tensions with the West. Given its desire to advance population nourishment programs and its weak influence over food supply chains, China will **likely** increase its food imports from overseas suppliers, including geopolitical rivals, to preserve population and economic stability (Figure 2).

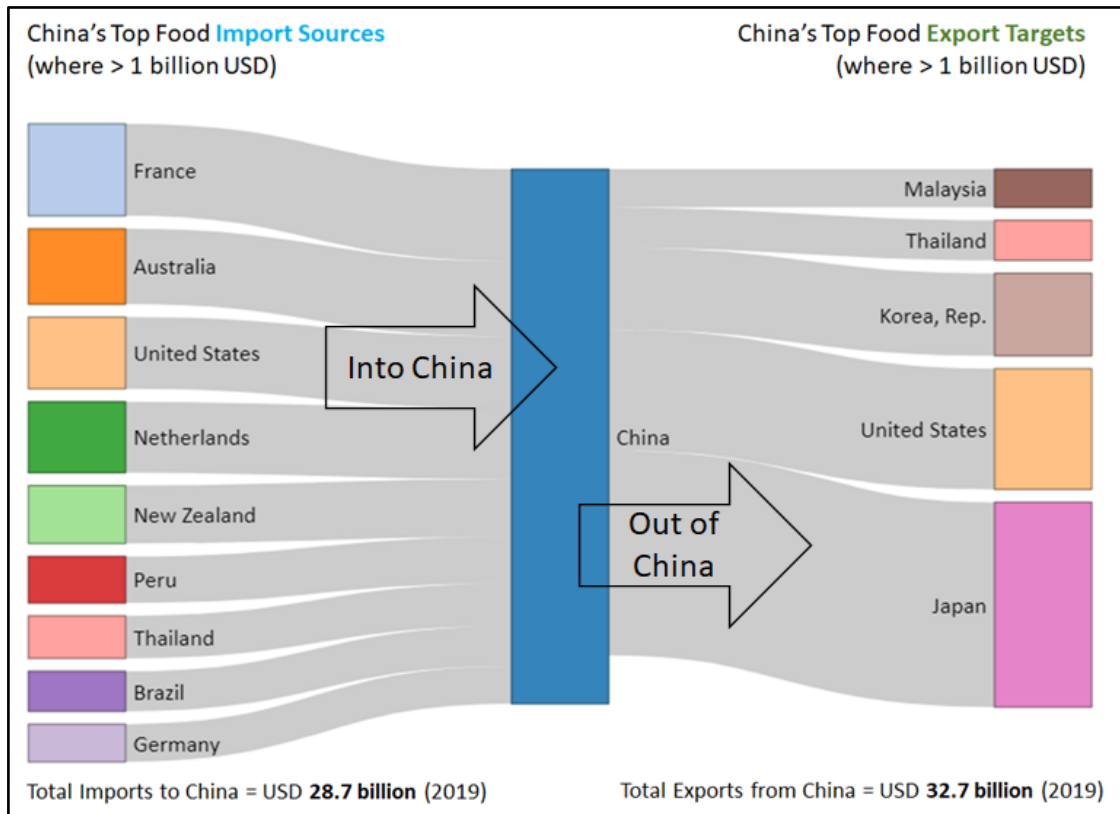


Figure 2: Largest Chinese food imports and export nations; source data (chart produced separately)

China is **likely** to become a net importer of food amidst higher global food prices. Higher prices are **likely** to stoke further economic planning pressures. Despite these challenges, it is **69 percent likely** to achieve its 2049 food security objectives by becoming a net importer of food.

China must diversify its energy sources to meet growing demand while reducing vulnerability to energy supply disruptions. The country remains highly vulnerable to supply disruptions from maritime chokepoints and rival geopolitical suppliers (e.g., the US and Australia). Failure to meet growing energy requirements will hinder its ability to maintain high levels of manufacturing output. To reduce vulnerabilities, China is **likely** to increase pipeline deliveries from friendly nations (e.g., Russia, Iran, and African countries). Clean energy projects and future technologies such as nuclear fusion can replace imported

fossil fuels, **likely** achieving China's stated 2030 and 2060 targets for peak emissions and becoming carbon neutral.

China is **highly likely** to achieve this subgoal by 2049 due to its heavy investment in renewable energy development and heavy investment in new suppliers of fossil fuels through the Belt and Road Initiative projects.

China must reclaim ancestral lands, including Taiwan and various islands within the Nine-Dash-Line, to secure a regional base to project influence and global power. To consolidate power and bolster its strategic narrative of historical Chinese legitimacy, the PRC seeks to recover Taiwan and militarize disputed islands in the South and East China to secure maritime access, undermine Western regional influence, and disrupt US alliances.

China is slightly more **likely** to accomplish this reclamation objective by 2049. This prediction is equal to a coin toss where divergences among the five analysts' forecasts (40 – 70 percent spread) were (perhaps) the result of different interpretations of the term 'reclamation.' For example, China may successfully reclaim some of these islands but not all 166 islands. Alternatively, China may seek de facto control over the Taiwan Main Island by increasing pressure on the Taiwanese military and citizens to install a government friendly to the CCP's internal security goals.

Goal 2: Build Regional Hegemony

China will **likely** focus on three areas to establish itself as the regional hegemon. **By increasing its regional influence to promote stability and self-interest, the country can** extend its reach and economic influence across the region. The PRC is **likely** to continue using the Belt and Road Initiative (BRI) to establish regional dependencies. The global network of railroads, ports, highways, and infrastructure projects Beijing develops and funds primarily through loans to other nations expands its economic and geopolitical influence over regional countries through debt and trade while providing access to export markets and resources. Most Asian countries participate in the BRI (Figure 3).

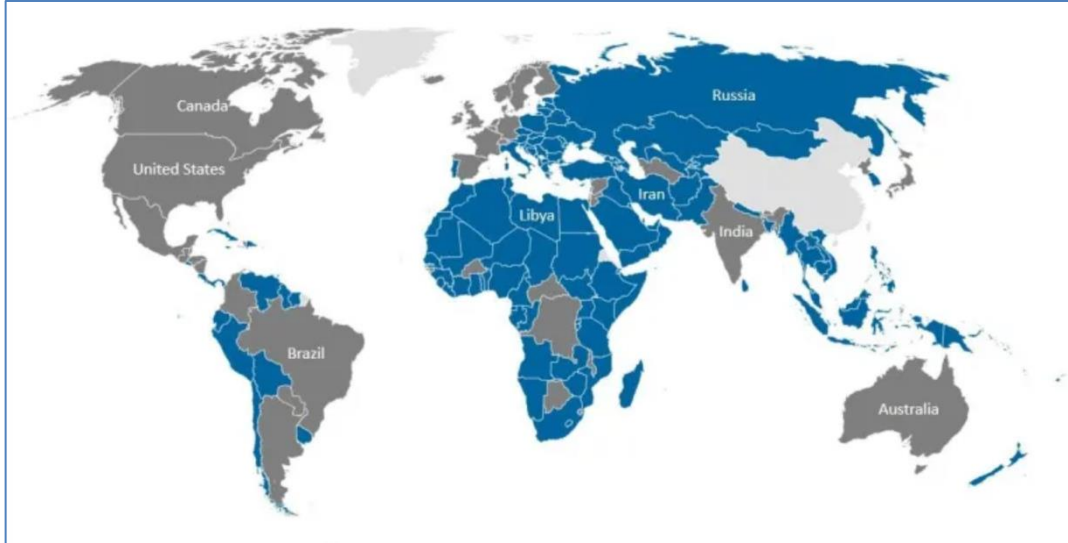


Figure 3: BRI Participating Countries Shade in Blue

However, China faces three obstacles to becoming the regional hegemon. First, continued BRI expansion and overseas investments will strain China's corporate debt and public debt levels. The Atlantic Council estimates the potential slowdown from deleveraging overseas lending and real estate debt reduction could cut its GDP growth by one percentage point per year until 2025. The number of loans from the PRC's two biggest policy banks has already fallen drastically from their 2016 highs (Figure 4). Reductions in regional investment are **likely** to limit China's ability to increase dependencies within the region.

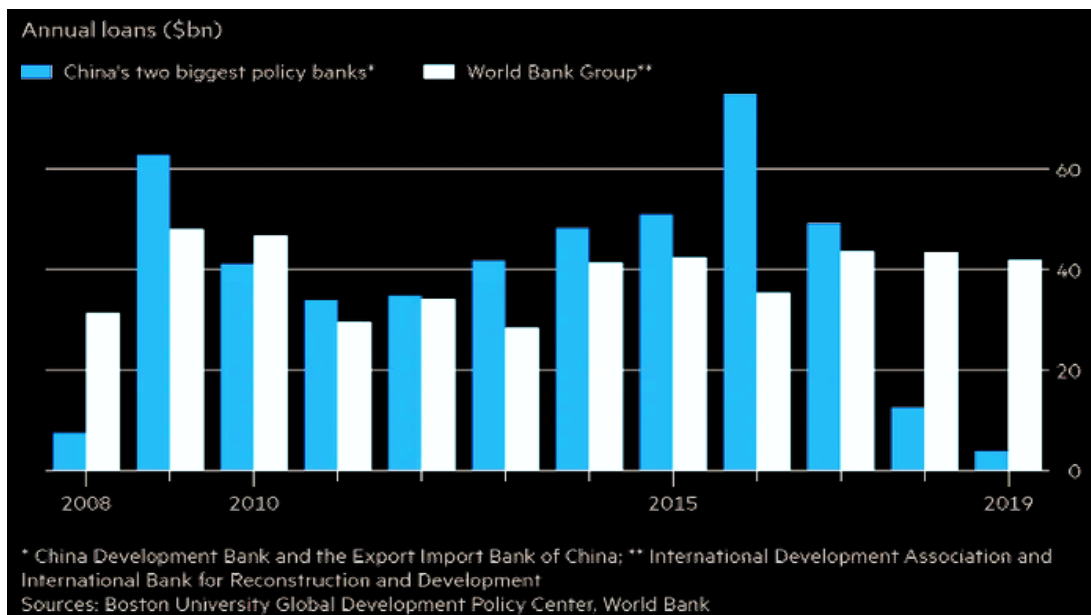


Figure 4: Chinese overseas lending \$ by year among its largest policy banks compared to World Bank lending

Second, while Chinese firms excel at "adaptive **innovation**" based on theft or forced technology transfer, they lack many advantages of an open economic system maximizing competition. Innovation is a product of flexible financing and trust in government institutions, and the PRC lacks these structural advantages for the foreseeable future. The CCP's centralized decision-making helps drive whole-of-government resource mobilization, but centrally driven models ultimately inhibit true innovation. Over the long term, the PRC's manufacturing productivity and economic health are questionable, but its regional dominance may go unchallenged.

Finally, following China's border dispute with **India** in 2020, China built alliances through the BRI, effectively surrounding India with ports capable of supporting the PLA-Navy. This move pushed India into strengthened relations with their Quadrilateral Security Dialogue (QUAD) partners and increased naval partnerships throughout the Indo-Pacific to counter Sino influence. The QUAD will **likely** continue to hinder Chinese regional dominance unless they amend their relationship with India.

Despite the **likely** reduction in its regional investments, China is **likely** to achieve a significant degree of regional influence based on the regional dependencies it has already established.

To reduce the Western influence in the region, China is likely to position itself as the regional economic and security partner of choice. Economically, Beijing is **highly likely** to use BRI-like infrastructure development initiatives to foster economic dependencies and develop influence in neighboring countries through trade agreements. Its trade with Asian countries accounts for half of China's exports, while key US Allies (e.g., Australia, Taiwan, South Korea, and Japan) have trade surpluses (Figure 5). Decisions on who can access its growing domestic market will shape regional trade.

If Beijing maintains its regional export and economic power, its partnership opportunities will **likely** increase. Chinese financial and export strength provides natural conduits to the rest of the region through signed agreements like the Regional Comprehensive Economic Partnership and an agreement between ASEAN and China to officially upgrade their ties to a comprehensive strategic partnership. The economic dependencies are **likely** to complicate international consensus on economic sanctions directed towards China.

China is also **likely** to increase participation in UN peacekeeping missions and disaster relief and participate in combined training exercises throughout the South China Sea to demonstrate its reliability as a security partner. Foreign Military Sales, including with US

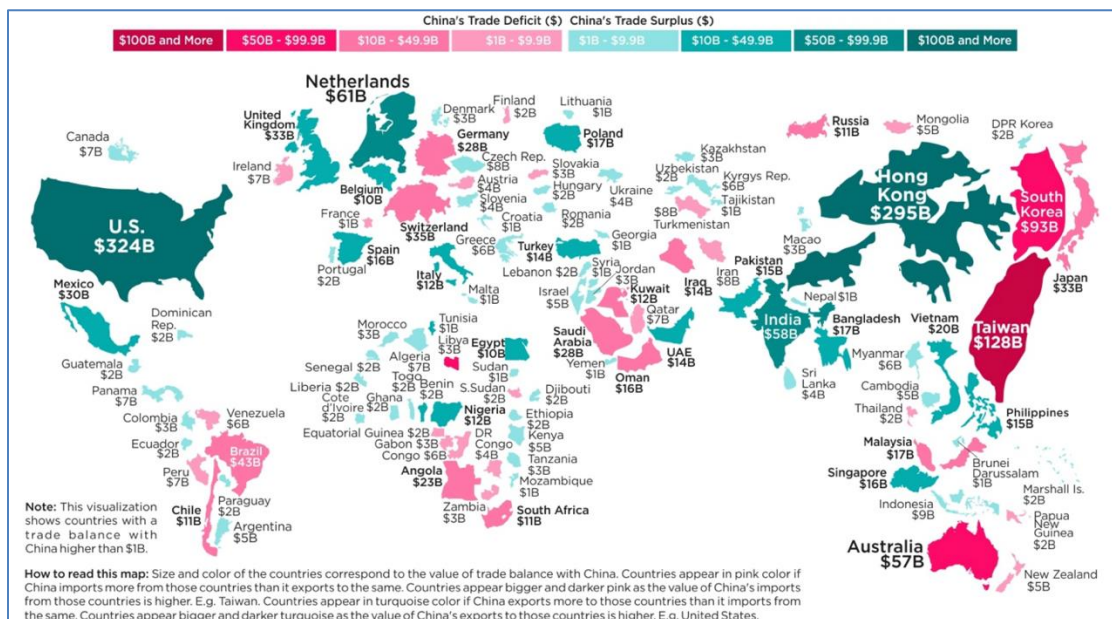


Figure 5: Chinese Trade Deficits/Surpluses

partners such as Thailand, increase opportunities for the PLA to engage with regional militaries and strengthen relationships.

Finally, Xi Jinping is **highly likely** to continue building alliances in the Indian Ocean through the BRI. Dual civil/military port projects in Pakistan, Myanmar, and Sri Lanka allow the PLA-Navy to isolate its regional geopolitical competitor, India, militarily. The China-Pakistan Economic Corridor project, connecting western China directly to the Indian Ocean shipping lanes through Pakistan's Gwadar Port with pipelines, railroads, and roads, is **likely** economically unviable. Still, the geopolitical benefit outweighs the cost if the isolation forces India to reach an accommodation with China and downgrade its relationship with the US.

Beijing faces challenges in becoming the economic and security partner of choice. As discussed earlier, the continued expansion of the BRI strains China's corporate debt and public debt levels, **likely** threatening financing for future infrastructure development projects. Its claims to disputed islands in their near seas and continued aggression toward Taiwan continue to cause friction, increase tension, and erode trust. The disputes are certain to push their SE Asian neighbors further toward security cooperation with the US, regardless of their economic ties.

Overall, China's chances are a **little less likely** to earn the required trust from its neighbors and drive the US out of the region, primarily due to the tension between their regional neighbors' economic ties to China, but security relationships with the US.

Finally, China must build an effective PLA and A2AD capability to develop a credible threat of hard power and deter intervention. Modernization through the development of precision-guided munitions, hypersonic glide vehicles, UAVs, cyber-warfare, and intelligentization enabling complex thinking and decision-making will **likely** provide an A2AD advantage. To this end, the PRC has invested billions of dollars in military modernization and reorganized the PLA into joint commands while increasing joint exercises with Russia and Iran. The modernization mainly focuses on deterring Western military interventions in the region.

The PLA faces significant modernization challenges due to its deep-seated culture of over-centralization of command authority, top-down control of military assets, and failure to incorporate the style of decentralized mission command demanded by technology-driven future warfare. They currently lack a plan to prioritize incorporating new technologies into their training strategy to challenge their soldiers to fight and win in a complex multi-domain environment.

Still, China is **likely** to achieve this goal due to its ambitions to reach parity with the West and its ability to radiate sharp power regionally.

Goal 3: Global Influence

First, China must increase its leadership in multinational organizations to establish its voice as a trusted leader. In its efforts to shape a revised international order, China is **likely** to execute a strategy of discourse power to project the China Story, attempting to persuade the global community that it is a trusted leader on the international stage. China is also **likely** to increase its leadership in supranational organizations like the United Nations, African Union, and Organization of Islamic Cooperation Council, among others, to shift global standards and norms to align with its vision. Beijing will utilize its extensive global diplomatic presence (the largest of any nation) as another network to broadcast narratives and advance its strategic interests (Figure 6).

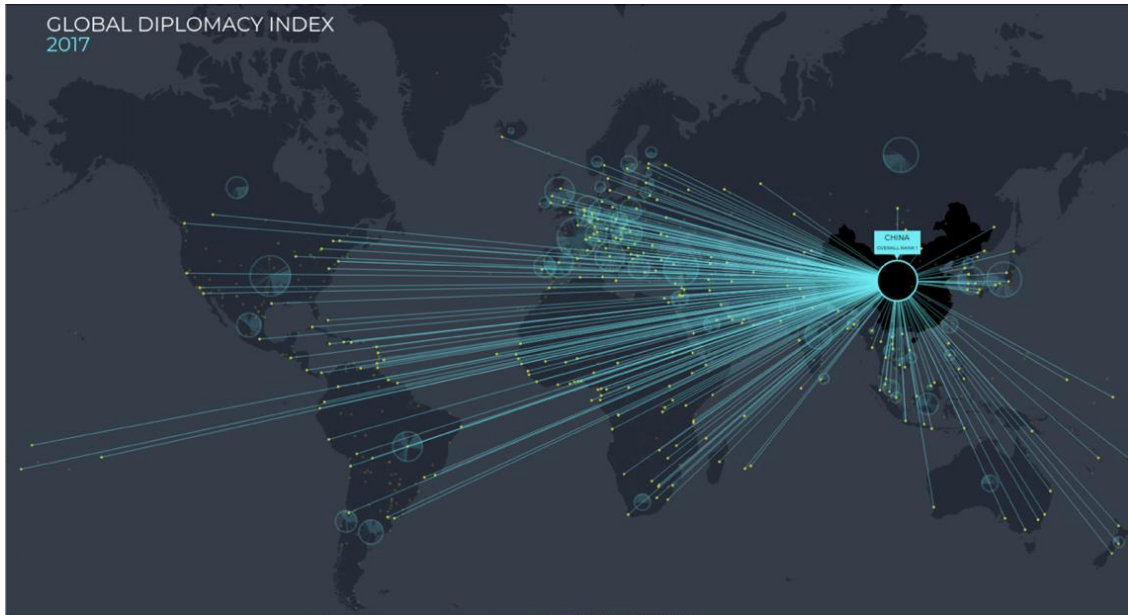


Figure 6: China has 276 Diplomatic Embassies and Representative Offices, the most of any nation

Beijing will prioritize influence operations in regions without significant Western engagement, promoting its multilateral approach as an alternative to the Western "unilateral" approach. Engagement through the Forum on China-Africa Cooperation (FOCAC), the Forum of China and the Community of Latin America and Caribbean States (China-CELAC Forum), and the China-Arab States Cooperation Forum (CASCF) provide opportunities to push its narratives and increase economic and political influence. They currently control 74 percent of broadcast media in the Middle East and Central Asia (compared to 7 percent for the US). Their highly favorable perceptions across the region demonstrate the strategy's effectiveness.

Beijing faces challenges using its influence tools, including increasing pressure from Western nations concerned with its rising global influence. Western discourse on issues such as the Russian invasion of Ukraine or human rights violations against the Uyghurs run counter to President Xi's desired image as a trusted global leader. This discourse will force the PRC to use countermeasures to address the disconnect between its actions and stated policy.

China is **highly likely** to assume significant leadership roles in multinational organizations by 2049. Divergences among five analyst predictions were minimal, given that leadership in these organizations is obtained at low cost. That said, analysts agree that leadership roles are contingent on factors like military peacekeeping commitments and BRI expansion. However, there is doubt PRC overseas lending programs can continue at the current rate, given looming debt issues.

Next, China is likely to use a multi-pronged approach to shape international standards and norms. Standards and norms are multifaceted and can have different meanings. For example, standards and norms can encompass technology standards like 6G networks or the adoption of international financial networks and payment systems.

China will use initiatives such as the BRI to establish international standards supporting its industrial policies. Using its considerable lead in next-generation technologies (e.g., 5G infrastructure, clean energy), Beijing intends to impose de facto global-standards and either block competition or force competitors to conform to their standards. Western nations fear the potential for a bifurcated internet and telecommunications systems split between an open system in the West and a censored system in the East. The country also intends to set global de jure standards. For example, their nationals fill one-third of the International Telecommunications Union study groups focused on establishing networked technology standards.

Beijing confronts technology challenges, including increased Western pushback on the use of its technologies, alleging the Chinese National Intelligence Law enables Beijing to collect intelligence through Huawei-built 5G networks and steal intellectual property. In response, the Trump Administration added Huawei to a trade blacklist in May 2019 and began successfully urging key allies and partners to do the same. The US Build Back Better World (B3W) Partnership and the European Union Global Gateway initiative attempt to counter Chinese influence by providing alternate sources of financing for digital infrastructure.

The PRC is **likely** to seek changes to international financial networks by establishing the RMB as a global reserve currency and developing an alternative payment structure to reduce US influence and minimize the effects of potential Western economic sanctions. Learning from the effective implementation of sanctions during the Ukraine conflict, Beijing will seek to undermine Western payment. To this end, the PRC's Cross-Border Interbank Payment System (CIPS) has the potential to become a viable substitute to SWIFT by 2049, provided its user base trusts the system and the network expands significantly beyond the current membership of 1,280 financial institutions.

China is also **likely** to push to increase the use of RMB and the digital e-Yuan as a global reserve currency over the Dollar, Euro, and Yen. A reserve currency represents the most significant proportion of currency held by central banks, where a nation reduces its exchange rate risk by managing its currency as a global reserve. Approximately 2.5 percent of worldwide official foreign exchange reserve claims are in RMB – far below the USD at 60 percent.

Beijing faces challenges relative to the use of these payment and currency tools. USD dominance will not end soon because the dollar represents a safe haven and US institutional strength support its primacy. Institutions that safeguard fundamental freedoms and private property rights are missing in China, and therefore global public trust in the RMB is diminished. Xi Jinping's concentration of power increases the liquidity risk associated with the RMB. Beijing needs to foster trust in its institutions and adopt a hands-off approach

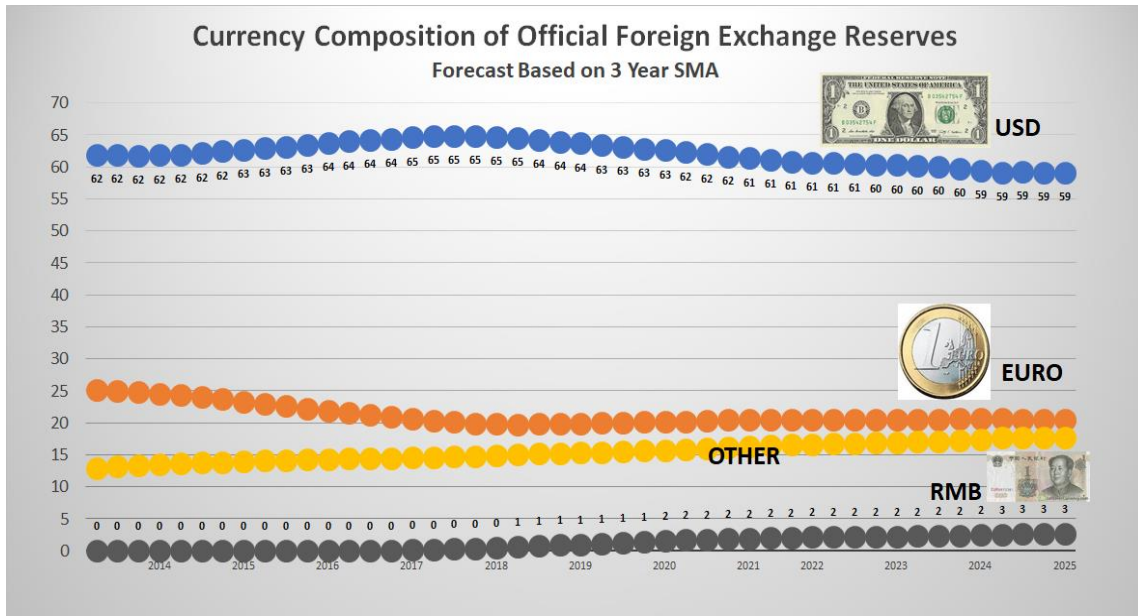


Figure 7: The projected percentage share of currency reserves held by central banks, 12 quarter simple moving average: 2014-2025 (forecast)

allowing its currency to float freely in foreign exchange markets to inspire broader RMB confidence.

Beijing faces challenges relative to the use of these payment and currency tools. China has ambitions to promote the RMB as an ascendant reserve currency, but it has a long way to go. USD dominance is **highly unlikely** to end soon because the dollar represents a safe haven, and US institutional strength supports its primacy. Many factors constrain CIPS as an alternative payment system. The RMB accounts for less than 3 percent of global trade, while the USD and EURO combined account for 77 percent. Buying US Treasury bonds represents the safest investment for China, although these transactions strengthen the USD and reduce the likelihood of CIPS becoming a payment standard.

Overall, we assess China is **likely** to **shape these international standards and norms** by 2049. China is most **likely** to succeed in standardizing new technology and exercising revisionist diplomacy but will **likely** experience far less success shaping global financial standards.

Conclusion

In the final analysis, the CCP will succeed in certain areas but fail in others. Ideally, goals, subgoals, and tools are measurable events with a quotient for either success or failure. In this context, perceptions are fundamental to gauging success and failure. For example, to the United States and the West, Beijing's failure does not always equal Western success. In economics, when Chinese markets fail their participants, the Western audiences may feel the effects of higher commodity prices that creep into household wallets. To Western eyes, when the United States describes China as a "pacing threat," it is desirable for a pacing threat to lose momentum. The West does not want an autocratic regime to deliver on a credible military force promise. Still, failure to do so could signal a revised political and economic consensus among CCP elites. This signal could represent success by Western assessments.

China will have global and regional influence whether the West wants it or not. Nor is its success a mutually exclusive condition as Western and Chinese fates are intertwined. As future scenarios are concerned, the PRC will achieve some of these ten subgoals but not others. This report forecasts a mean nominal-group response based on Chinese perceptions of success. The five analysts developed their predictions based on research and production of more than twenty-five short-form analytical reports.

Key Judgments

The following subgoals as **most likely** to materialize by 2049:

1. The CCP will consolidate and grow its power by implementing populace control measures to manage dissent and challenges to its authority (94 percent).
2. China will diversify its energy sources while reducing vulnerability to energy supply disruptions to meet growing demand (77 percent).
3. Beijing will establish its leadership in multinational organizations to position itself as a trusted leader and defender of the international order (74 percent).

China is **least likely** to achieve the following subgoals by 2049:

1. Building an effective PLA and A2AD to develop a credible threat of hard power (57 percent).
2. Reclaiming ancestral lands to include Taiwan and the islands within the 9-dash (54 percent).
3. Becoming the regional partner of choice (48 percent).

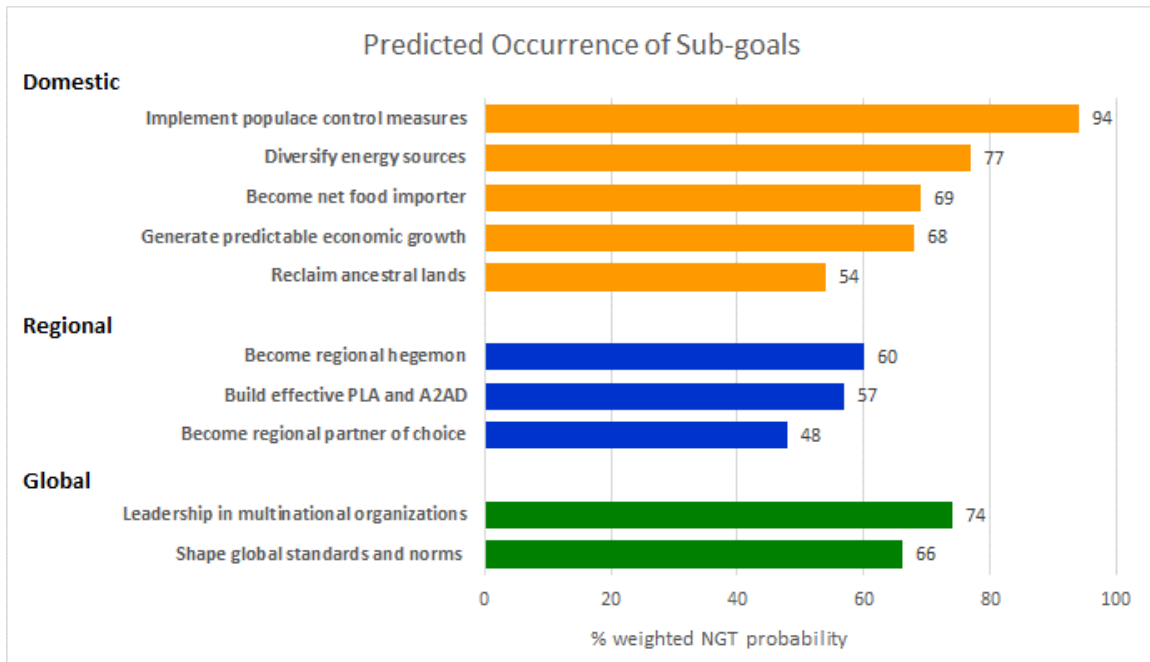


Figure 8: Key judgements and predicted probabilities of sub-goals

Each subgoal is aligned with an internal, regional, or global goal. According to these projections, Beijing will succeed in managing its internal security, while its regional and international aspirations are less certain. While Beijing will **likely** achieve success in positioning itself as a leader in multinational organizations, economic and business challenges may prevent the country from realizing any benefit. Future qualitative assessments should explore specific areas (e.g., international standards and norms) in highly tailored ways within the ten subgoal framework this report identifies.

Appendix 1 - Weighted Nominal Group Technique

A weighted nominal group technique (NGT) provided the prediction analysis. Each analyst applied a weight factor of one (analyst has limited knowledge of the subjects), a two (analyst has followed this subject in media reports or has researched previously), or a three (analyst wrote a short form analytical report on this subject) to their prediction.


Despite this weighting scheme, there were still "spreads" between the weighted and unweighted averages, but these were minor. Divergences among analyst predictions ("By 2049, China will shape international standards and norms") resulted from different interpretations. For example, Beijing may successfully shape technology standards (e.g., 5G) but fail in others (e.g., fostering widespread adoption of alternative payment systems).

Below are the raw NGT results.

		Eric	Andy	Stacy	Jon	Paul	Mean Scores
Internal Security	1a China will generate predictable economic growth to achieve economic prosperity and improve the lives of the estimated 25 percent of its citizens living below the World Bank poverty line for upper-middle-income countries	0.6	0.75	0.75	0.7	0.6	0.68
	1a weight	3	3	2	2	2	12
	1a weighted score	1.8	2.25	1.5	1.4	1.2	8.15
	1a weighted average						0.68
	1b The CCP will consolidate and grow its power through implementation of populace control measures to manage dissent and challenges to its authority.	0.99	0.9	0.95	0.95	0.9	0.94
	1b weight	2	1	3	1	2	9
	1b weighted score	1.98	0.9	2.85	0.95	1.8	8.48
	1b weighted average						0.94
	1c China will raise its food security level and become a net importer of food to meet the population's nutritional demands and increasing desire for higher quality of food by the growing middle class	0.9	0.6	0.7	0.75	0.4	0.67
	1c weight	3	1	2	1	2	9
	1c weighted score	2.7	0.6	1.4	0.75	0.8	6.25
	1c weighted average						0.69
	1d China will diversify its energy sources to meet growing demand while reducing vulnerability to energy supply disruptions.	0.7	0.5	0.85	0.9	0.9	0.77
	1d weight	2	3	3	3	2	13
	1d weighted score	1.4	1.5	2.55	2.7	1.8	9.95
	1d weighted average						0.77
Regional Hegemony	1e China will reclaim ancestral lands to include Taiwan, and the islands within the 9-dash.	0.67	0.6	0.5	0.7	0.4	0.57
	1e weight	2	1	1	1	3	8
	1e weighted score	1.34	0.6	0.5	0.7	1.2	4.34
	1e weighted average						0.54
	2a China will become the regional hegemon to promote stability and their own self-interests.	0.5	0.6	0.7	0.9	0.4	0.62
	2a weight	2	2	2	2	3	11
	2a weighted score	1	1.2	1.4	1.8	1.2	6.6
	2a weighted average						0.6
	2b China will be the regional partner of choice.	0.4	0.6	0.7	0.6	0.3	0.52
	2b weight	2	2	1	2	3	10
Global Branding	2b weighted score	0.8	1.2	0.7	1.2	0.9	4.8
	2b weighted average						0.48
	2c China will build an effective PLA and A2AD to develop a credible threat of hard power.	0.45	0.7	0.65	0.85	0.35	0.6
	2c weight	2	1	2	2	3	10
	2c weighted score	0.9	0.7	1.3	1.7	1.05	5.65
	2c weighted average						0.57
	3a China will establish its leadership in multinational organizations to establish itself as a trusted leader and defender of the international order	0.67	0.75	0.8	0.9	0.6	0.74
	3a weight	2	3	2	2	2	11
	3a weighted score	1.34	2.25	1.6	1.8	1.2	8.19
	3a weighted average						0.74
	3b China will shape international standards and norms.	0.35	0.6	0.7	0.9	0.9	0.69
	3b weight	3	3	3	2	2	13
	3b weighted score	1.05	1.8	2.1	1.8	1.8	8.55
	3b weighted average						0.66

Appendix 2 - Kesselman Words of Estimative Probability

The study used the Kesselman words of estimative probability (WEP).

Kesselman List of Estimative Words		
Certainty 100%		
Almost Certain	86-99%	 Likelihood
Highly Likely	71-85%	
Likely	56-70%	
Chances a Little Better [or Less]	46-55%	
Unlikely	31-45%	
Highly Unlikely	16-30%	
Remote	1-15%	
Impossibility 0%		

Appendix 3 - Peterson's Analytic Confidence Factors

Peterson's Analytic Confidence Factors

<i>PETERSON TABLE OF ANALYTIC CONFIDENCE ASSESSMENT</i>	Points Possible	Example Points
Use of Structured Method(s) In Analysis	(1-10)	7
<i>For example: ACH, IPB, Social Networking, Bayes, Simulation, etc...</i>		
<i>10 indicating highest possible score when considering factors below</i>		
<i>Consider:</i>		
Number of methods used		
Applicability of methods to the analysis		
Level of robustness of method		
Degree to which methods' results coincide		
Overall Source Reliability	(1-10)	7
A rating of 10 indicates the highest reliability		
Source Collaboration/Agreement: <i>Level of conflict amongst sources</i>	(1-5)	4
5: No conflict amongst sources		
4: Very little conflict amongst sources		
3: Moderate conflict amongst sources		
2: Significant conflict amongst sources		
1: Sources conflict on nearly all points		
Level Of Expertise On Subject/Topic & Experience	(1-5)	2
5: Deep, intimate knowledge and understanding & 3+ years experience with topic		
4: Wide knowledge & 1-3 years experience with topic		
3: Moderate knowledge & 8-12 months experience with topic		
2: Minimal knowledge & 0-5 months experience with the topic		
1: No knowledge & no experience with the topic		
Amount of Collaboration:	(1-5)	2
5: Part of aggregated individual analyses		
4: Worked on a team		
3: Worked with a partner		
2: Casual discussion		
1: Completely individual work		
Task Complexity	(1-5)	3
5: Minimally complex & challenging		
4: Somewhat complex & challenging		
3: Moderately complex & challenging		
2: Quite complex & challenging		
1: Very complex & highly challenging		
Time Pressure: <i>Time given to make analysis</i>	(1-5)	4
5: No deadline		
4: Easy to meet deadline		
3: Moderate deadline		
2: Demanding deadline		
1: Grossly inadequate deadline		
	Score:	29
	Total Possible:	45
	Analytic Confidence	
	Adjusted Score:	0.644444

Appendix 4 - Trust Scale and Website Evaluation Worksheet

Trust Scale and Website Evaluation Worksheet

Trust Scale and Web Site Evaluation Worksheet (Updated OCT 2013)														
Piece of Evidence #:													Score:	Trust Scale:
Criteria	Tips	Value	Y or N	Y or N	Y or N	Y or N	Y or N	Y or N	Y or N	Y or N	Y or N	Y or N	0	15-20 High
Content can be corroborated?	Check some of the site's facts	2												11-15 Moderate
Recommended by subject matter expert?	Doctor, biologist, country expert	2												6-10 Low
Author is reputable?	Google for opinions, ask others	2												5-0 Not Credible
You perceive site as accurate?	Check with other sources; check affiliations	1.5												
Information was reviewed by an editor or peers?	Science journals, newspapers	1.5												
Author is associated with a reputable org?	Google for opinions, ask others.	1.5												
Publisher is reputable?	Google for opinions, ask others.	1.5												
Authors and sources identified?	Trustworthy sources want to be known	1												
You perceive site as current?	Last update?	1												
Several other Web sites link to this one?	Sites only link to other sites they trust	1												
Recommended by a generalist?	Librarian, researcher	1												
Recommended by an independent subject guide?	A travel journal may suggest sites	1												
Domain includes a trademark name?	Trademark owners protect their marks	1												
Site's bias is clear?	Bias is OK if not hidden	1												
Site has professional look?	It should look like someone cares	1												
Total		20												

19 Dec 2001: The criteria and weighted values are based on a survey input from 66 analysts. For details see: <http://maxnorman.googlepages.com/analysis>. Edited for simplicity by Kristan J. Wheaton, OCT 2013
 13 Feb 2012: Excel Spreadsheet which adds auto-sum was produced by Bill Walsh, Deputy Director, Center for Intelligence Research Analysis and Training, Mercyhurst College.
 26 Jan 2013: Trust Scale and Web Site Evaluation Worksheet is in the PUBLIC DOMAIN.

China Almost Certain To Fail Building Military Capable Of Defeating US

Executive Summary

China is almost certain (86-99 percent) to fail building a modern military capable of defeating the United States in armed conflict due to inadequate modernization and intelligentization plans. Despite emerging as a world leader in innovative technologies and establishing effective anti-access area denial (A2/AD) capabilities in the South China Sea (SCS), mounting national debt and an unwillingness to accept cultural change will almost certainly prevent the People's Liberation Army (PLA) success.

Discussion

President Xi Jinping believes a modern military able to defeat the US is inextricably linked to achieving every element of Chinese rejuvenation.^[H] The PRC invested billions of dollars in military modernization and completely reorganized the PLA into joint commands, but there is no indication this effort will succeed.^[H] In his first order to the PLA in 2022, Xi acknowledged this shortfall and stressed the important role technology will play to win future wars.^[H] China's version of the US' National Training Center, the Zhurihe Training Site, appears disconnected from this vision and remain focused on recapturing Taiwan minimally impacting the military's readiness to fight future high-tech wars.^[H]



Figure 1: First US Autonomous Blackhawk Flight

China designed their intelligentization concept to enable complex thinking and decision-making at echelon to gain a decisive advantage.^[H] However, Xi underestimates how difficult this transformation is due to the PLA's deep-seated culture for over-centralization of command authority and top-down control

of military assets.^[H] Their culture does not accept failure effectively incentivizing leaders to prioritize simplistic training exercises that assure success, over complex scenarios with new weapon systems that will build true readiness.^[H] The PRC must also overcome a sizable US advantage in information and communications technology.^[H] Seven of the ten largest AI start-ups in the world are American companies, 50% of the world's leading innovators work for US companies, and although China has more patents in deep learning technology,^[H] the US recruits talent world-wide, while the PRC relies solely on domestic expertise.^[H] Additionally, it is unlikely their investments in autonomus weapon systems will surpass American capabilities. The PRC plans to modify outdated second and third

generation jet fighters with self-navigation technology to build a fleet of autonomous combat systems.^H However, the US Department of Defense (DoD) is already modifying legacy systems applying new advancements such as Sikorsky's MATRIX technology to enable the first successful unmanned Blackhawk flight earlier this year (Figure 1).^H

China's vision of future military dominance depends on PLA commanders psychologically dominating their opposition through better, faster decision-making.^H To enable this realization, they developed new weapons such as precision guided munitions, hypersonic glide vehicles, UAVs, and intend to use cyber-attacks to target US vulnerable battle network systems to achieve A2/AD goals.^H China's investment in quantum computing and hypersonic missiles created a modern and lethally equipped force.^H Heavy investment in AI powered technology for drone swarms over the past year also increased their technology-driven advantage.^M

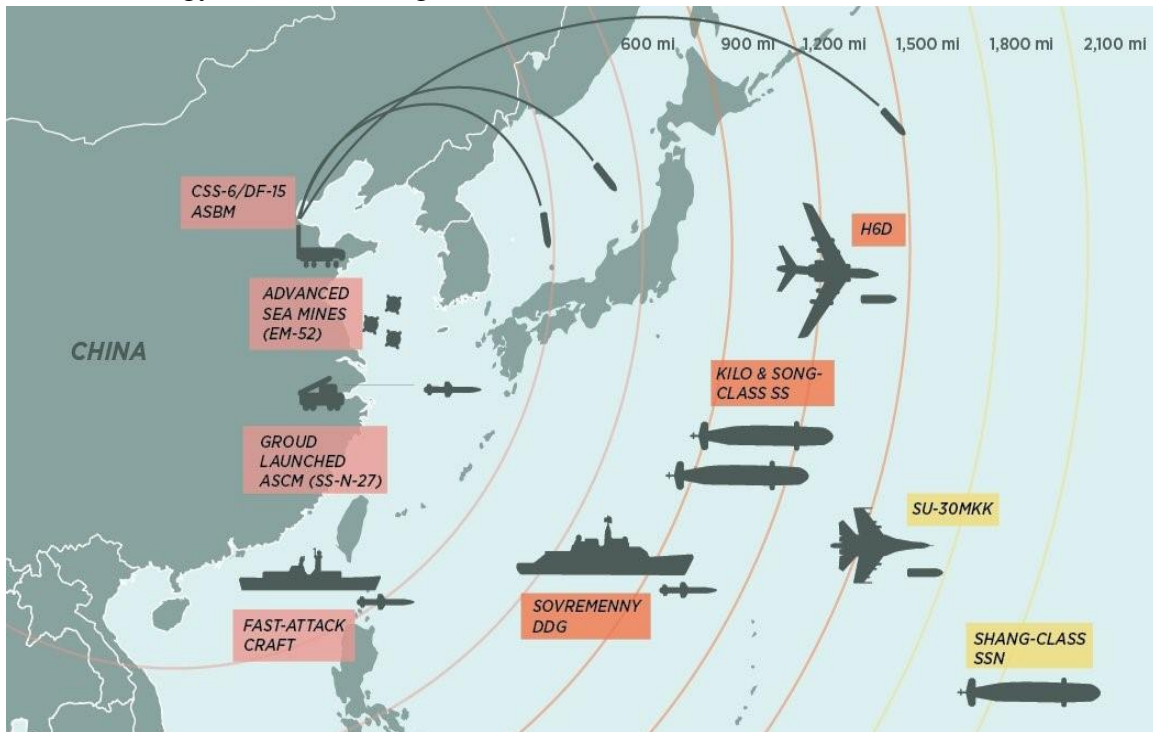


Figure 2: China's A2/AD Posture

One area of military success is their A2/AD zone which integrates a web of missile, sensor, and guidance technologies to deter international interference in Chinese domestic affairs (Figure 2).^H Micro photo reconnaissance satellites,^H electronic early warning intelligence aircraft, artificial islands fortified with anti-ship ballistic missile systems and air defense systems, and nuclear submarines aggregate to detect and intercept advancing forces.^H This system is enabled by quantum computing technology with communications that are long range, difficult to locate, and nearly impossible to break into rapidly passing information between early warning satellites and ground-based defense systems.^H

Beijing must overcome two remaining obstacles to achieve military dominance. First, the PRC's budget faces increasing challenges with the state pension system due to an aging population, likely to produce a USD 1.6 trillion annual deficit by 2050.^M Additional stress from growing national debt that already totals 300 percent of GDP will also likely slow defense spending.^H Second, the PLA is unlikely to meet the demands of future warfare due to military leadership resistance to transformation, reporting in one self-assessment that training with new weapon systems is not important because leaders will simply combine legacy weapons with new high-technology systems when called upon to defend China.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate*. There was an abundance of sources available detailing China's military progression. There was adequate time, the analyst worked alone and used an unstructured method. Finally, given the extended time horizon of the estimate, this report is sensitive to change due to new information.

Author: Paul Bonano

China Highly Likely To Fail Meeting Military Modernization Goals by 2035

Executive Summary

China is highly likely (71-85 percent) to fail completing military modernization by 2035 due to a training strategy which remains focused on fighting a low-tech regional war. Despite emerging as a world leader in innovative technologies and completely reorganizing the People's Liberation Army (PLA) force structure to become a more lethal joint force, they lack a plan to prioritize incorporating new technologies into their training strategy to challenge their Soldiers to fight and win in a complex multi-domain environment.

Discussion



Figure 1: PLA executes a mock assault at Zhurihe Training Site at a replica of Taiwan's Presidential Office Building

New weapon systems are helpful to power next generation technology, but training strategy shortfalls will likely inhibit their success.⁴ China invested billions in modernization efforts but there is no indication these technologies translated into widespread use during training.⁴ In his first order to the PLA in 2022, President Xi Jinping acknowledged this shortfall and stressed the important role technology will play to win future wars.⁴ China's version of the US' National Training Center, the Zhurihe

Training Site, increasingly improved realistic combat training with dedicated professional opposing forces, however they remain largely focused on recapturing Taiwan (Figure 1) and thus far, made minimal impact on military readiness to fight future high-tech wars.^H China's Defense Minister, General Wei confirmed this gap stating last year that “we are facing mounting tasks in national defense and we must comprehensively improve military training and preparedness.”^H Key areas of improvement include more rigorous and realistic training and addressing issues in the PLA's education systems related to conducting complex joint operations.^H

The PLA is unlikely to change their approach to training without experiencing a significant transformational event such as losing during armed conflict to motivate them. Military leadership does not grasp the real problem, reporting in one self-assessment that when fighting becomes necessary, leaders “will respond with the capabilities at hand, combining old weapons with new ones, high-technology systems with low-technology ones, and integrating military and civilian assets to defend China’s sovereignty, territorial claims, and national interests.”^H However, the reality is once conflict starts, it will highly likely be too late to incorporate new systems during the fast pace of conflict. The PLA’s culture does not accept failure effectively incentivizing leaders to prioritize simplistic training exercises that assure success, over complex scenarios that build true readiness.^H Some leaders resort to falsifying training records to portray their units at higher readiness levels for personal gain.^H

In 2017, China restructured and modernized their command-and-control force structure realigning the PLA’s military regions from a ground force centric formation into five Joint commands.^H They also established a Joint Logistics Support Force to improve sustainment operations and a Strategic Support Force (SSF) to synchronize evolving cyber, space and electronic warfare capabilities. Chinese doctrine added SSF team integration at the battalion level to operate AI-enabled ISR platforms and provide the needed rapid intelligence processing and situational awareness for commanders to make targeting decisions in order to win future wars.^H

China’s vision of future military dominance hinges on PLA commanders psychologically dominating their opposition through better, faster decision-making.^H To enable this realization, they developed new weapons such as precision guided munitions, hypersonic glide vehicles, UAVs, and intend to use cyber-attacks to target US vulnerable battle network systems to achieve A2/AD goals.^H China’s investment in quantum computing and hypersonic missiles created a modern and lethally equipped force.^H Heavy investment in AI powered technology for PLA drone swarms over the past year also increased their technology-driven advantage.^M

Analytic Confidence

The analytic confidence for this estimate is *moderate*. There was an abundance of sources available detailing China's modernization intentions with new technology. However, there is little evidence to support Chinese claims of technological effectiveness, and because China does not publish detailed PLA training and readiness reports, it is difficult to ascertain how far they have likely come with new equipment fielding and training applications under combat-like conditions. There was adequate time, the analyst worked alone and used an unstructured method. Finally, given the extended time horizon of the estimate, this report is sensitive to change due to new information.

Author: Paul Bonano

China's Intelligentization Efforts Unlikely To Produce Military Advantage By 2049

Executive Summary

China's current intelligentization strategy leveraging artificial intelligence (AI) to achieve a dominant military position over the US is unlikely (31-45 percent) to materialize before 2049. Despite investing billions of dollars in AI research producing a clear advantage in 5G technology and having access to big data, China has yet to surpass the US in communications and autonomous weapon development, they own less than 5 percent of the world's semiconductor market share, and their intelligentization strategy must overcome the People's Liberation Army's (PLA) cultural norms.

Discussion

Intelligentization is designed to enable complex thinking and decision-making to gain a decisive advantage.^{[H](#)} However, China has several obstacles to overcome before achieving intelligentized warfare including a sizable US advantage in information and communications technology.^{[H](#)} Seven of the ten largest AI start-ups in the world are American companies, 50% of the world's leading innovators work for US companies, and although China has more patents in deep learning technology,^{[H](#)} the US recruits talent world-wide, while the PRC relies solely on domestic expertise.^{[H](#)} Additionally, Chinese investments in autonomous weapon systems are unlikely to surpass American capabilities. The PRC's goal is to modify outdated second and third generation J-7 and J-8 jet fighters with autonomous self-navigation technology to build a fleet of autonomous



Figure 1: First US Autonomous Blackhawk Flight

combat systems.^{[H](#)} However, the US Department of Defense (DoD) is already modifying legacy systems applying new advancements such as Sikorsky's MATRIX technology which enabled the first successful unmanned Blackhawk flight earlier this year (Figure 1); military fixed-wing aircraft is now incorporating this technology as well.^{[H](#)}

Semiconductor contract manufacturers by market share

Total foundry revenue stood at \$85.13 billion in 2020

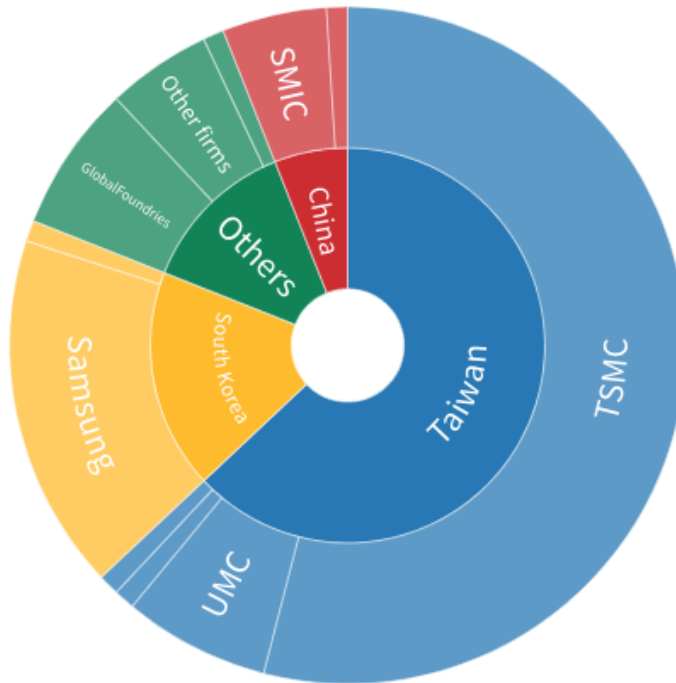


Figure 2: Semiconductor Manufacturer Global Market Share

Semiconductors remain a critical enabler for AI-powered technology and the US maintains an advantage possessing 50 percent of the global market share with 9 of the top 13 global chip designers.^H In 2020, China spent USD 350 billion buying 60 percent of the world's chip production and only 5 percent were domestically made,^H relying heavily on semiconductors made in Taiwan (Figure 2).^H Recognizing that is not sustainable, the PRC invested billions of dollars attempting to establish a domestic semiconductor industry, but with limited success.^H The challenge for China is twofold: first, their domestic fabrication capabilities are four to five technology generations behind the world leaders which will likely take more than a decade to overcome.^H Second, semiconductors require at least 2000 gallons of ultra-pure water to produce one chip, and water is a resource they severely lack possessing only 7 percent of the global water supply to support 20 percent of the world's population.^H

Chinese intelligentization is challenging to achieve and includes gaining information dominance to leverage target centric warfare capable of beating adversary operational systems.^H This requires developing unmanned intelligent combat systems, enhancing battlefield situational awareness and decision-making, conducting multi-domain offense

and defense, and facilitating advanced training, simulation, and wargaming practices. Simultaneously, they must achieve doctrine modifications to determine how to operate AI-enabled platforms and wage intelligentized warfare in an effective decentralized manner.^H Xi's vision for intelligentization underestimates just how difficult this transformation is based on the PLA's deep-seated culture for over-centralization of command authority and top-down control of military assets.^H China has yet to form suitable doctrine that mitigates this conflict.^H

President Xi remains wholly committed to prioritize AI research and development, investing USD 10 billion in 2021^H into quantum computing in an attempt to shift the speed of battlefield understanding and decision making in China's favor.^H He also acknowledged the need to incorporate innovation into PLA training making that the topic of his first order in 2022.^H To ensure they maintain homegrown expertise, Xi invested in talent development as dozens of universities and colleges received Ministry of Education funding in 2019 to dedicate new AI departments and begin offering it as a major.^H The PLA also reorganized its affiliated research institutes and military universities adjusting its recruitment policy to achieve improved talent management.^H The PRC is also ahead of US 5G technology development and implementation which is a requirement to quickly pass large amounts of data to achieve the high level of battlefield understanding intelligentization requires.^H Finally, China owns the advantage in possessing high-quality big data, a critical area required to train algorithms to enable machine learning.^H

Despite advances in technology, the pace and trajectory of autonomous weapon system development remains uncertain.^H Coding some elements of warfare into machine-readable data is difficult, and scientists find it challenging to understand the behavior patterns machine learning discovers, creating the risk of unreliability.^H Extended time-horizons for testing, experimentation and improvements in machine learning, along with competing demands for limited funding and China's decade-long bureaucratic capability development process will likely continue to delay autonomous weapon creation and fielding.^H As new technologies evolve, international use standards will likely require global acceptance agreements and further delay widespread implementation.^H The history of AI progress indicates the current increase in optimism and interest will highly likely (71-85 percent) lead to frustration and declining investments for several years, producing an "AI winter" pushing the projected impact to PLA capabilities out past 2049.^H

Due to this extended time horizon, China must resist the risk of over reliance on technological advances and divesting in modern combat platforms, a miscalculation highlighted by Russia's recent invasion of Ukraine. Anti-drone technology defeated Russian drones and their cyber-attacks became predictable, failing to produce the

instability and confusion expected. Simultaneously, weak cyber defensive measures made Russia susceptible to domestic cyber-attacks.^{[H](#)}

Analytic Confidence

The analytic confidence for this estimate is *moderate*. There were numerous sources available which appeared reliable based on the credibility of their publications. While they tended to corroborate one another, they did vary in the confidence of China's AI programs and development. However, a lack of credible evidence for the immediacy for PLA integration of new technologies as they come online led to a more conservative time horizon forecast. There was adequate time, the analyst worked alone and used an unstructured method. Finally, given the extended time horizon of the estimate, this report is sensitive to change due to new information.

Author: Paul Bonano

Chinese Growth Likely to Peak in 2030 Before Significant Decline

Executive Summary

China will likely (56-70 percent) experience a significant decline in gross domestic product (GDP) growth after 2030 due to a shrinking labor pool and increased social spending. Despite surpassing the United States as the world's largest economy in the next 8-10 years, future economic growth will likely decline relative to nations with increasing populations as technologies fail to stimulate growth potential lost with the retiring workforce.

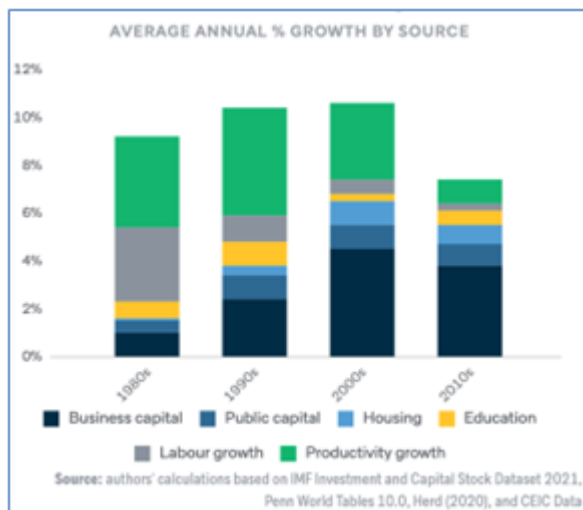


Figure 1: Chinese Drivers of Economic Growth

Discussion

China averaged almost 10 percent annual gross domestic product (GDP) growth since 1978, recently achieving over eight percent in 2021 (Figure 1).^H It will likely transition to a high-income country in 2023,^M joining only two other economies, Taiwan and South Korea, to shift from low- to high-income since World War II. ^H The decades of high growth are likely over as economists forecast future growth contracting as low as 3^M to 4.7^M percent through the end of the decade. Still, China's GDP will likely overtake the US

economy by 2030,^M before its growth declines to 2 percent annually by 2040.^M Meanwhile, US long-term economic growth is projected to average 1.6 percent through 2050, after averaging 2.5 percent from 1990 to 2019.^M

Historically, the three primary sources of China's GDP growth were capital, labor, and productivity (Figure 1).^H While favorable demographics and productivity gains initially contributed to China's economic growth, capital investment became the main driver in the 2010s.^H China now faces challenges finding growth in any of the drivers. China's working-age population (16 - 59-year-olds) dropped from 70 percent in 2010 to 63 percent in 2020.^H If fertility rates remain at the 2020 level of 1.3 children per woman,^H the 2050 working-age population will shrink by 260 million. In 2020, 10.5 million emigrants (often highly educated) left China in search of business opportunities and prosperity worldwide.^H Restrictive immigration policies hinder the recruitment of skilled

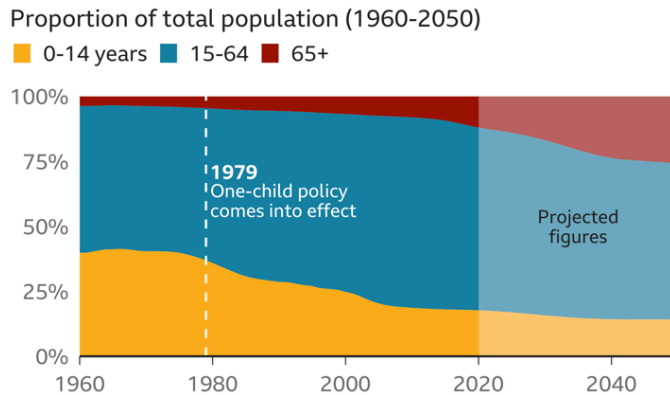


Figure 2: China Population Breakdown in 2021

growth is also slowing in China. Averaging 15 percent from 1995 to 2013, GDP growth slowed to an average of just under 6 percent from 2014 to 2018 as the working-age population reached its peak.^H Research indicates raising the mandatory retirement age from 60 to 65 for men and 55 to 60 for women could significantly increase the size and quality of the workforce. The plan's unpopularity led to a gradual implementation, extending the timeframe to see results.^H

China also faces increased social spending due to its aging population. Currently, the government spends 7 percent of GDP on social welfare, lagging the 20 percent average for wealthy countries.^H People over 60 years old account for almost 20 percent^H of the population with forecasts of one-third^H over 60 (460 million people)^H by 2050. With a 1:1 ratio of worker to retiree in 2050, the gap between contributions and outlays in the state pension system may reach USD 1.6 trillion, diverting public capital from more productive uses.^M Although Beijing relaxed its family policy in 2021 to allow three children per family; the country is unlikely to see an increase in births.^H Following the 2015 transition from the one-child policy to a two-child policy, deliveries increased in only one year before declining again.^H As evidenced in other aging countries, China will likely experience depressed consumer spending as savings are diverted from investments, further reducing growth potential.^H

China is investing heavily in technology (36 percent of the global USD 129 billion in 2020) to help solve the demographic crisis, eager to avoid the lessons learned from Japan and South Korea.^H Both countries saw significant losses in their manufacturing sectors when the workforce losses increased labor costs.^H China estimates a shortage of 30 million technical specialists as soon as 2025.^M They hope robots and machine learning will replace people, reduce operational costs, and enhance efficiency and productivity, preventing the loss of jobs to lower-cost neighbors.^H Manpower shortages also have

workers. They currently make up less than 1 percent of the population (compared to 14 percent for the US) but could fill gaps in critical technological fields.^H

Without significant improvement in labor productivity, the smaller workforce will reduce its competitiveness through rising labor costs^H while lowering the GDP growth rate.^H Productivity

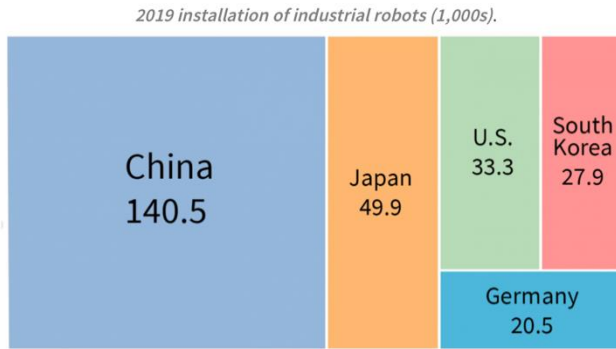


Figure 3: Global Installation of Robots in 2019H

between the US and China, including information technology and artificial intelligence, may ultimately doom Beijing's technological solution as US blacklistings prevent the import of critical components and foreign talent.^h It is still unclear if robots and machine learning can be the driver of growth necessary to maintain China's status as the world's largest economy from 2030 to the 2049 centenary of the People's Republic of China founding.

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources were generally reliable and tended to corroborate one another. However, the global digital economy is complex, with multiple high-income countries interested in expanding their market share. The long-time horizon makes the forecast vulnerable to unforeseen international events such as pandemics, recessions, and conflicts. There are still unknown impacts from the COVID-19 pandemic, including the effects of China's current lockdowns on future growth. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the time frame of the estimate, this report is sensitive to change due to new information.

defense implications. The People's Liberation Army (PLA), anticipating workforce shortages, is exploring the use of autonomous weapons and automated command tools for decision-making to reduce manning requirements.^h Their significant lead in the global installation of industrial robots bodes well for their efforts (Figure 3).^h Yet, the tech decoupling

Author: Andrew J. Wiker

Human Rights Suppression Will Almost Certain Continue for CCP to Remain in Power

Executive Summary

China will almost certain (86-99%) continue to suppress the human rights of its citizens to protect the power of the state and eliminate opposition to CCP control. With a history of revolutions, the CCP fears internal security threats as the most prominent opposition. Spending and technology development on internal security and policing increased at levels for repressive programs. The COVID pandemic and Hong Kong take-over brought more powers to the regime for controlling its people. Despite China's claims on the world stage for constitutional human rights, the average citizen or minority remains one of the most repressed populations.

Discussion

Domestic internal security and control of their citizens is the foundation for the CCP's grand strategy.^{[H](#)} The regime mistrusts its people, treating its citizens as a potentially hostile force to control.^{[H](#)} Although there are numerous human rights in China's Constitution, those rights are negated by Article 51, which states, "When exercising their freedoms and rights, citizens of the People's Republic of China (PRC) shall not undermine the interests of the state."^{[H](#)} "Those interests are all-encompassing, with the most important in maintaining the Chinese Communist Party's (CCP's) monopoly on power."^{[H](#)}



Figure 1: Tianamen Square Protects 5 June 1989

speech and assembly.^{[H](#)} However, after protesters began to criticize the CCP openly, those rights were revoked in 1980 by the National People's Congress.^{[H](#)} Even though economic prosperity increased living standards, personal freedoms and human rights remained in state control, as seen in the 1989 suppression in Tiananmen Square.^{[H](#)}

China's empires and transformations are from a history of violent revolutions.^{[H](#)} Modern China came from revolutions, first in 1911, ending the Qing Empire, followed by the civil war that led to the Communist Party victory in 1949.^{[H](#)} After Chairman Mao's death, a constitution in 1978 outlined progressive rights for freedoms of

Experts estimate that China spends more on domestic security than external security, tripling spending to 1.24 trillion yuan (USD 192B) in 2019.^{[H](#)} Control of the media, websites, universities, and businesses existed for decades.^{[H](#)} Tactics such as coercion, information control, and population monitoring continue to expand.^{[H](#)} Using facial recognition, AI, and data mining enables China to control more significant swaths of the population.^{[M](#)} A dystopian future that normalizes monitoring is in place in some areas with a social credit score to incentivize good behavior and punish bad behavior.^{[H](#)} Additionally, Beijing incentivizes individuals to report on neighbors not following the rules.^{[M](#)}

The Government is also engaged in programs targeting ethnic minorities to change demographics and ensure social stability.^{[H](#)} Under the premise of fighting ethnic separatism, religious extremism, and violent terrorism, China engages in documented human rights abuses.^{[H](#)} Reported abuses include coercive population control methods, forced labor, arbitrary detention in internment camps, torture, physical and sexual abuse, mass surveillance, family separation, and repression of cultural and religious expression.^{[H](#)} Domestic security spending increased 90 percent in 2018 in the Xinjiang province targeting the Uighur Muslim population.^{[H](#)}

During COVID, the Chinese government ~~has~~ gained even more control of its populace in its zero-tolerance policy toward infections as they imposed policies in the name of public health.^{[H](#)} The idea of loosening control and policies post-COVID to pre-pandemic levels is unlikely.^{[H](#)} The national security law imposed on Hong Kong strips individual, academic, and media freedoms while installing new security measures and denying those arrested a fair trial process.^{[H](#)} Separate Hong Kong freedoms could erode to levels of mainland China citizens' freedoms in just a few years.^{[H](#)}

As the CCP gains more power over its citizens, it becomes harder for an internal uprising to occur.^{[M](#)} A black swan event that could be used to overthrow the government is now monitored and targeted.^{[M](#)} Despite China's claims for human rights such as free speech, those freedoms are reserved only for specific categories of people, such as the wealthy or government elites.^{[H](#)}

Analytic Confidence

The analytic confidence for this estimate is high. Numerous sources were referenced, sources were reliable and corroborated one another. There was adequate time, but the analyst worked alone and did not follow a structured research method. Furthermore, given the lengthy outlook of this estimate, the estimate has the possibility to change given new or significant world events.

Author: Stacy Slate

US Regulator Move To Delist PRC Stocks From US Exchanges Poses Risks To Chinese Economic Growth

Executive Summary

The Chinese economy is likely to slow if the Securities and Exchange Commission (SEC) moves to delist Chinese stocks will threaten USD 1.1 trillion if 248 PRC companies that fail to comply with US regulator demands. Chinese stocks are likely to attract less investment over the next ten years (2032) and consequently, PRC military modernization is unlikely (31-45 percent) to keep pace with its current growth rate.

Discussion

The Holding Foreign Companies Accountable Act is a 2020 law that requires companies publicly listed on stock exchanges in the United States to declare they are not owned or controlled by the Chinese government.^{[H](#)} US enforcement agencies have identified clear patterns of misconduct in such areas as export control violation and other misconduct from secretive autocracies like The People's Republic of China (PRC).

The PRC has made strides to integrate Chinese firms into US capital markets through cross-listing on US exchanges and since at least 2013, Chinese companies have had access to US capital markets.^{[H](#)} Cross-listing enables Chinese firms to maximize investment through the issuance of publicly held company shares to US retail and institutional investors.^{[H](#)} Despite investing hundreds of billions of dollars into high-tech industries to support its global trajectory and military modernization goals,^{[H](#)} delisting stocks from US exchanges threatens to reduce capital inflows to PRC accounts and slow modernization growth.

During 2021, China adopted a set of severe regulatory and policy changes that exert stronger government control over domestic firms forcing new rules on a range of sectors.^{[H](#)} In an effort to protect its severe regulatory practices, the Chinese government has shielded its companies from US audit and legal authority.^{[H](#)} Strategists at Morgan Stanley expect the Securities and Exchange Commission (SEC) to act against Chinese firms that do not share their financial statements in upcoming annual reports for US regulatory inspection.^{[H](#)} As a result, 248 Chinese stocks are likely to face delisting if they continue to defy US auditing requirements.^{[H](#)} Experts predict that most of these 248 Chinese companies will no longer be listed in the United States by 2024.^{[H](#)} If that pattern holds, China will lose access to the world's biggest capital market shedding \$1.1 - 1.4 trillion of value from its stocks.^{[H](#)}

If the US moves forward to delist hundreds of Chinese firms, China will may generate investment and capital alternatives to finance PLA military modernization. To that end,

the Beijing stock exchange began trading in November 2021 as a secondary exchange (that also includes Shenzhen and Shanghai) to help smaller Chinese companies attract investment without US scrutiny.^{HH} At a minimum, China seems prepared for a divergence from the Washington Consensus but will have to work hard to attract global investment to these domestic exchanges, particularly if the PRC aligns itself with Russian interests (analyst comment).

Primary Offense	China Average Penalties	United States Average Penalties	China/U.S. Ratio
motor vehicle safety violation	82,000	8,928,321	0.0
consumer protection violation	1,785,000	28,776,610	0.1
aviation safety violation	25,000	385,583	0.1
price-fixing or anti-competitive practices	3,000,000	41,603,286	0.1
environmental violation	199,451	2,728,386	0.1
labor relations violation	36,904	419,213	0.1
banking violation	12,500,000	119,921,729	0.1
privacy violation	7,300,000	62,762,253	0.1
insurance violation	90,000	721,901	0.1
employment discrimination	374,466	2,040,209	0.2
energy conservation violation	8,000	32,044	0.2
wage and hour violation	1,076,563	2,587,848	0.4
investor protection violation	12,252,500	18,200,614	0.7
anti-money-laundering deficiencies	110,150,000	155,679,697	0.7
railroad safety violation	7,000	9,308	0.8
economic sanction violation	2,329,991	2,451,485	1.0
agribusiness violation	39,000	28,863	1.4
workplace safety or health violation	28,046	17,156	1.6
Family and Medical Leave Act	63,608	18,339	3.5
product safety violation	404,325,000	79,855,567	5.1
export control violation	518,642,013	5,136,334	101.0

Figure 1: Heatmap Comparison of Average US and Chinese Penalties Paid From US Regulatory Actions (2012-2021)

US regulators have had an uneasy relationship with Chinese firms for at least the last 10 years. Using a data extract from the non-profit Good Jobs First, Violation Tracker database (VT) from 2012-2022,¹ regulatory penalties cover a broad range of misconduct: everything from financial reporting to chemical spills and these penalties vary by size over time. The VT database combines federal and state agency fines but also captures the cost of supplementary expenses companies undertake as part of legal settlements.

When we compare US and Chinese firms over the past 10 years, we see a pattern among one type of violation: export control. On average, China has paid over 100 times as many

penalties as US firms over the last 10 years. Export control violations include exporting goods, information, or services from the United States (or US entities) to foreign entities in violation of US law. In China's case, most violations occurred from Zhongxing Telecommunications Equipment Corporation (ZTE) that registered four violations of exporting US technology to Iran and North Korea. ZTE operates in the United States with state-owned shareholders including the People's Liberation Army.⁴ ZTE USA is headquartered in Richardson, Texas but trades only in Hong Kong and Shenzhen.

ZTE is an example of how Chinese firms violate US administrative law through a lack of compliance and transparency to the SEC and the Department of Commerce. China may resist disclosure to US regulators because of its desire to circumvent enforcement actions against US sanctioned countries (analyst comment).

Analytic Confidence

If 248 Chinese firms are de-listed from US exchanges, the PRC will struggle to raise capital for state-sponsored initiatives – including national defense. Other western government attempts to open markets to foreign firms and investors (like the London-Shanghai Stock Connect) have also failed to take off against a backdrop of geopolitical mistrust.⁴ Analytic confidence in this estimate is high because there are many reliable sources and data from US regulators corroborates the analysis. The blindside hypothesis includes the possibility that delisting Chinese firms will not a material impact on the capital structure of Chinese firms of any magnitude. Much of what makes a national currency valuable is the trustworthiness of a country's institutions. US and western concern over whether China suffers Russian-style financial isolation renders PRC equity listings potentially un-investable and untrustworthy. Were China to build global trust in its institutions, it would come as the result of significant social and political change which itself would be a welcome event. Absent these changes, it seems unlikely the Beijing Stock Exchange (along with its Shenzhen and Shanghai mainland counterparts) will attract the same level of capital inflows hindering the Chinese economy and industry for decades.

Author: Eric P. Magistad

China's Food Security Is Important To Preserving Social Harmony And Economic Stability

Executive Summary

In a globalized world, food security is closely linked to its national security, energy security, and economic security.^{[H](#)} Amid covid-related disruptions to the global agricultural supply chain tensions with the West, China seeks self-sufficiency.^{[H](#)} It can achieve self-sufficiency either through 1) diversifying its internal food supply or it can 2) influence domestic demand and consumption by reducing food waste.^{[H](#)} Given China's desire to continue its population nourishment progress,^{[H](#)} its weak influence in food supply chains,^{[H](#)} higher global food prices, and the decline in arable land^{[H](#)} it is highly likely (71-85%) China will increase its food imports from overseas suppliers year-over-year to preserve population and economic stability.

Discussion

According to official PRC documents¹, Chinese food policy addresses self-independence and self-sufficiency policy and the CCP maintains that food security is the foundation of national security.^{[M](#)} High food prices and serious food shortages are key drivers of social and political unrest.^{[H](#)} China must find a way to contain these costs in order to preserve social harmony.

Food security is a global issue presenting opportunities and risks. Countries that can integrate emerging technologies to alleviate food shortages stand to amplify their influence abroad.^{[H](#)} Breakthroughs in global technology such as robotics, genetics, sensory data, and artificial intelligence will contribute to higher levels of productivity and food generation with a reduced environmental and animal impact.^{[H](#)} China is not immune to these export opportunities, but according to data, China is mainly a net exporter of rice.^{[H](#)}

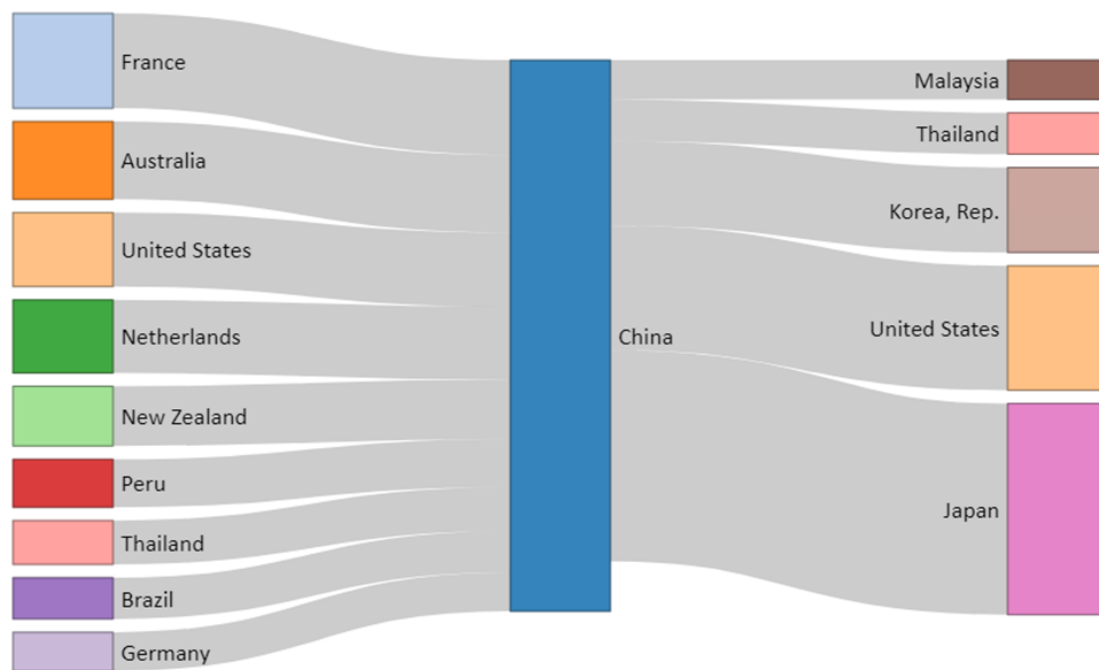
Short of technological breakthroughs, the PRC will compete with the US to remain a net exporter of food to satisfy its population and expand its influence abroad while also continuing to grow its imports. According to World Bank data², China imports 28.7 USD of its food but exports 32.7 USD which equals an exports to imports ratio of 1.1:1.^{[H](#)} By comparison, in 2009, imports were 6.4 billion USD (2019 current value) compared to exports of 16 billion USD (2019 current value) which equals a ratio of 2.5:1. While it is still a net exporter, China's export surplus has declined significantly since 2009 where the balance of imports to exports is nearly equal. By comparison, the United States is a net food importer although the import export balance has not shifted much in the last 10 years (see figure 1).^{[H](#)}

	2009			2019		
	Imports (billions USD)	Exports (billions USD)	E/I ratio	Imports (billions USD)	Exports (billions USD)	E/I ratio
China	6.4	16	2.5	28.7	32.7	1.1
U.S	41.7	27.7	0.7	75.3	45.3	0.6

Figure 1: US and China Food Import/Export Comparison

China's Top Food **Import Sources**
(where > 1 billion USD)

China's Top Food **Export Targets**
(where > 1 billion USD)



Total Imports to China = USD **28.7 billion** (2019)

Total Exports from China = USD **32.7 billion** (2019)

Figure 2: Top Food Import/Export Nations to China, 2019

China is on its way to becoming a major importer of food, perhaps as consumers demand more dietary diversity and undernourishment declines. China's undernourished population rate fell from 16.2 percent in 2000 to 8.6 percent in 2017.⁴ As global prices rise, imports will drive up costs (and risks) to the government. Heavy monetary stimulus during the pandemic helps drive food import inflation.⁵ If inflation represents a national security threat, China's food security needs are driven by its desire to reach self-sufficiency in staple grains, including wheat and rice.⁶ Despite these self-sufficiency goals, given how the dietary landscape of the country has changed, economic growth will be vital to the increasing costs of the population's demand for imports and dietary diversity.

Analytic Confidence

Analytic confidence in this estimate is moderate. Although the analyst had adequate time to study the issue and consult numerous sources, some of the trade data sources conflicts with other sources. However, the quantitative data from the World Bank matches many of the qualitative assessments. The blindside hypothesis includes the possibility that China reduces its import reliance based upon less complex dietary requirements. However, given how much China has changed in the 21st century, it seems unlikely it will reverse course on its nutritional and food diversity goals – even if it partially contravenes self-sufficiency traditions.

Author: Eric P. Magistad

China Highly Vulnerable to Energy Disruptions Through 2049

Executive Summary

China is highly unlikely (31-45%) to reduce its vulnerability to foreign fuel disruptions by 2049 due to its significant growth in demand and delays to Belt and Road Initiative (BRI) projects. Despite substantial investment to increase pipeline imports from Russia, Central Asia, and Southeast Asia, China will remain dependent on vulnerable sea lines of communication and imports from geopolitical competitors to meet its fuel requirements.

Discussion

In its 14th five-year plan for 2021-25, China identified dependence on oil and natural gas imports to meet growing energy demand as a strategic vulnerability.^{[H](#)} While domestic natural gas production should increase by just under five percent between 2020 and 2030,^{[M](#)} the country will remain dependent on imports to meet roughly a third of its requirements well past 2040 (Figure 1).^{[H](#)} In 2021, China imported an estimated 513 million metric tons (mt) of oil and 120 mt of natural gas,^{[H](#)} making it the world's top importer of oil and natural gas.^{[H](#)}

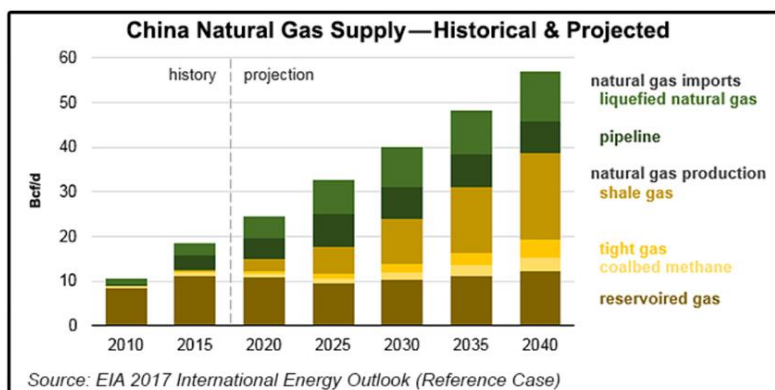


Figure 1: China Natural Gas Supply Projection. Future demand met through increased LNG imports and domestic shale gas production.

Maritime chokepoints, such as the Straits of Malacca,^{[H](#)} Straits of Hormuz,^{[H](#)} and the Suez Canal,^{[H](#)} present opportunities for accidental (e.g., *Ever Given* blockage of the Suez Canal)^{[H](#)} or deliberate (e.g., foreign navy)^{[H](#)} blockage of critical energy imports from Africa, the Middle East, Europe, and North America. In 2003, former Chinese President Hu Jintao referenced this as the "Malacca Dilemma."^{[H](#)} An estimated 70 percent of China's oil^{[H](#)} and 30 percent of liquid natural gas (LNG)^{[H](#)} imports transited the Malacca Straits in 2019. Alternate sea lanes through the Sunda and Lombok Straits exist but are geographically inconvenient, increasing cost and transit time.^{[H](#)}

Beijing initiated multiple pipeline projects under the BRI to mitigate the risk of energy disruption with varying success. The Myanmar-Yunnan pipeline became operational in 2017, allowing up to 22 mt of crude oil imports from the Middle East and Africa to reach China. Offload terminals in Myanmar allow overland oil movement to the Yunnan province, bypassing the Straits of Malacca.^{[H](#)} Beijing also constructed a network of natural gas pipelines extending north to the Caucasus, providing 35 percent of their 2019 natural

gas import requirements.^H Partnering with Russia, the Power of Siberia pipeline came on on-line in Dec 2019, providing 15 mt or 12 percent of annual natural gas imports in 2021.^H

China and Russia negotiated two new deals in February 2022 due to Russia's deteriorating relationship with Europe over Ukraine. On 04 Feb, Russia agreed to supply 7.5 million metric tons of natural gas via an additional pipeline from its Far East fields, beginning in 2-3 years.^H Under a new contract announced on 28 Feb, the Russian Gas Company, Gazprom, will design a new Russian pipeline, the Soyuz Vostok, to China via Mongolia.^H If built, the pipeline and an interconnector will allow Russia to redirect roughly 37 million metric tons of natural gas to China from gas fields currently flowing to Europe.^M Construction could begin as early as 2024 with full commissioning in 2027-2028.^M If completed, these projects will more than double Russian gas delivery from the 40 million tons delivered in 2021, potentially offsetting maritime delivery of LNG.^H However, Western sanctions against Russia over Ukraine could delay the projects. In March 2022, China's large state energy companies suspended several joint projects with Russia due to uncertainty of the impact of the sanctions on project financing.^M

In 2015, China revealed its USD 62 billion China-Pakistan Economic Corridor (CPEC), connecting western China directly to the Indian Ocean shipping lanes through Pakistan's Gwadar Port with pipelines, railroads, and roads (Figure 2).^H While CPEC pipelines would allow imported oil and LNG to bypass the Straits of Malacca, delivery costs of USD 15 per barrel compared to USD 2 per barrel by ship could make the project economically unsustainable.^M Challenging construction conditions include a 4700-meter elevation change, freezing temperatures, and security concerns, threatening the 2030 pipeline completion date.^H Still, China's USD 400 billion pact with Iran in April 2021 likely indicates a long-term desire to expand the CPEC further to incorporate Iranian pipeline supplied oil.^M The CPEC path through the Pakistan-administered Kashmir territory claimed by India further complicates the project.^H

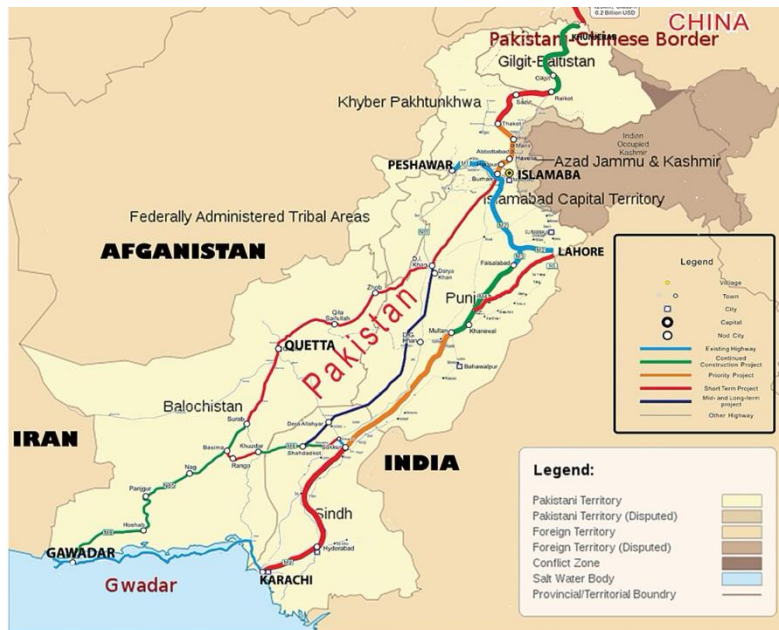


Figure 2: China-Pakistan Economic Corridor

Despite the increases from Russia and the Caucasus, China's dependence on geopolitical rivals for oil and natural gas continues to grow, increasing its vulnerability to supply disruption. In 2020 and 2021, the U.S. and Australia provided half of China's LNG imports, with the U.S. becoming Beijing's second-largest LNG supplier.⁴ In 2021,

Chinese companies completed four long-term deals to buy U.S. natural gas, locking in fuel dependencies for the next twenty years.⁵

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources considered are reliable and generally, supply consistent information across multiple sources. The complexities of the global energy market and geopolitics make this report susceptible to new information and external factors. The analyst was unable to access and verify Chinese source documents. There was adequate time, but the analyst worked alone and did not use a structured method. Given the time horizon of this estimate, this report is sensitive to new information.

Author: Andrew J. Wiker

China's Use Of Force In Reunification With Taiwan Unlikely Before 2035

Executive Summary

It is unlikely (31-40 percent) China will attempt forceful reunification with Taiwan before 2035 despite improved military readiness and anti-access area denial (A2/AD) technological advances. The risk of failure remains a strong deterrent for China whose chance of successfully completing an amphibious assault on Taiwan is unlikely. Additionally, US and partnered nations will highly likely (71-80 percent) impose detrimental economic sanctions should China attempt forceful reunification.



Figure 1: PLANMC conducts amphibious landing training exercises to improve chances of success in a cross-strait attack on Taiwan

Discussion

President Xi indicated that reunification with Taiwan is an inevitable requirement for realizing the great rejuvenation of the Chinese Nation, and the current status quo is the root cause for cross-strait instability.^H However, uncertainty with regard to a military victory will hinder rejuvenation efforts and likely eliminate this course of action for Xi. A failed attempt to take Taiwan is highly likely to lead to a perception that rejuvenation failed.^M Xi is highly unlikely (21-30 percent) to take that chance and his priority on domestic stability will likely continue to drive China's decision-making cycle on options for Taiwan in the direction of the status quo.^H

In order to both improve their chance of success in forceful reunification with Taiwan and deter American intervention, China continues to grow their number of amphibious landing vessels and the size of their Marine Corps while increasing amphibious landing aptitude through training exercises (Figure 1).^H However, they still lack the equipment, personnel and training proficiency to likely achieve success in a war with Taiwan.^H Although China will highly likely meet stated military modernization goals between 2030-2035, a large gap still exists in the required aptitude of their Marine Corps, which tripled in size since 2017 and remains relatively young and inexperienced.^H Rachel Esplin Odell, Chinese foreign policy and maritime dispute expert explained “the PLA still lacks the naval and air assets necessary to pull off a successful cross-strait attack. Just as important, it suffers from weaknesses in training, in the willingness or ability of junior officers to take initiative, and in the ability to coordinate ground, sea, and air forces in large, complex operations.”^H China’s global ambitions may further detract from preparation of forceful reunification with Taiwan as the PLANMC remains committed to other priorities including maintaining a presence in Djibouti, committing marines indefinitely to counter-piracy operations in the Gulf of Aden to protect PRC economic interests, and a broad training focus to operate in a variety of climates.^H

An attempt at forceful occupation of Taiwan would also very likely result in impeding economic sanctions from US and partnered nations who comprise of 60 percent of Chinese export partners.^H The US already demonstrated the ability to disrupt the global sale of semiconductors to the Chinese company Huawei, a strategy they are very likely employ on a larger scale to increase economic sanction impacts, further hindering China’s rejuvenation goals.^M Additionally, the US Senate continues to search for new legislative deterrence measures including heavy sanctions on Chinese financial institutions, industrial sectors, investments, and export bans.^H Former Japanese Prime Minister Shinzo Abe called a Chinese attack economic suicide^H and many agree armed conflict with Taiwan would likely destroy China’s economic growth, a key pillar of Xi’s strategy for achieving China’s 2049 goals.^H Xi will remain unlikely to accept the risk of collapsing China’s economy over Taiwan until he is confident the economy can withstand US sanctions.

China’s A2/AD zone is an area of strength integrating a web of missile, sensor and guidance technologies to deter international interference in Chinese domestic affairs (Figure 2).^H Micro photo reconnaissance satellites,^H electronic early warning intelligence aircraft, artificial islands fortified with anti-ship ballistic missile systems and air defense systems, and nuclear submarines aggregate to detect and intercept advancing forces.^H This system is enabled by quantum computing technology with communications that are long range, difficult to locate, and nearly impossible to break into rapidly passing information between early warning satellites and ground-based defense systems.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate*. There were numerous sources available which appeared reliable based on the credibility of their publications. While they tended to corroborate one another, they did vary in time horizon estimates. There was adequate time, the analyst worked alone and used a structured method. Finally, given the extended time horizon of the estimate, this report is sensitive to change due to new information.

Author: Paul Bonano

China Highly Unlikely To Replace United States As Southeast Asia's Security Partner Of Choice

Executive Summary

China is highly unlikely (71-85 percent) to successfully create divisions between the US and its SE Asian partners and allies due to territorial water disputes in the South China Sea (SCS). Despite the People's Liberation Army's (PLA) continued military modernization, combined joint military cooperation with Russia, and the regions strong desire to improve international relations with China, they remain highly unlikely to become more influential than the US in the region.

Discussion

After refusing to condemn the Russian invasion in Ukraine effectively deteriorating their relationship with the EU and hindering trade and diplomatic cooperation in Europe, China's relationship with ASEAN nations suddenly gained renewed strategic importance.^h However, the PRC remains highly unlikely (16-30 percent) to capitalize on this opportunity because ASEAN sees its relationship with Beijing as an inclusive order



Figure 1: China's 9 Dash Line Territorial Water Claim in the South China Sea

of co-existence with opportunities for all nations to diversify their options, whereas China remains committed to promoting a hierarchical order where their own centrality in regional leadership is paramount. ^h While Xi Jinping believes “inclusiveness” and “open regionalism” are common values to build on, their near seas neighbors remain anxiety-ridden over the PRC's willingness to constrain their countries' sovereignty and

foreign policy choices. ^h This is largely based on territorial and maritime disputes in the SCS where Beijing's assertive behavior continues unabated, threatening the maritime rights and interests of other Southeast Asian states.^h Philippine President Rodrigo Duterte initially took a pro-China, anti-US stance upon taking office in 2016.^h However Xi's aggressive military actions against Philippine naval vessels and his insistence on territorial claims in the Spratly Islands proved to be enough for Duterte to abandon his pro-Sino endeavor and resume political norms with the US.^h Finally, Xi's hostile naval

actions to disrupt operations in the exclusive economic zones of both Vietnam and Malaysia made adversaries of both nations.^H China's unwavering commitment to enforcing their claim in the SCS around their self-proclaimed 9-dash line (Figure 1) will highly likely continue to prevent regional trust and security cooperation.^H

Alternatively, the US offers greater stability and is almost certain (86-99%) to remain a dependable security partner in the region maintaining bilateral military cooperation with Australia, the Philippines, Thailand, India, Singapore, Indonesia, and Vietnam.^H While China unilaterally claimed disputed territory in the Spratly and Paracel Islands to build military bases, America relied on alliances to establish bases in South Korea, Japan the Philippines and Singapore.^H



Figure 2: China and Russia conduct joint military exercise in 2021 at China's Zhurihe Training Site

China's naval growth and modernization is directly supporting President Xi's determination to advance security interests in East Asia by challenging US alliances and security interests.^H For almost two decades, they steadily increased military cooperation with Russia including multiple joint exercises in 2021 (Figure 2) in an attempt to achieve this goal.^H In addition to joint aviation patrols in the Asia-Pacific region, Chinese participation in Russia's annual strategic exercises and command

post exercises simulating combined missile defense tasks increased interoperability.^H The two nations now seem prepared to extend their drills into the cyber and space domains, and may also incorporate the use of advanced drones, electronic warfare tests, artificial intelligence-enhanced systems, and employment of both militaries' new hypersonic missiles to demonstrate increased military strength.^H

SE Asian nations provided several indications they likely desire improved SINO collaboration, even if it comes at the expense of US relations. President Duterte reduced naval cooperation with the US and threatened to end the nation's visiting forces agreement with America.^H He also expanded Chinese naval access to Philippine ports in exchange for restored economic cooperation, \$24 billion in aid, military assistance to defeat its Muslim insurgency, and additional access for his fishing vessels in disputed SCS waters.^H The Regional Comprehensive Economic Partnership (RCEP), which took effect 1 January 2022 conveyed China and the fourteen other regional members fully intend to improve regional economic cooperation.^H Additionally, ASEAN and China

officially upgraded their ties to a comprehensive strategic partnership (CSP) last year, signaling increased cooperation in a range of sectors including greater priority in foreign affairs, security and defense, and economic policymaking.^H To further build on these relationships, China also increased participation in UN peacekeeping missions and disaster relief, and conducted combined training exercises^H in the SCS with Thailand, Cambodia, and the Phillipines.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate*. There was an abundance of sources available which appeared reliable based on the credibility of their publications. They tended to corroborate one another and reinforced SE Asian security concerns promoting distrust towards China. There was adequate time, the analyst worked alone and used an unstructured method. Finally, given the extended time horizon of the estimate, this report is sensitive to change due to new information.

Author: Paul Bonano

China Likely To Resume Cooperation With India By 2027

Executive Summary

China is likely (56-70 percent) to transition from competition to cooperation with India by 2027 to become the world's dominant power by 2049. Despite border disputes serving as the primary source of friction between these two states, India's desire for improved economic and security relations, and China's pursuit to weaken US influence in the Indo-Pacific to improve their own security posture will likely return these two nations to cooperation.

Discussion

The last twenty years demonstrated a propensity for increased cooperation between these two neighbors including joint participation in international and regional organizations such as the Asian Infrastructure Investment Bank.^[H] Both are also members of the BRICS (Brazil, Russia, India, China, and South Africa), a group of nations with common goals to promote peace, security, development and cooperation outside of the US led international



Figure 1: PRC President Xi Jinping and Indian Prime Minister Narendra Modi meet to improve China-India relations in 2019

order.^[H] India Prime Minister Narendra Modi offered numerous indications he desires a better relationship with China, meeting with Xi Jinping eighteen times from 2016 to 2020 (Figure 1).^[H] Xi demonstrated reciprocity by agreeing to establish a High-Level Trade Dialogue (HLTD) to improve bilateral trade and business cooperation.^[H] The two nations grew economically intertwined as the PRC became India's largest trading partner with two-way trade growing over 35% in 2021 and now exceeding USD 100 billion.^[H] The two leaders intended for 2020 to be the year of India-China cultural exchanges with 70 events planned between legislative, political parties, cultural and youth organizations, and even included military cooperation before relations deteriorated over border tensions.^[H]

Military escalation in the border region referred to as the Line of Actual Control (LAC) remains cooperation's primary obstacle.^[H] Since 2019, Xi expanded military presence in the area and began building towns along the border paying Tibetan citizens to relocate

there in support of PRC territorial claims.^H He then endorsed plans to build a dam on the Brahmaputra river near the LAC despite India's objections that the dam would provide PRC control over the water flow, potentially leading to a number of detrimental outcomes for India.^H Modi, responding to escalation, increased military presence, began patrolling portions of the LAC, and built a new road to a high-altitude air base in the region.^H Tensions escalated into hand-to-hand combat in June 2020 killing 20 Indian and 4 Chinese Soldiers effectively ending productive relations between the two nations.^H

For Modi, the most critical piece of the border is a narrow 50-mile stretch of land that connects the far east states to the rest of India.^H For Xi, a territorial dispute in Ladakh near the LAC is the key point of contention.^H He views that land as critical terrain for two reasons: it is the 6th Dalai Lama's birthplace and conceding that it is not Chinese terrain means the Dalai Lama is also not Chinese, leading to questions about Beijing's right to sovereignty over Tibet.^H Second, the land contains the only national highway directly connecting Beijing to their western front.^H For Xi, the border dispute does not preclude Sino-Indian cooperation in other areas, but from New Delhi's perspective, tensions must deescalate reducing the 50 thousand troops each nation maintains in the area before any cooperation resumes.^H

Rather than continue negotiations on LAC disputes, Xi opted to build alliances through the Belt and Road Initiative with Pakistan, Myanmar and Sri Lanka, effectively surrounding India with ports along the coast capable of supporting the PLAN.^M Modi responded by renewing relations with Quadrilateral Security Dialogue (QUAD) partners US, Japan, and Australia.^H Xi views this partnership as a direct threat to national security and allows increased US influence and access in the region, negating much of the security standoff he achieved through Anti-Access Area Denial (A2/AD) in the near seas.^H India also increased naval partnerships throughout the Indo-Pacific to counter Sino influence, participating in security exercises with the Philippines, Vietnam, Singapore, Indonesia, and Australia.^H New Delhi will also likely attempt to compel nations such as Sri Lanka, Nepal, and Bangladesh to limit additional cooperation with China further hindering Xi's ambitions.^H

A return to cooperation will likely win out with both national leaders motivated to find areas for Sino-Indian cooperation.^H Ultimately for Xi, this competition will highly likely (71-85 percent) continue to detract from his global ambitions forcing him to contend with a regional US ally who shares 2500 miles of border and is growing closer every day to his adversaries.^H He also now views the cooperation of the Quad as a "consequential challenge" to his rejuvenation goals, so repairing relations with India will improve their chances (46-55 percent) at disrupting the Quad's broader China containment aspirations.^H Modi has trepidation about the US's reliability and their consistency on Chinese policy,

as well as concern over maintaining good relations with Vladimir Putin who he believes possesses at least some degree of influence over Xi.^H Finally, both nations took a similar position toward the invasion in Ukraine, resisting pressure at the United Nations Security Council to condemn Moscow, likely due to their defense and energy ties to Russia.^H These ties make Russia a likely third party to pull China and India back into cooperation.

Analytic Confidence

The analytic confidence for this estimate is *moderate*. There were numerous sources available which appeared reliable based on the credibility of their publications. While they tended to corroborate one another, they did vary in the level of importance that China should place on their relationship with India. Additionally, with new global tensions caused by the Russia-Ukraine conflict, there are not many sources yet on how Russia will ultimately influence this estimate. What little there is suggests Russia will be a polarizing factor to eventually motivate a return to cooperation. There was adequate time, the analyst worked alone and used an unstructured method. Finally, given the extended time horizon of the estimate, this report is sensitive to change due to new information.

Author: Paul Bonano

China's Modernization Efforts Face Innovation Deficit Heading Into 2035

Executive Summary

Economic innovation weaknesses make China highly unlikely (16-30 percent) to outpace US defense modernization efforts through 2035 despite efforts to imitate other nations' next generation technology. Similarly, the PRC is likely (56-70 percent) to lose access to Western markets and foreign capital sources because of its inability to attract foreign investment which will hinder innovation funding and the commercial application of invention. Because of the CCP's innovation "Achilles Heel," China will struggle to grow its economy and match US defense modernization efforts by 2035.

Discussion

Two major indices gauging innovation levels include the Global Innovation Index (GII)^{[H](#)} produced annually by the World Intellectual Property Organization (WIPO) and the International Innovation Index produced jointly by the Boston Consulting Group. GII is computed through a simple average of the scores in two sub-indices, the Innovation Input Index, and Innovation Output Index, which themselves are composed of five and two dimensions, respectively. The International Innovation Index measures both innovation inputs and outputs where inputs include government and fiscal policy, education policy and the innovation environment and outputs include patents, technology transfer, and other R&D results. A third indicator of innovation is simply the raw number of patent applications and grants a nation produces.^{[H](#)} Innovation contributes to economic expansion which funds military modernization to include materiel, doctrine, and training. While China ranks high on patent conversion (grants divided by applications), the PRC fares poorly on GII measures like institutional strength which encapsulates the political and regulatory environment. In other words, researchers, inventors, and investors have limited trust in CCP government institutions and legal regimes. China also ranks low on the GII measure of creative outputs: Intangible assets that comprise the creativity of goods and services a nation produces.

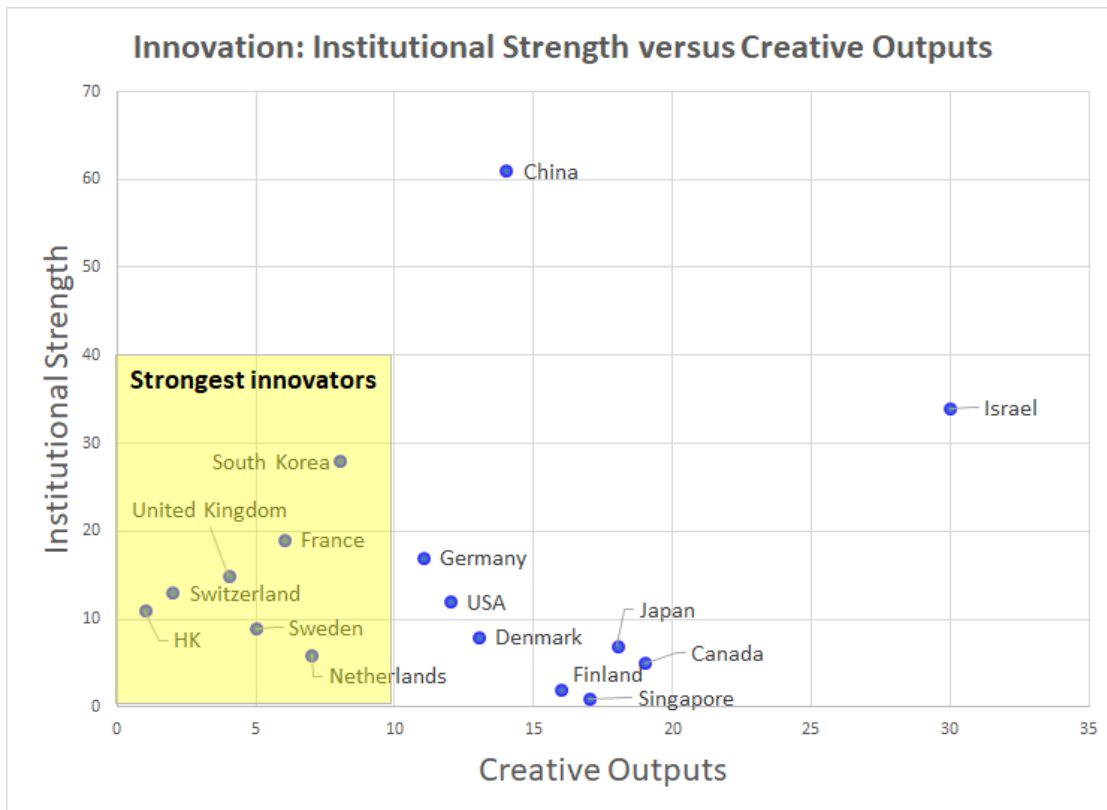


Figure 1: Ranking of selected nations on institutional strength and creative outputs. Lower values are better.

In sum, these two GII measures imply fundamental innovation ingredients like intellectual property rights protection and a flexible financial system that funds startups and provides various capital support services at various stages of product development.⁴

Innovation weaknesses raise questions about China's ability to expand its economy, indefinitely. The CCP requires reform if it wants to compete as a global manufacturer in line with Beijing Consensus expectations. In the words of Xi Jinping, "a lack of innovation is China's Achilles' heel."⁵ While this kind of vulnerability is a weakness, it also reduces the PRC's capacity to weather ordinary economic contraction and geopolitical tensions.⁶ Innovation shortcomings complicate Sino-US trade frictions and a slowing domestic economy more than they would without this "Achilles heel."

Since the 1990s, China has become manufacturer to the world, and imitation and intellectual property theft (along with a predictably weak RMB) fuels export demand.⁷ Brute force imitation does not stop at forced technology transfer or intellectual property rights theft. Apple's products have been a target of Chinese piracy, but the PRC has taken it a step further opening fake Apple stores with employees who think they work for the US company.⁸ Despite this level of imitation, the Harvard Business Review analysis asserts the PRC has no shortage of entrepreneurs among its population who can

contribute to a culture of innovation. The forces of the CCP's influence over education and free speech give rise to a private enterprise system unaccustomed to creativity among its designers and engineers.^{[H](#)}

Over the last decade, China has made noteworthy technological advances achieving major a breakthrough launching the world's first quantum satellite in 2016^{[H](#)} but these breakthroughs do not translate into sustained innovation. As the PRC advances in quantum technology, a field with clear strategic defense potential, Chinese research is state-driven and concentrated with a few universities and companies.^{[H](#)} Research in the US is more disparate and spread across dozens of universities and private firms offering better funding potential.^{[H](#)} The PRC faces systemic challenges including high error rates and a scientific talent gap (i.e., brain drain)^{[H](#)} and researchers raise questions about whether true cooperation and investment between the CCP and industry can compete with the market efficiencies of public-private initiatives like SpaceX, Orbital ATK, or Microsoft Federal in the United States.^{[H](#)}

Brookings describes true innovation as the profitable implementation of ideas versus just raw invention activity.^{[H](#)} In one example, Brookings' analysts calculated the ratio of spin-off companies formed to the number of invention disclosures in a year. This ratio rewards countries that convert inventions into commercial enterprises^{[H](#)} whereas a low score indicates a county's failure to convert invention disclosures to commercial potential.

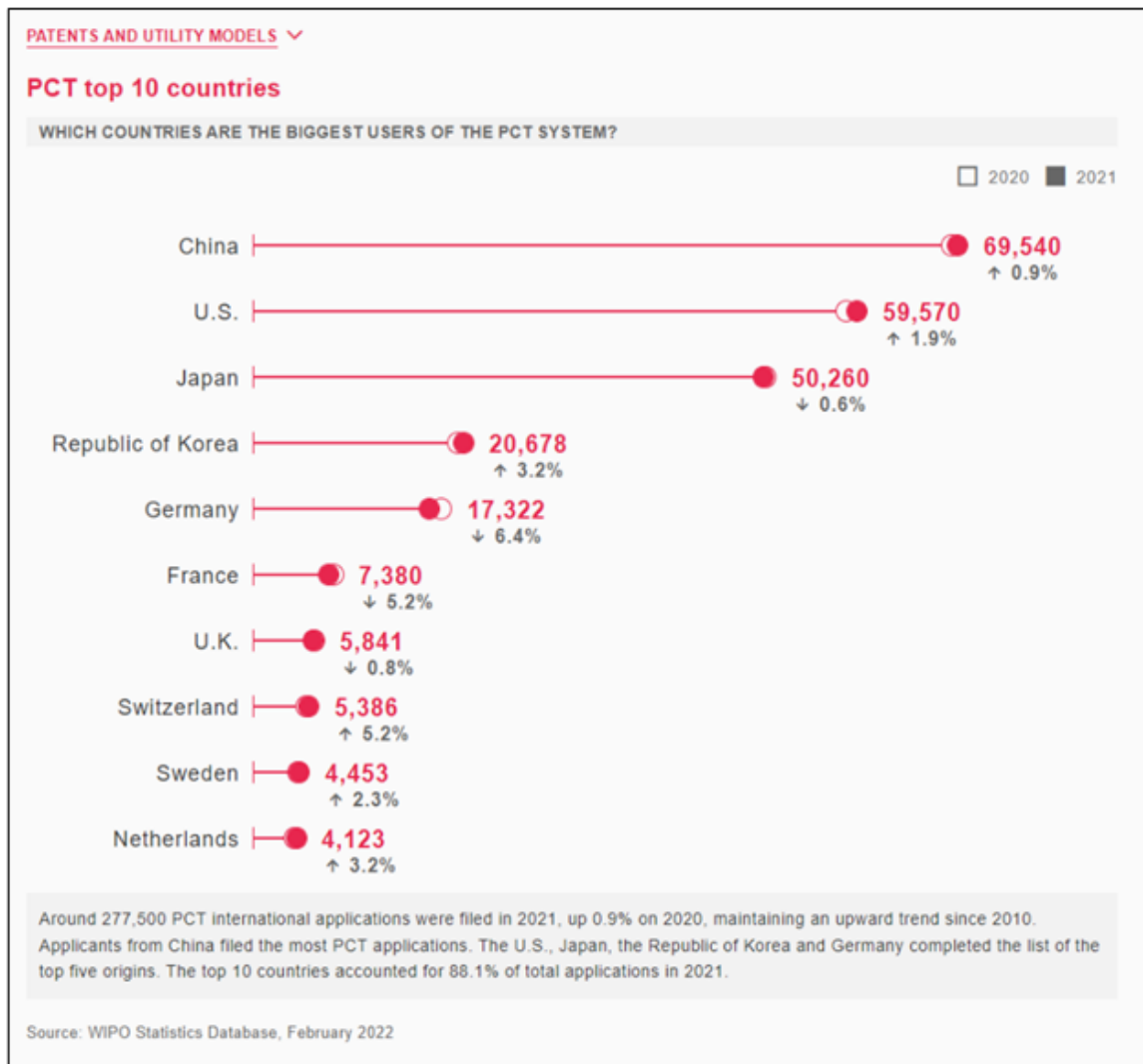


Figure 2: Patent Control Treaty Country Ranking

The PRC fares well with raw invention disclosures. The Patent Control Treaty (PCT) offers patent protection for an invention across a broad range of countries through a single “international” patent application.⁴ While the PRC files many international applications under the PCT system (Figure 1), invention and patent activity are insufficient measurements if they are not converted to commercial enterprises. If “a lack of innovation is China’s Achilles’ heel,” we can expect the Beijing Consensus’ 2035 PLA modernization goals to be constrained by innovation deficits linked to an array of other economic vulnerabilities.

Analytic Confidence

Analytic confidence in this estimate is high because the analyst had adequate time to study the issue and conduct a well-rounded analysis. The blindside hypothesis includes the possibility of missing critical data and theories of innovation. However, given the available data and think-tank perspectives, China faces an innovation deficit relative to its

modernization goals. Were China to make innovation advancements, it would be the result of significant social and political change which itself would be a welcome event.

Author: Eric P. Magistad

China's Public and Corporate Debt Threaten PLA Modernization

Executive Summary

Because of mounting corporate and public debt concerns and the limitations these force upon economic growth, China is unlikely (31-45 percent) to meet military modernization goals by 2035 due to increasing public and private debt, and slower GDP growth despite its pronouncements about a recovering economy. Rising corporate and public debt is a subject of concern to advanced economies across the world and the PRC faced the same economic constraints as the United States and Europe during the pandemic. Yet, when General Secretary Xi Jinping announced the People's Liberation Army's (PLA) modernization program would culminate by 2035, this advancement depends on rapid GDP growth.^{[H](#)}

Discussion

2020 saw the largest worldwide one-year public and private debt surge since World War II according to the IMF, with global debt rising to USD 226 trillion. The PRC alone accounted for 26 percent of this debt surge.^{[H](#)} According to one source, China is one of the most indebted large economies in the world and its state-owned banks are managing enormous quantities of non-performing loans that pose an economic dilemma for the Chinese Communist Party (CCP).^{[H](#)}

China's debt consists of three components: corporate, household and government (or public) debt.^{[H](#)} Its corporate debt of USD 27 trillion is equivalent to 31 percent of the global total (by comparison, the US holds only 20 percent). Similarly, "its (corporate) debt-to-GDP ratio of 159 percent is markedly higher than the global rate of 101 percent and twice the US rate of 85 percent."^{[H](#)} An example of this corporate debt peril is troubled real-estate developer, the Evergrande Group. Should China's second largest real estate developer default on its corporate debt, there may be consequences to other developers, home prices, and the global economy giving way to systemic credit and lending problems.^{[H](#)}

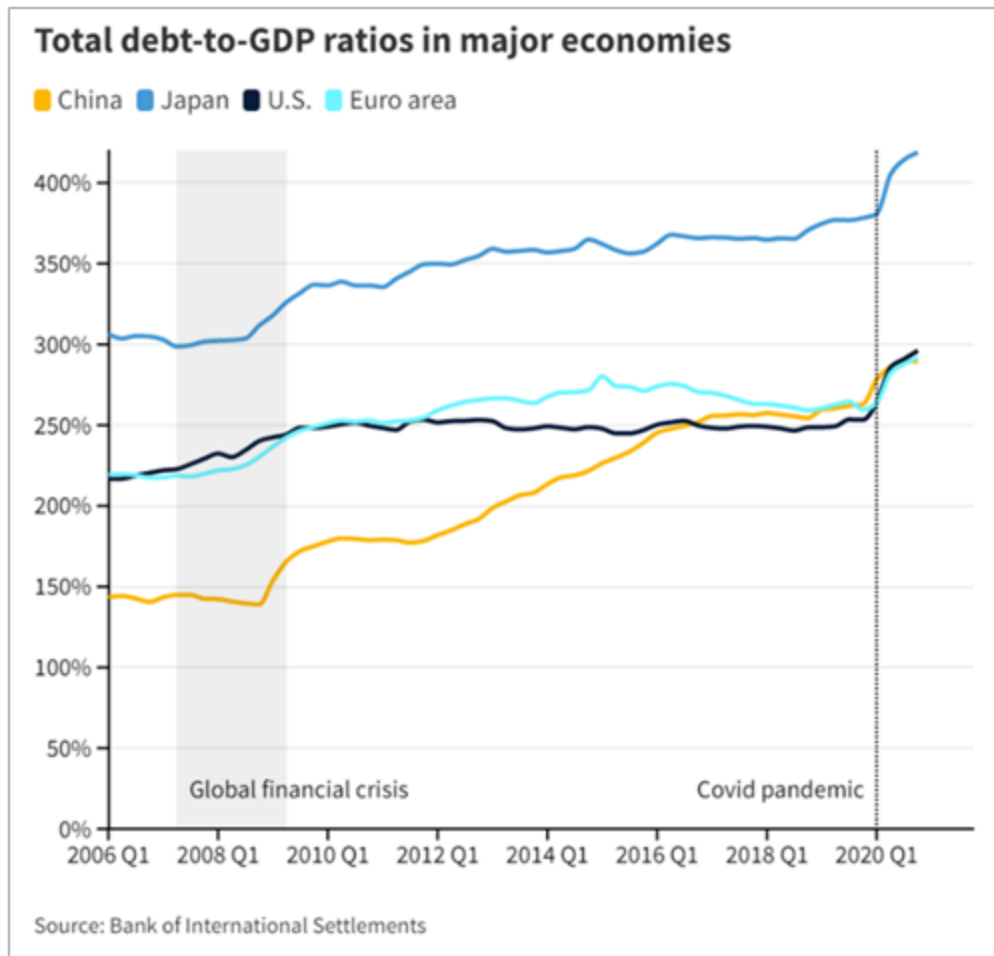


Figure 1: Total Debt-to-GDP Ratios

Likewise, China's gross total debt (corporate plus public debt) is increasingly becoming an issue. Its total debt exceeds 300 percent of GDP and is 60 percent higher than the average across other countries (see figure 1).^H While this ratio is roughly equal to the United States, it is far below the debt-to-GDP ratio of Japan.^H However, the PRC's total debt-to-GDP ratio is projected to grow at a rate of about 11 percent per year exceeding competitor economy's growth.^H

Despite these weaknesses, the Chinese economy experienced the same strains as the rest of the world during the pandemic. The IMF reports the economy continues its fast recovery from the crisis as macroeconomic and financial policy mitigated the impact helping the economy rebound. However, the IMF also asserts PRC recent growth is unbalanced and depends on public support and debt financing.^H

While China's debt levels are not more extreme compared to other economies of scale,^H its corporate debt and public debt are not easily distinguishable. In an economy where state-owned enterprises accounted for over 60 percent of China's market capitalization,^H corporate debt blends together with public debt. But reducing corporate debt (where the

real estate sector accounts for up to 25 percent of GDP) will require decelerating the debt-fueled economy for the near future.^h The Atlantic Council estimates the resulting slowdown from deleveraging real estate and corporate debt reduction could cut China's GDP growth by 1 percentage point per year until 2025.^h According to RAND, if China experiences a major slowdown in economic growth, this could create sharp trade-offs between defense spending and the government's other budgetary priorities.^h Chinese state media affirms that the country needs to upgrade its arsenal by commissioning new weapons and equipment and the CCP's schedule to push forward military modernization is only possible through positive economic growth.^h A steadily rising debt-to-GDP ratio threatens consistent economic growth.

Analytic Confidence

Analytic confidence in this estimate is high because the analyst had adequate time to study the issue and consult reliable sources. The blindside hypothesis includes the possibility that China finds another path to amassing budget for PLA modernization priorities. However, given the perspectives from major think-tanks and government agencies, it seems likely China's 2035 modernization goals are at risk.

Author: Eric P. Magistad

China Highly Likely To Exploit Russian Decline To Further Global Dominance

Executive Summary

China is highly likely (71-85 percent) to benefit from the international isolation of Russia by taking advantage of energy opportunities, shared financial systems, expanding partnerships, and potential global arms sales. These factors will exploit international sanctions on Moscow and further Beijing's aspiration of global dominance by 2049. Sino-Russian relations are highly likely to improve despite the risk of secondary international sanctions, regime volatility, Moscow's deteriorating economy, and historical mistrust between the autocratic regimes.



Figure 1: Chinese President Xi Jinping and Russian Federation President Vladimir Putin

Discussion

President Vladimir Putin and President Xi Jinping reaffirmed a no-limits strategic security and energy partnership early this year.^{[H](#)} The Ukraine invasion continues to strain that tie by disrupting China's Belt and Road Initiative (BRI) trade with Europe, the global economy, diplomatic relations, and European security alliances at levels unseen since

World War II.^{[H](#)} International sanctions leave the Russian Federation (RF) with few options except to strengthen economic and geopolitical ties with China, providing the latter with leverage and favorable trade and security cooperation opportunities.^{[H](#)}

Already RF's largest energy importing nation, the PRC seeks to expand oil, liquid natural gas (LNG), and coal investment to exploit market vacancies left as Western countries reduce trade and reliance on Moscow. The European Union (EU) currently accounts for 45 percent of Russian crude and 60 percent of natural gas exports but expects to cut total volume by 80 percent by the end of the year and end LNG imports by 2027.^{[H](#)} China and India have already increased energy import volumes at a steep discount (currently 20 percent) with a plan to absorb more capacity.^{[H](#)} In addition, the three nations agreed to finance energy transactions by using yuan, rupees, and rubles to bypass international finance systems.^{[H](#)}

Beijing plans to increase stakes in Russian energy companies such as Gazprom, Rosneft, Lukoil, and Novatek, to secure resource access, hedge economic volatility, and accelerate Moscow's "Pivot to Asia."^{[H](#)} New projects such as the Gazprom's *Power of Siberia 2* pipeline in the Arctic will redirect gas from Europe to China by 2025.^{[H](#)}

China and the RF will also challenge the US Dollar's dominance, evade sanctions, and reduce dependence on international payment networks such as the Society for Worldwide Interbank Financial Telecommunication (SWIFT).⁴ Each nation continues the development of alternative payment systems such as the System for Transfer of Financial Messages (SPFS) and China's Cross-Border Interbank Payment System (CIPS), both analogous to SWIFT but isolated.⁴ SPFS is accessible in Armenia, Turkey, Uzbekistan, Kazakhstan, and Russia.⁴ CIPS is only located in People's Bank of China locations for BRI projects in Japan, Russia, and Africa.⁴ RF prioritizes the renminbi as the primary currency for payments and international trade. Still, China is delaying the integration of CIPS and SPFS to prevent potential disciplinary sanctions by the West.⁴

Long-term international sanctions will jeopardize Moscow's regional hegemony and provide an opportunity for the PRC to extend its influence. In 2014, Putin established the Eurasian Economic Union (EAEU), consisting of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, to integrate economic and diplomatic development initiatives in Central Asia.⁴ Most states rely on Moscow, but relations have cooled since the invasion of Ukraine, with many of the former-Soviet states concerned about the potential economic fallout of sanctions and future support.⁴ Alienation from Tokyo and Seoul further reduces Putin's room for diplomatic maneuver in Asia and renders him even more dependent on Beijing.⁴ As Russia recedes, China could seize the opportunity to expand its influence by utilizing BRI and trade incentives with organizations such as the EAEU and Shanghai Cooperation Organization (SCO).

Sanctions and poor performance on the battlefield will adversely impact Russia's arms exports and give the PRC an advantage. Most of China's military hardware and technology consists of improved post-Soviet platforms or domestically developed systems based on Western intellectual property theft.⁴ In 2017, Beijing became the second-largest arms exporter behind the US, with weapon technology advancing faster than Moscow's.⁴ The former is increasing global market share, serving as the primary arms supplier for Pakistan, Bangladesh, Myanmar, and many African nations, and even creeping on traditional Moscow allies.⁴ In 2020, Serbia opted to buy Chinese HQ-22 surface-to-air missile systems over its counterpart, the S-300. A system delivered to Belgrade on 9 April 2022 through NATO skies by six modern, Y-20 People's Liberation Army-Air Force (PLAAF) cargo aircraft.⁴

China's opportunities come with many risks. The specter of secondary sanctions for aiding its ally and subsequent harm to international standing remain vital concerns.⁴ A protracted war in Ukraine and military attrition render its western neighbor a weaker, less helpful ally against the US and its partners and a reduced threat to China. A difficult prospect given a reinvigorated and potentially larger NATO. A failed war puts Putin's regime stability in question and poses a viable concern given the close relations with Xi

Jinping.^H Russian international debt default, shortage of essential goods, and lack of access to sophisticated foreign technology increase the likelihood of it becoming a dependent rather than a partner for Beijing.^H Regardless, the opportunities for China are great—on par with the collapse of the Soviet Union that led the PRC’s emergence as a global power.^H The risk of a few sanctions is tolerable to pay for Russia’s long-term loyalty and dependency.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate* and accounts for potential blindside bias. Sources were reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Given the extended time horizon of this estimate, this report is sensitive to emerging information.

Author: Johannes E. Castro

Chinese Likely to Achieve Goal of Global Influencer By 2049

Executive Summary

By 2049, China is likely (56-70 percent) to achieve its goal of being a global leader in international influence due to its strategy of discourse power, ability to reshape global norms through multinational organizations, and use of geoeconomics to influence other nations. Despite Western initiatives to counter growing Chinese influence through anti-China discourse and alternate infrastructure development initiatives, the PRC is well-positioned to expand its global sphere of influence through its advantages in international infrastructure development and clean energy technologies.

Discussion

By the centenary of the People's Republic of China (PRC) in 2049, Chinese President Xi Jinping set the ambitious goal of making China “a great modern socialist country,” with “common prosperity and a global leader in international influence.”^H To achieve this goal, China is focusing its “discourse power” (DP) on the projection of the “China Story,” convincing the global community that it is a trusted leader on the international stage.^H Through a strategy of DP, Beijing intends to change the international order to conform to its interests and governance by shifting the accepted norms on human rights from individuals to the Chinese concept of “community of common human destiny.”^H

China is likely to continue exploiting geopolitical engagements with individual nations and multinational organizations to shape norms in its favor. China has the most extensive global diplomatic presence with 276 Embassies and Representative Offices, providing a network to broadcast its narratives (Figure 1).^H In the United Nations (UN), the Chinese now lead multiple departments and agencies tasked to develop international standards.^H They successfully influenced the UN to endorse the Belt and Road Initiative (BRI) in the 2030 Agenda for Sustainable Development.^H China used its position on the UN Human Rights Council to align the organization's official human rights position with its own, including downplaying its alleged human rights abuses against the Uyghurs.^H Similarly, the PRC's uses its integration into regional multinational organizations such as the 57-nation Organization of Islamic Cooperation (OIC) and the 54-nation African Union (AU) to advance Chinese interests on a regional level. For example, the Chinese Foreign Minister used his invitation to the 57-nation OIC Council in March 2022 to push the narrative of the Islamic Uyghurs as a terrorist organization.^H OIC nations' statements supporting Beijing's over the Islamic minority demonstrates China's influence.^H Through its long-standing financial support of the AU, Beijing brokered the African Continental Free Trade Agreement (AfCFTA),^M despite being the primary economic beneficiary.^H

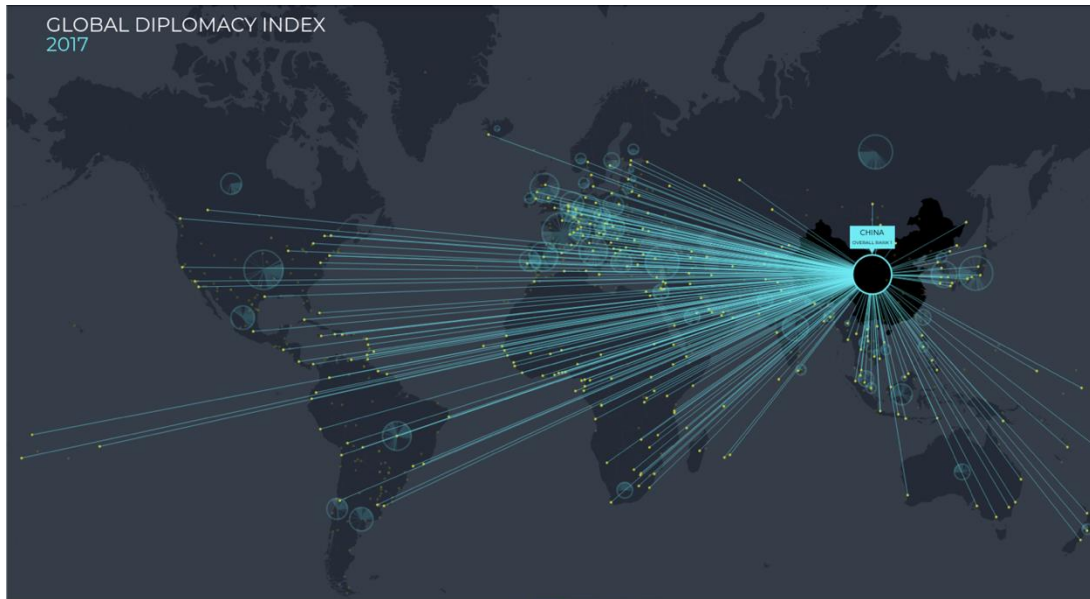


Figure 1: China has 276 Diplomatic Embassies and Representative Offices, the most of any nation

China also uses the BRI to increase geoeconomic influence and set international norms and standards supporting its industrial policies.^H Given its considerable lead in 5G infrastructure and applications, they intend to impose de facto global-standards. By supplying over 70 percent of digital networks in Africa, Chinese companies can block out competition or force competitors to conform to their standards.^H Chinese nationals also fill one-third of the three study groups from the International Telecommunications Union (ITU) focused on establishing networked technology standards in an attempt to set de jure standards.^H Without international standards, Western nations are concerned about the potential for a bifurcated internet and telecommunications systems, split between an open-system in the west and a censored system in the east.^H

China's significant trade economy, importing or exporting over USD 1 billion to over 110 countries,^H including a USD 676 billion trade surplus in 2021,^H gives it considerable influence over the global economy (Figure 2). As its economy likely surpasses the US by 2030, Chinese decisions on access to its growing domestic market will increasingly shape international trade.^M With almost half of China's exports being delivered to Asian countries (including US allies such as South Korea, Japan, Thailand, Singapore, and the Philippines), it will likely attempt to use its economic influence to reduce American regional influence.^H The scale of the worldwide infrastructure development in the BRI also provides China with significant influence over other countries, especially developing nations. As of March 2022, over 139 countries signed the memorandums of understanding with USD 850 billion in investments between 2013 and December 2021.^H

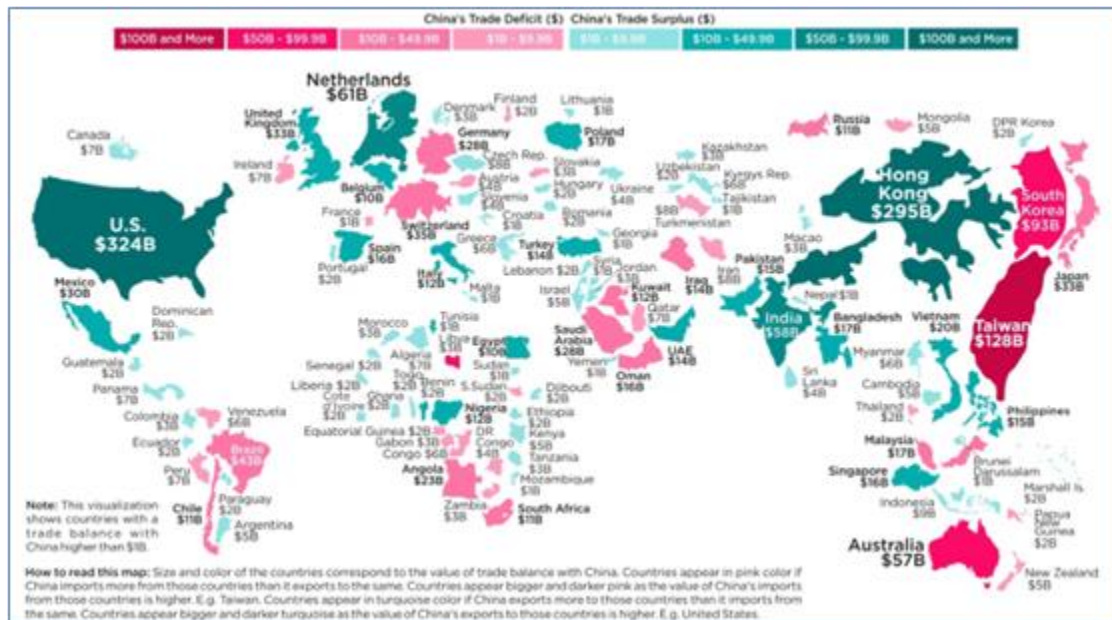


Figure 2: Chinese Trade Deficits/Surpluses

China will face increasing pressure from Western nations concerned over its rising global influence. Western discourse on issues such as the Russian invasion of Ukraine or human rights violations against the Uyghers run counter to President Xi's desired image as a trusted global leader, forcing China to address the disconnect between its actions and stated policy. Similarly, the US Build Back Better World (B3W) Partnership and the European Union Global Gateway initiative attempt to counter China by providing alternate sources of infrastructure financing.⁴ It is unlikely these efforts will markedly impact China's vast influence. Beijing's sphere of influence will continue to grow through the emerging narrative of China as the leader in the fight against climate change. Western nations will ultimately reinforce the narrative as they cooperate with Beijing on climate change due to their dependency on Chinese clean energy manufacturing, comprising 75 percent of the world's solar panels⁵ and 60 percent of wind turbines.⁶

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources were generally reliable and tended to corroborate one another. However, influence and discourse power are difficult to measure. The long-time horizon makes the forecast vulnerable to unforeseen international events such as leader secessions, pandemics, recessions, and conflicts. There are still unknown impacts of the COVID-19 pandemic, including the effects of China's current lockdowns on future growth. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the time frame of the estimate, this report is sensitive to change due to new information.

Author: Andrew J. Wiker

China's Geopolitical and Economic Initiatives Likely to Expand Global Influence

Executive Summary

The People's Republic of China (PRC) is likely (56-70 percent) to succeed in expanding its geopolitical and economic influence due to energy resource access, Arctic initiatives, and foreign military sales, all critical components of China's long-term plans. Despite issues with the Iron Silk Road (ISR), Beijing's strategy, steady leadership, and global partnerships will likely enable them to achieve its goals regardless of increasing international concerns, potential sanctions, domestic debt, and unforeseen events.

Discussion

As of 2019, the PRC's annual total energy requirement was 152 quadrillion British Thermal Units (BTUs),^{[H](#)} with annual requirements expected to increase by 7 percent.^{[H](#)} Imported oil, liquid natural gas (LNG), and coal account for 88 percent of demand, with the remainder sourced domestically through mining or green sources.^{[H](#)} Renewable energy accounts for 28 percent of Chinese production,^{[H](#)} with expansion sufficient to meet future growth while reducing carbon emissions.^{[H](#)} China's strong domestic economy relies on imports and forms the basis of their BRI development plan to advance energy security and global geopolitical interests. China leverages extensive regional partnerships with Russia and Middle Eastern nations to satisfy its increasing demand.^{[H](#)} In 2021, its LNG imports from Russia alone rose 55 percent,^{[H](#)} with oil imports expected to grow over the next decade.^{[H](#)} With the invasion of Ukraine, many European countries will reduce reliance on Russian energy resources, which directly benefits Beijing with increased volume at negotiated discounts of up to 20 percent.^{[H](#)} PRC energy development accounts for two-thirds (over USD 50 billion) of its BRI global project investments.^{[H](#)} (Figure 1). These include long-term economic partnerships to develop oil and LNG reserves with Iran, Iraq,^{[H](#)} and the Russian Arctic.^{[H](#)} With sufficient domestic energy, China could export excess resources for profit, though with the risk of secondary sanctions.

The PRC's clean energy initiatives are another influencing mechanism. It leads the world in solar, wind, and high voltage power networks, with future nuclear fission innovation goals to improve domestic energy security.^{[H](#)} This presents a future export option for regional partners faced with critical power shortages. China dominates solar manufacturing, accounting for 71 percent of global capacity.^{[H](#)} In 2021, exports increased by 60 percent to USD 28 billion,^{[M](#)} with further growth expected as Western nations divest from Russian energy reserves, expanding Beijing's geopolitical and economic influence.

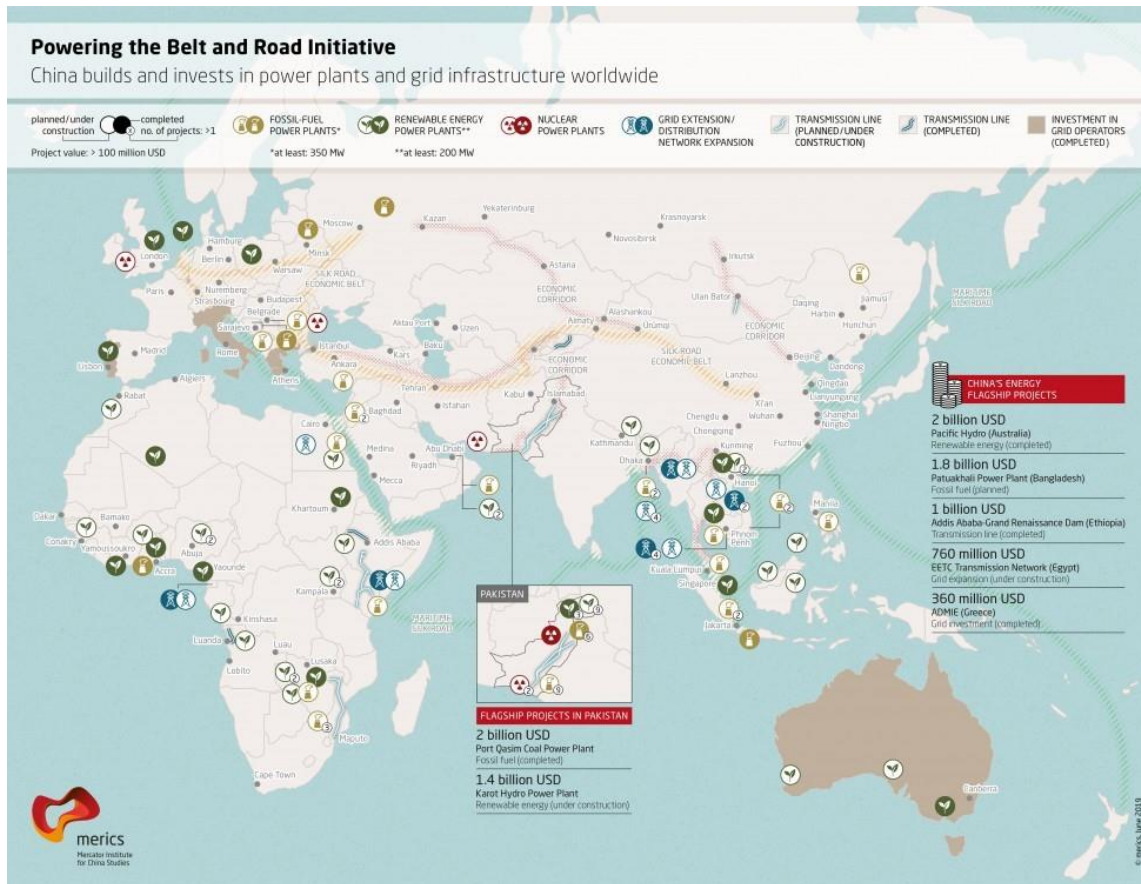


Figure 1: China's Belt and Road Initiative Global Energy Projects

China's Arctic Silk Road (ASR) initiatives will expand maritime trade by reducing transport time and cost between Asia and Europe while circumventing US-dominated sea lanes.^H Already the world's largest navy with a growing fleet of nuclear ice-breakers,^H this ensures polar access and a redundant means of transportation to the overland Iron Silk Road (ISR). Membership in international bodies such as the Arctic Council and the Shanghai Cooperative Organization (SCO) enable the PRC to shape geopolitical and economic policies in its favor and secure access to energy resources.^H China's coercion of organization members, consistent presence, and external themes of shared prosperity, peace, and security enable them to be very successful today and will likely remain so in the future.^{MH} These mask Beijing's hidden agendas and aspirations of dominance.

The ISR is another critical component of BRI that China leverages for economic and geopolitical goals. With ISR rail access to Europe reduced to 20 percent due to the conflict in Eastern Europe and Russian sanctions,^H China must seek other opportunities for long-term investment. The Southern route through Turkey and Iran remains the only route from Asia to Europe. Still, it requires significant development to overcome terrain restrictions and enhance volume.^H Improving the Trans-Asian Railway Network from poorly served regions in Central China to Southeast Asia improves trade and diplomatic

relations with traditional US allies, including Vietnam and Thailand.^H This investment also increases China's influence with the Association of Southeast Asian Nations (ASEAN).^H Improved ISR investment with Central Asian Nations would boost economic growth, job creation, reduce poverty, and draw the region away from an economically-challenged Russia.^H Lastly, improving Digital Silk Road (DSR) infrastructure with other BRI projects will further enhance Chinese influence.^H

Foreign military sales (FMS) are a significant component of China's foreign policy and present expanded growth opportunities.^H China is the fourth largest exporter of arms behind the US, Russia, and France.^H Moscow's military exports declined by 26 percent from 2016 to 2021, and Western sanctions will further erode deliveries, thus presenting the PRC with an opportunity to gain increased market share and expand influence.^H Russia is requesting Chinese support to replace equipment losses, which will increase as the former seeks the capability to counter a potentially expanded and modernizing NATO.^H Beijing is also exporting arms to traditional Russian satellite states like Serbia's recent HQ-22 surface-to-air missile system purchase.^H The PRC's ongoing BRI projects could provide FMS inroads with other Russian partners such as India, Vietnam in Asia, Iraq in the Middle East, Algeria and Egypt in Africa, and Venezuela in South America.^H

China will need to overcome several challenges. First, it will increase international concern over its coercive financial practices. The US and European Union continue implementing measures to reduce dependence on Chinese goods due to breaches of legal commitments, intellectual property theft, and human rights concerns.^H This decoupling involves tariffs, restrictions on Chinese corporate investment, increased domestic manufacturing, and non-PRC trade agreements such as the US agreement to purchase EU-produced steel.^H Second, Beijing remains concerned about potential secondary sanctions related to continued trade with Russia and Iran, especially with increased energy imports.^H Third, rising Chinese corporate debt, which rose to a record high of 272 percent of gross domestic product (GDP) in 2021, increases the economic risk to continued growth and sustainability of global BRI investments.^H Finally, unforeseen events or "black swans" such as regime survival in Russia,^H North Korea^H, expanded European conflict, energy market volatility, and pandemic events all have the potential to destabilize regional and global political and economic dynamics unexpectedly.

Analytic Confidence

The analytic confidence for this estimate is *moderate* and accounts for potential blindside bias. Sources were reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Given the extended time horizon of this estimate, this report is sensitive to emerging information.

Author: Johannes E. Castro

China Highly Likely to Shape International Perception through Discourse Power

Executive Summary

China is highly likely (71-85%) to use discourse power to establish the strategic narrative that it is a responsible world leader by showing itself committed to global diplomacy, as an engaged UN partner, and as a leader in the worldwide response to climate change. Despite successfully shaping international discourse during the COVID crisis, China's inability to counter Western narratives during the Ukraine crisis demonstrates the future challenges it will face when its actions and messages are increasingly contrary to its strategic narratives.

Discussion

In its quest to achieve world dominance by 2049, Beijing must advance its “huayu quan,” commonly translated as “discourse power” (DP) or more loosely as “a seat at the table.”^H DP enables the projection of the “China Story” to convince the global community that they are a trusted leader on the international stage.^H In a December 2021 Beijing address, Foreign Minister Wang Yi, highlighted the country's commitment to meeting its responsibilities for international peace and stability while promoting balanced global development.^H China now leads the world with 276 embassies and representative offices after overtaking the US in 2019.^H Taiwan heavily influences Chinese diplomacy. They recently opened new embassies in Burkina Faso, the Dominican Republic, El Salvador, Gambia, and Sao Tome only after the countries severed diplomatic relations with Taiwan,^H while downgrading diplomatic ties with Lithuania following Taiwan's opening of a de facto embassy in Vilnius.^H

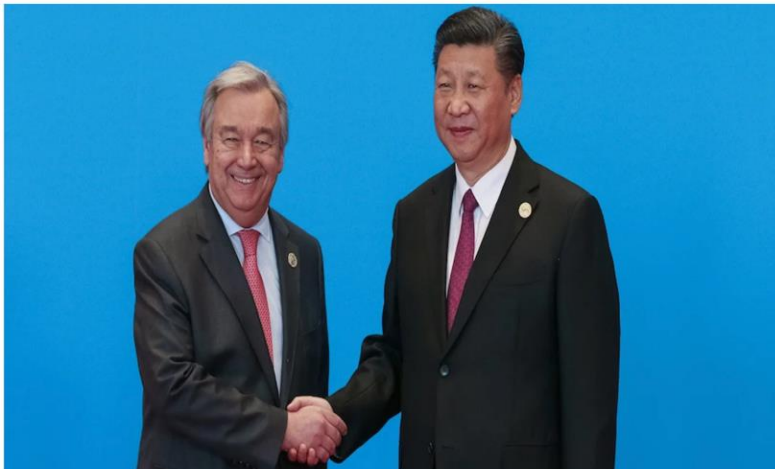


Figure 1: Chinese President Xi Jinping with UN Secretary General Guterres during BRI Forum, 15 May 2017

US decisions to reduce support for international organizations provide Beijing the opportunity to fill the void and increase its global presence.^H Within the United Nations (UN), Chinese nationals now lead the Department of Economic and Social Affairs (DESA) and three other specialized agencies tasked with developing international norms and

technical standards.^H The release of a pro-Belt and Road Initiative (BRI) study authored by a Chinese national working in DESA^H likely contributed to the UN promoting the BRI

as a critical component of its 2030 Agenda for Sustainable Development in May 2017.^{[H](#)} Similarly, the Deputy Secretary-General's endorsement of the BRI as "a way for African leaders to boost their economies and end decades of strife" during the 2018 African Union summit reinforced the perception of China as an advocate for developing nations.^{[H](#)} China promotes itself as the defender of the UN, calling out the US for funding cuts under the Trump administration that are allegedly creating a liquidity crisis in the organization.^{[H](#)} They simultaneously highlighted their funding increases to 12 percent of the UN annual budget and 15 percent of the peacekeeping budget, second only to the US.^{[H](#)}

Similarly, China recognized an opportunity to fill the global climate change leadership void created by the 2017 US withdrawal from the 2015 Paris climate agreement.^{[H](#)} In 2021, at the UN Biodiversity Conference, over 100 nations signed the Kunming Declaration under the theme of "Ecological Civilization: Building a Shared Future for All Life on Earth."^{[H](#)} The inclusion of President Xi's concept of Ecological Civilization demonstrates their growing influence.^{[H](#)} Advocating for increased global climate change cooperation, China advertised its increasing renewable energy sector and expertise in overseas energy infrastructure projects.^{[H](#)} They now control the majority of clean energy manufacturing, producing 75 percent of the world's solar panels^{[H](#)} and 60 percent of wind turbines, providing a significant economic incentive to promote global initiatives for renewable energy projects.^{[H](#)} While 91 percent of BRI energy projects from 2014 to 2017 involved fossil fuels, BRI renewable energy projects reached 57 percent in 2020 following their implementation of the Green Investment Principles.^{[H](#)}

The COVID 19 response effort illustrates China's growing mastery of the DP tool. Despite their role in allowing an outbreak to escalate to a pandemic, they successfully shifted the global narrative, highlighting the success of their domestic policies and significant donations to the international response.^{[H](#)} When the US halted funding for the World Health Organization (WHO) in April 2020, Beijing increased its financial contributions, stating they were "defending the ideals and principle of multilateralism and upholding the status and authority of the United Nations."^{[H](#)} The strategy worked as subsequent WHO reports spared them from blame. At the same time, the reports criticized governments who devalued science during the pandemic and claimed wealthy nations failed to provide vaccines to the developing world.^{[H](#)} China's successful messaging of its global COVID aid deliveries (including to the US) paired with strategic narratives emphasizing solidarity, multilateralism, and international cooperation resonated across the globe, enhancing Beijing's image as a responsible global leader.^{[H](#)}



Figure 2: First batch of China's COVID-19 vaccines arriving in Thailand, 25 February 2020

Despite progress through the BRI and climate initiatives, the Russian invasion of Ukraine shows the limits of Chinese strategy. Their early messaging blaming the war on NATO expansion and Western efforts to dominate the global order failed to gain traction.^H One hundred forty-one countries reaffirmed

Ukrainian sovereignty during the 2 March 2022 UN General Assembly vote.^H Beijing's abstention is contrary to its long-held policy of non-interference and promotion of the infallibility of sovereignty and territorial integrity.^H Adherence to this policy often made their overseas development investments more attractive to developing nations than Western aid contingent on domestic reforms.^H As the conflict escalates, their position may threaten future BRI projects and the recent trade agreement with Europe.^H Western narratives highlighting the disconnect between China's stated policies and its actions will likely harm the international perception of Beijing as a trusted world leader.^M

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources were generally reliable and tended to corroborate one another. However, discourse power is abstract and cannot be easily quantified or measured against other countries. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the lengthy time frame of the estimate, this report is sensitive to change due to new information, such as changes in global perception of China due to the ongoing Ukraine crisis.

Author: Andrew J. Wiker

China Likely to Lead Global Digital Economy by 2030 Through 5G Dominance

Executive Summary

China is likely (56-70 percent) to achieve its goal of leading the global digital economy by 2030 due to its significant market advantage in digital infrastructure and demonstrated ability to extract economic efficiencies from the digital economy. The country is well-positioned to export its 5G systems for smart city applications and introduce industrial efficiencies in developing nations. Despite its investment, China remains vulnerable to Western sanctions and blacklisting over privacy and security concerns.

Discussion

In January 2022, China's State Council published its 14th five-year plan on the digital economy, focusing on using digital technologies to boost its global competitiveness and restructure the global economy.^{[H](#)} The document prioritizes the country's efforts to shape global technology standards and identifies 5G infrastructure as a catalyst for digital economic development.^{[H](#)}

Revenue from 5G private network deployment

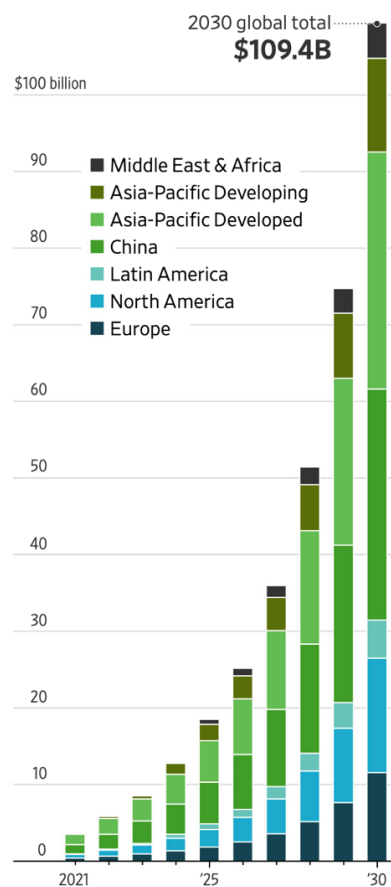


Figure 1: Revenue Forecast for 5G

Recognizing the value of 5G as the building block for the 4th Industrial Revolution, China invested over USD 50 billion^{[H](#)} in installing more than 1.4 million 5G base stations,^{[H](#)} comprising 60 percent of the world's total as of March 2022.^{[H](#)} They report coverage over 98 percent of urban areas and 80 percent of townships.^{[M](#)} Already looking to the next technology, China leads the world in 6G patent applications with 35 percent of the total, followed by the US with 18 percent.^{[M](#)} Even as the global telecom industry struggles to agree on 6G specifications, they launched a test satellite in November 2020.^{[H](#)} In January 2022, a Chinese lab claimed to have achieved a 206.25 gigabits per second 6G transmission speed.^{[M](#)}

The robust 5G infrastructure facilitates the build-out of smart city systems which automate municipal functions through big-data analysis using surveillance technologies such as facial recognition and machine learning sensors.^{[H](#)} Some estimates show China hosting

half of the world's smart cities.^{[M](#)} In 2020, the country's tech giants demonstrated their prowess by beating competitors from nearly 40 nations in every area to win the Artificial

Intelligence City Challenge.^H They already realize a domestic economic benefit from 5G through efficiencies gained in factories, mines, shipyards, and warehouses.^H Localized, high-powered networks generated USD 1.2 billion in revenue in 2021(see Figure 1).^H Revenue will likely grow to USD 30 billion by 2030, outpacing North America and Europe combined.^M

Given its considerable lead in 5G infrastructure and applications, China intends to lead the development of global-standards while exporting its technology to developing nations eager for affordable networks.^H The Chinese company, Huawei, remains the global leader in supplying 5G infrastructure with 30 percent of the market.^H Considerable growth opportunities from 5G installations exist in developing markets in Asia, Africa, the Middle East, and Latin America (see Figure 1).^H As the supplier of 70 percent of Africa's 4G networks, China remains well-positioned to export its 5G systems and technical expertise to Africa.^H

Despite the domestic success, China faces increased pushback on the use of its telecom equipment from Western countries,^H alleging the Chinese National Intelligence Law enables Beijing to collect intelligence through Huawei-built 5G networks and steal intellectual property.^H In response, the Trump Administration added Huawei to a trade blacklist in May 2019^H and began successfully urging key allies and partners to do the same.^H The US Build Back Better World (B3W) Partnership and the European Union Global Gateway initiative attempt to counter Chinese influence by providing alternate sources of financing for digital infrastructure.^H Western efforts are producing mixed results. Despite the sanctions, Huawei's profits soared 76 percent year over year in 2021.^H Huawei's advantages of low prices combined with easy financing through the Chinese Exim Bank are proving challenging to counter in Africa,^H the Middle East,^H and South America.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources were generally reliable and tended to corroborate one another. However, the global digital economy is complex, with multiple high-income countries interested in expanding their market share. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the time frame of the estimate, this report is sensitive to change due to new information.

Author: Andrew J. Wiker

Developing Nations Highly Likely to Use Chinese IT Infrastructure by 2035

Executive Summary

Developing nations are highly likely (71-85%) to use Chinese information technology (IT) infrastructure because of concerted Chinese efforts and costs relative to Western products. Despite the West's effort to limit Chinese expansion in these areas, developing nations and others will choose cheaper alternatives over security concerns.

Discussion

Chinese IT companies pursued global markets a decade before the creation of the Belt and Road Initiative in 2013.^H Officially created in 2015, the Digital Silk Road (DSR) is loosely controlled and incentivized by the government, though its importance and integration to overall BRI efforts is only now realized.^H To date, over 40 countries signed with Chinese companies to build fiber optics networks and server farms within their borders.^M

Dominating IT build-out across the African continent; continued Chinese expansion and more complex projects will occur as demand for IT services grows.^H Unstable Middle Eastern and Central Asian countries appeal to Chinese investment as a burgeoning market area that Western companies avoided.^{M H} Growth areas include the Caribbean and Central America, where limited investment exists today by either China or the West.^H Focused on developing countries as their primary market, Chinese companies offer cheaper options backed by government loans and future service fees for nations to bridge the digital divide.^M

Once a Chinese IT firm gains an initial contract, larger, more extensive contracts for future projects will grow as countries will seek to advance their nation's infrastructure to remain digitally viable.^{H M} Countries will seek projects beyond networks and server farms toward undersea cabling, AI, block-chain, quantum computing and potential areas such as population monitoring.^M Increased demand for more access to the digital service sector, such as cross-border e-commerce, smart cities, telemedicine, and internet finance for more people will occur.^H New partnerships with developed nations such as Poland and Israel signal a willingness to overlook concerns from Chinese companies for cheaper access for technology commerce and interoperability.^H Further collaborations with poorer Western countries in eastern and southern EU may win out over more expensive Western solutions.^H

As Chinese firms gain a larger global market share, China will likely pursue changes to digital industry standards that benefit its companies.^M Changing industry standards eliminates competition from areas where they already created an IT infrastructure.^H

Pursuing the China Standard 2035 for digital preference establishes the country as a leader in emerging new technologies like Internet of Things (IoT), artificial intelligence, and 5G internet.^M

Despite warnings over the possibility of Chinese firms limiting access to data, controlling information flow, corporate espionage, and having access to private information, developing countries seem to prefer access to technology and the Internet over no access.^H Privacy and control issues may go unheeded as countries look for alternatives to expensive Western IT infrastructure products.^H Stopping Chinese IT companies from expanding into new markets is unlikely to succeed as these companies are operating within the norms of global free trade.^H

Analytic Confidence

The analytic confidence for this estimate is moderate. Sources were generally reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the lengthy timeframe of the estimate, this report is sensitive to change due to new information

Author: Stacy N. Slate

China's Iron Silk Road Unlikely To Deliver Economic Prosperity By 2049

Executive Summary

The Iron Silk Road (ISR) is unlikely (31-45 percent) to support the achievement of China's economic goals by 2049 due to international partnerships, infrastructure investment, unprofitable business models, and long-term conflict impacts. The ISR is a crucial component of the Belt and Road Initiative (BRI) and expanded global influence strategy. The rail network reduces travel time, provides an alternative to air and sea transport, and expands the People's Republic of China's (PRC) geopolitical influence, but it is unlikely to enable the achievement of economic goals.

Discussion

In 2013, President Xi Jinping unveiled BRI, an array of integrated infrastructure development projects across four continents intended to further economic prosperity for a globally dominant China by 2049.^{[H](#)} A key component is the Iron Silk Road (ISR) (aka Eurasian Railway Network (ERN)), a rail network connecting over 50 PRC cities to 180 Western European urban areas.^{[H](#)} Last year, the European Union's (EU) 27 countries formed the PRC's largest trading partner, exchanging over USD 709 billion worth of goods and services.^{[H](#)} The prospective 2020 EU-China Comprehensive Agreement planned to expand the economic partnership, including rail trade. The deal quickly halted over Uyghur internment camp sanctions, Lithuanian ties with Taiwan, and Beijing's failure to condemn the Russian invasion of Ukraine.^{[H](#)} President Xi unsuccessfully intervened to save the agreement, highlighting its importance to the Chinese government and his commitment to the ISR.^{[H](#)}

The ISR connects the Far East to Central Asia and Europe by a network of five main railways further organized into northern (three lines), central (one line), and southern paths (one line) (Figure 1).^{[H](#)} The primary concern along the northern way is through Mongolia, where the routes are single-tracked and in poor condition.^{[H](#)} China's lack of intermodal hubs (39 versus 385 in the EU) limits efficiency and adds cost.¹ Many other factors reduce efficiency, including bottlenecks, varying track gauges, and limited electrification in remote regions of Central and East Asia.^{[H](#)} Another problem is inconsistent reporting. For example, in 2017, Chinese state media reported 3,211 trains leaving China for Europe, while the EU only recorded 1,793 as arriving, which highlights a significant discrepancy in freight accounting with similar issues expected in China to Central Asian routes.^{[H](#)} These problems, coupled with the small percentage of total trade and dominance of maritime options, limit the necessary volume to make the China-Europe rail bridge a viable alternative to meet European or Central Asian demand.^{[H](#)}

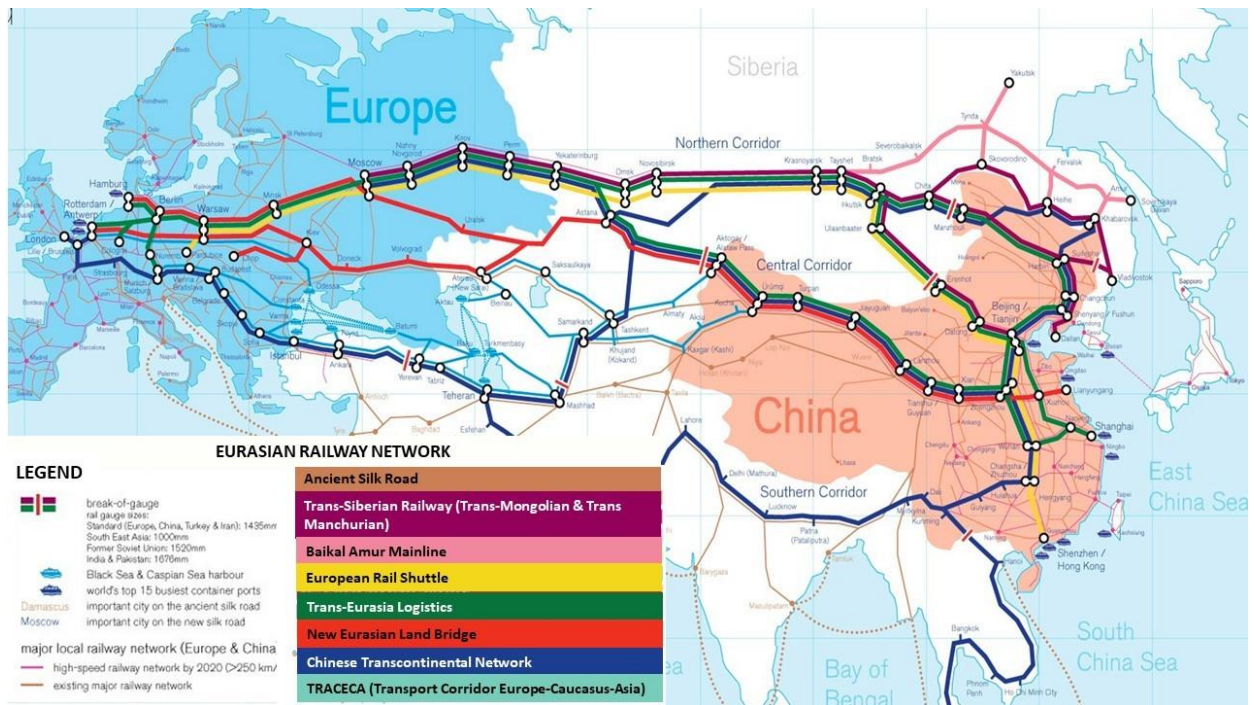


Figure 1: China's Iron Silk Road

By 2049, the estimated total cost of BRI will reach somewhere between USD 4-8 trillion, with 32 percent (1-3 trillion) dedicated to transportation development such as the ISR.^u Beijing underestimates rail project costs with actual expenses up to 45 percent higher due to poor planning, competing stakeholder interests, and delays.^h The majority of this infrastructure development is debt-financed through Chinese firms, increasing economic risk since over 25 percent of BRI corridor nations already face high debt levels, which may adversely impact future profitability.^h Inadequate maintenance of ISR infrastructure is a significant problem. One estimate assessed the need in Asia and the former Soviet Union as two percent of GDP or more than double the capital investment.^h

The Iron Silk Road remains unprofitable due to cheaper maritime shipping and increasing long-term costs, adversely affecting China's economic growth. For logistical planning, the cost of ISR rail transport is 25 percent of air but 400-500 percent above maritime shipping.^h The lack of seaport access for Central Asian and Western Chinese provinces decreases the cost disparity between rail and sea. Last year, trains moved 1.46 million containers, or about 4 percent of the total trade between China and Europe.^h This accounted for USD 75 billion (a 50 percent increase from 2020), boosted by pandemic-related maritime shipping delays and increased consumer spending.^h The growth in ISR shipping is artificially spurred by PRC province-funded container subsidies, covering 30-50 percent of costs^h (ranging from USD 3-5 thousand per container) meant to encourage trade with remote provinces in the West and North.^h President Xi planned to eliminate the

subsidies by 2023 to improve finances, but Russia's invasion of Ukraine drastically altered the global economy and reduced ISR volume.

ISR's biggest challenge is the ongoing conflict in Eastern Europe. Eighty percent (four of five lines) of the Eurasian Railway Network transits through Ukraine or Russia, with freight delivery adversely impacted by war. China invested 3 billion to improve Ukraine's transportation infrastructure^h for the central line, now deemed too risky for commercial trade due to damaged tracks, bridges, or security concerns.^h In addition, Ukraine prioritizes military and humanitarian relief freight with Europe over trade with Asia.^h The three northern routes all transit through Russia, with heavy international sanctions restricting cargo transit through their territory.^h This leaves the southern route through Turkey and Iran as the only ISR connection between China and Western Europe. This path relies on intermodal hubs through rough terrain, which reduces throughput.^h

The Iron Silk Road offers several advantages. Reduced transit time is a crucial factor. Rail transport takes two weeks to deliver Asian goods to Europe compared to a month by ship.^h A shorter transit time is vital for time-sensitive goods such as food, critical repair parts, electronics, and hazardous materials.^h It provides an alternative means of transport to air and maritime, which often experience delays due to port saturation, container availability, scheduling delays, worker shortages, and weather.^h Rail shipping avoids international pandemic restrictions since transit involves fewer stops and personnel.^h ISR provides a geopolitical benefit by linking poorly served regions and countries, in particular, those China's interior and West, Laos, Iran, and Central Asia.^h Regardless of these benefits, the strained relations, reduced volume and route access to Europe, unprofitability, and insufficient infrastructure, make the Iron Silk Road a long-term losing proposition for China's economy. The ISR setbacks will negatively impact President Xi's reputation as he seeks an unprecedented third term of office during this year's 20th Party Congress.^h

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources were very reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Given the extended time horizon of this estimate, this report is sensitive to emerging information.

Author: Johannes E. Castro

Chinese Covid Response Likely Used To Further Health Silk Road Expansion In Developing Countries

Executive Summary

Health Silk Road expansion to developing countries likely (56-70%) to happen due to vulnerabilities and inequities in global healthcare highlighted by the COVID-19 pandemic. Integrated with other Belt and Road Initiatives (BRI), HSR is an alternative to Western medicine as the solution to supply chain shortages and medical information sharing for less developed countries. HSR found customers from developing nations who needed support during the pandemic outbreak. Many western nations view HSR efforts with skepticism and a public relations campaign to combat the global narrative of China causing the pandemic. Despite HSR being largely rejected by western nations, developing nations will likely continue to be attracted to it because of few alternatives for healthcare support.

Discussion

The lesser-known Health Silk Road initiative gained significant traction since the COVID-19 outbreak.^{[H](#)} Created in 2015 under BRI 2.0, the services and information-based project is primarily run by privately owned enterprises and supported by policies by the Chinese government.^{[H](#)} Focused initially for medical supplies and the construction of healthcare facilities; HSR has expanded for engagement, training, infectious disease prevention, emergency aid, and promotion of traditional Chinese medicine.^{[H](#)} In 2017, China signed a memorandum of understanding with the World Health Organization (WHO) to be a supplier of healthcare goods and services worldwide and additional agreements with the Bill and Melinda Gates Foundation.^{[H](#)}

HSR is dependent on other BRI programs, such as maritime and iron, for shipping medical supplies like personal protective equipment (PPE) worldwide.^{[H](#)} Digital initiatives connect China and local governments for information sharing, on topics like infectious disease tracking, vaccine distribution, and medical records.^{[M](#)} BRI countries-build domestic manufacturing facilities to produce Chinese vaccines in Europe, the Middle East, Africa, and South America.^{[H](#)}

Africa and other struggling countries accepted HSR as a welcome and viable solution to their healthcare problems.^{[H](#)} China supported Africa for decades battling malaria and infectious disease outbreaks such as Ebola.^{[H](#)} and now, African nations import Chinese masks, PPE, and vaccines.^{[M](#)} Unexpected partnerships in countries such as Italy, Spain, and Serbia for PPE and vaccines show China's ability to act and lead globally in healthcare.^{[M](#)} By October 2020, the PRC exported over 179 billion masks and 1.8 billion protective suits to 150 nations worldwide.^{[H](#)} Inroads China has made in developing

countries could extend to telehealth, research, and expanding primary healthcare across each country.^H

Most Western nations view China's actions during the pandemic as a public relations ploy to improve their image.^M Soft power actions of mask and vaccine diplomacy had little influence over nations with established healthcare services.^H However, over 100 nations accepted donations from private Chinese companies such as Huawei or Alibaba, including the United States, receiving 1 million masks and testing kits donated by Jack Ma of China.^H While the West accepted shipments of inexpensive medical supplies; it trusted domestic vaccines, research, and information sharing.^H

Despite Western rejections, HSR found a customer base in developing countries.^M The initiative demonstrates China's ability to act as a leader in healthcare and influence globally.^H Working with WHO, the PRC's demonstrated ability during the pandemic to ship needed medical supplies to impoverished countries cements its leadership position within the WHO while the United States withdrew.^H The result is that China will likely be a partner of choice for many countries, including Western and developing nations, for future healthcare needs.

Analytic Confidence

The analytic confidence for this estimate is moderate. Sources were generally reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the lengthy timeframe of the estimate, this report is sensitive to change due to new information

Author: Stacy N. Slate

U.S And Allies Expected To Experience Trade Issues Over Rare Earth Minerals Over Next 10 Years

Executive Summary

The United States and Japan will highly likely (71-85%) experience trade issues with China's monopoly on rare earth minerals within the next 8-12 years. Demand for rare earth minerals (REM) is expected to increase since they it is required in almost all technology. This monopoly caused trade issues in the past twenty years. The potential for significant trade issues remain since no new competitors are expected to join in mining and refinement of REMs in the coming years. Despite overcoming past international pressures to trade these minerals, if political tensions rise over issues such as Taiwan or territorial claims in the South China Sea, trade of REMs could halt.

Discussion

Rare earth minerals are 17 elements on the periodic table that are not necessarily rare but desired for their magnetic and conductive properties necessary for modern technology.^{[H](#)} The United States and Japan are the largest consumers of REMs.^{[H](#)} They are required in green energy such as solar panels, wind turbines, and electric vehicles requires.^{[H](#)} Military weaponry consumes large quantities of REMs for aircraft, missiles, and ships.^{[H](#)} The F-35 has over 900 lbs of rare earth minerals in each aircraft, and a single Virginia-class submarine has more than 4 tons of rare earth minerals on board.^{[H](#)} Demand is expected to grow by 7.5% through 2025 as technology increases.^{[H](#)}



Figure 1: Mountain Pass Mine, California

Modern life and the United States' security depend on trade and access to a consistent supply of these minerals. The market is controlled by China, with access and rights to over 70% of mining and 96% of purification and refinement of these minerals.^{[H](#)} In 1992, Deng Xiaoping, chairman of CCP of China stated, "the Middle East has oil, China has rare earth minerals," signaling

intent to control the market.^{[H](#)} Only a few places exist with large concentrations of rare

earth minerals profitable for mining.^H Extracting and purifying REMs through an acid-based separation is an ecological hazard if not properly conducted and therefore heavily monitored and expensive.^H

As the largest consumers of REMs outside of China, the United States and Japan are dependent on importing rare earth minerals.^M The one United States mine in Mountain Pass, California, declared bankruptcy in 2015 following an environmental hazard of toxic chemicals leaking into the local groundwater.^H China purchased the mine and mining rights two years later.^H Outside of China's control, the only nations with deposits large enough for mining are the United States, Australia, Brazil, Russia, and India.^M

Past political tensions disrupted mineral trade with China. In 2010, a Chinese fishing vessel collided with a Japanese Coast Guard vessel in a disputed area. Japan held the crew, intending to put them on trial. China retaliated by refusing to export rare earth minerals for over 30 days.^H In 2013, the United States filed an appeal to the World Trade Organization against China for limiting mineral exports, Japan and Canada joined the request.^H The WTO ruled against China, forcing them to lift their export quotas.^H In January 2021, China indicated that it would limit exports of rare earth minerals to the United States over diplomatic disputes surrounding COVID.^M China does not view limiting exports as hurting their economy, instead as a weapon against any nation that challenges them. It is highly likely that in a dispute or conflict in the future, China would withhold exports of rare earth minerals disrupting the supply chain, destabilizing economies, and testing security.

Analytic confidence

The analytic confidence for this estimate is high. Numerous sources were referenced, sources were reliable, and corroborated one another. There was adequate time, but the analyst worked alone and did not follow a structured research method. Furthermore, given the lengthy outlook of this estimate, the estimate has the possibility to change given new information or significant world events.

Author: Stacy N. Slate

China's Clean Energy Investment Furthers Likelihood Of 2030 Goal

Executive Summary

China is almost certain (86-99 percent) to meet its renewable energy goal of 25 percent non-fossil fuel share of energy requirements by 2030 and will likely (56-70 percent) achieve its carbon neutrality goal by 2060 due to significant investment in infrastructure, fusion technology, and clean energy research. Already the world's leader in wind and solar energy generation and manufacturing, sustained investment enables China to stay ahead of near-peer competition to expand its dominant global position.

Discussion

China's economic expansion, heavy industry, and urban growth increase domestic energy demand balanced with clean energy reform.^{[M](#)} In a 2020 statement to the United Nations General Assembly, President Xi Jinping pledged that the People's Republic of China (PRC) will achieve carbon neutrality by 2060^{[M](#)} to meet Paris Accord goals^{[H](#)} through infrastructure investment and greenhouse gas emission cuts.^{[H](#)}

Currently, China's energy production represents the extreme ends of environmental sustainability—accounting for almost 30 percent of the world's CO₂ emissions and more than half of global coal use, while leading the world in wind and solar energy production.^{[H](#)} ^{[H](#)} To meet President Xi's goals and domestic demand, the PRC is increasing solar and wind energy creation by over 100 gigawatts (GW) per year^{[1](#)} and investing USD 300 billion over the next 30 years to expand high efficiency, ultra-high voltage (UHV) power line networks from six interior provinces to urban and industrial regions (Figure 1).^{[H](#)} Additional measures to renovate coal polluting factories coupled with increased wind and solar energy production capacity to more than 1,200GW^{[H](#)} will almost certainly enable China to achieve its 25 percent renewable energy goal by 2030.

The PRC is expanding nuclear reactor construction and technology to meet future energy requirements, including 440 billion over the next 15 years to build 150 new fission reactors. Additionally, China's 1 trillion in fusion technology investment includes the Experimental Advanced Superconducting Tokamak (EAST) and collaboration with 35-nations for construction of the International Experimental Thermonuclear Reactor (ITER).^{[H](#)} ^{[H](#)} Both use nuclear fusion to supply near-limitless, sustainable, and safe clean energy at temperatures five times hotter than the sun. Long-term investment in renewable energy infrastructure, fusion technology, and broad implementation of stringent energy efficiency standards and regulations for facilities, appliances, and residences will likely enable China to achieve carbon neutrality by 2060.

Electrical Supergrid

Mainland China's ultra-high voltage (UHV) network

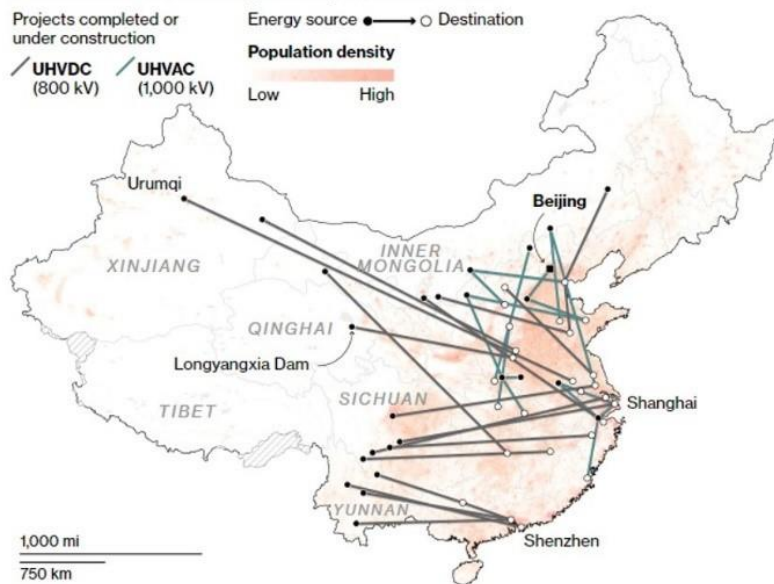


Figure 1: China's Ultra-High Voltage (UHV) Power Network.

China's renewable energy growth also offers several geopolitical and military advantages. First, by reducing dependence on foreign energy and associated overseas security costs.^H Second, the People's Liberation Army (PLA) is striving to achieve energy self-sufficiency by utilizing solar and wind farms at multiple island bases in the East

and South China Seas.^H China is likely to face several challenges to its clean energy goals. Economic volatility could disrupt long-term projects. Increased clean energy development and credit costs due to central bank interest rate hikes will reduce the cost advantages of clean energy over cheaper coal or oil.^M These increased costs will reduce China's economic flexibility to appease the growing demands of a rapidly expanding middle class.^H Furthermore, delayed implementation of energy standards and regulations will put carbon reduction and neutrality goals at risk.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources considered are reliable and generally supply consistent information from various subject matter experts. There was adequate time, but the analyst worked alone and did not use a structured method. Given the long-time horizon of this estimate, this report is sensitive to new information.

Author: Johannes E. Castro

China Will Likely Curb Worsening Climate Change Impacts Through Future Green Energy Efforts By 2030

Executive Summary

As the world's leading producer of greenhouse gases, China's commitment to reduce greenhouse gas emissions shown recent success and will likely (56-70%) exceed its goal on carbon emissions by 2030. Public health impacts have risen significantly over the past decade from air pollution and global warming. Economic impacts from climate change led to lost manufacturing revenue and energy insecurity. Acknowledging global warming's effect, Xi Jinping changed China's policy toward greenhouse gas emissions. With a domestic and global focus on green energy, China is working to reduce the impacts of climate change. Despite complaints that the construction of carbon-producing energy sources is continuing, evidence shows that CO₂ reduction goals and green energy efforts are working to curb peak energy consumption before 2030.

Discussion

Starting in 2005, China surpassed the United States as the leading producer of greenhouse gas emissions.^{[H](#)} Spurred by urbanization and rapid manufacturing growth, China emits 27% of all greenhouse gases, exceeding emissions from all developed nations combined.^{[H](#)} China resorted to coal as its primary energy source and consumes more than 58 percent of global use of this significant contributor to climate change.^{[H](#)}

Because of rapid urbanization and the use of coal, the average Chinese citizen is exposed to the effects of climate change daily.^{[H](#)} Four cities register in the top 10 of the worst air quality in the world.^{[M](#)} This has led to public health crises, reduced life expectancy, and increased poverty.^{[H](#)} Cardio and pulmonary mortality increase during temperature extremes caused when living in heat islands. ^{[M](#)} People die at higher rates from new weather patterns such as droughts, massive rains, flooding, and extreme snowfalls.^{[M](#)} Economic impacts caused by climate change are mounting.^{[H](#)} Extreme heat has lowered water tables and created desertification of once usable farmland, producing lower crop yields.^{[H](#)} Heat and air pollution-related impairments have closed schools and factories, resulting in revenue losses.^{[M](#)} Energy demands spike during extreme temperatures for air conditioning and refrigeration creating energy instability.^{[H](#)}

Without significant changes in greenhouse gas production, health and economic impacts would increase.^{[H](#)} Responding to pressures at home, President Xi Jinping made sweeping changes in climate policy during his second term.^{[M](#)} Participating in the Paris climate accords, China committed to reducing carbon emissions at home and becoming a global leader for green energy.^{[H](#)} Seizing the opportunity in a new market area, they have jumped into green energy as the best way to address domestic climate change impacts.^{[M](#)}

In 2021, under the Belt and Road Initiative, China stopped financing future global coal power plants.^{[M](#)} As the largest producer of solar panels, 8 out of the 10 top companies, China's green energy initiatives expect to achieve 16% renewable energy sourcing by 2030.^{[H](#)} Committing to building 150 clean energy nuclear power plants over the next 15 years puts them on track to build more than have been built globally in the last 35 years.^{[H](#)} Exploring geothermal heating and more efficient hydropower plants highlights the innovation they use to advance as a leading renewable energy nation.^{[M](#)} Implementing a policy directing that 40% of all vehicles produced by 2030 must be electric demonstrates a commitment to reducing emissions.^{[H](#)}

Because of its heavy carbon emissions, China is pivotal to the Paris climate accord's success and halting the impacts of climate change at home.^{[M](#)} China could exceed 26% domestic renewable energy if it remains on the current development path by 2030.^{[M](#)} Despite coal power plants still being built in China, recent projections have shown that China could hit its peak carbon emissions before 2030 due to green energy efforts and change the course of health and economic impacts.^{[M](#)}

Analytic Confidence

The analytic confidence for this estimate is moderate. Sources were generally reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the lengthy timeframe of the estimate, this report is sensitive to change due to new information.

Author: Stacy N. Slate

Chinese Payment System Gains Momentum But Unlikely To Be A Viable Alternative To Existing Financial Institutions

Executive Summary

Chinese efforts to launch an alternative global payment system would help Beijing reduce the power of potential US sanctions and the use of the US dollar in cross-border business transactions. In the wake of the Russia-Ukraine War and Russia's removal from both the SWIFT and Visa and Mastercard networks, China may hasten its development of a global alternative payment system to reduce US power during a future conflict. Thus, China is unlikely (31-45 percent) to succeed in instituting an alternative Interbank Payment System by 2049 that competes with western systems.

Discussion

Backed by the People's Bank of China (PBOC), the Cross-Border Interbank Payment System (CIPS) is a payment system permitting clearing and settlement services in cross-border Renminbi (RMB) payments and trade.^{[H](#)} Overseen by the People's Bank of China in Shanghai, CIPS has registered capital worth 2.38 billion RMB (USD 376.9 million).^{[H](#)} By contrast, SWIFT transmits USD 140 trillion in payments each year.

	SWIFT	CIPS
What It Does	Launched in 1977 to ensure secure messaging between global financial institutions. It facilitates movement of funds, but does not move funds itself.	Established in 2015 to clear and settle onshore and offshore RMB transactions. It moves funds by using SWIFT-enabled messaging.
Why It Was Created	To standardize interbank communications, which improves efficiency and lowers the costs of transactions.	To increase the efficiency and lower the costs of RMB transactions.
Participants	11,000+ participating institutions in 200 countries.	1,280 participating institutions in 103 countries.

Figure 1: SWIFT and CIPS Comparison

CIPS is important to US officials since it represents a potential secondary sanctions regime that penalizes China if it continues facilitating transactions for Russia.^H

Secondary sanctions target third country actors doing business with targeted regimes – like Russia – as part of a primary response.^H On February 26, 2022, the US and EU banned Russian banks from the SWIFT network as part of such a primary sanctioning response. Additionally, on March 5, 2022, Visa and Mastercard suspended Russian operations further damaging Russia's ability to conduct transactions.^H Global investors bet that exorcising Russian banks from the SWIFT financial messaging system along with the VISA and Mastercard networks would benefit China's own cross-border payment system.^H However, the evidence in support of CIPS is insubstantial.

CIPS is dependent on SWIFT messaging for most of its transactions, so China cannot help Russia within the CIPS framework.^H However, Russian banks have been using China's state-owned UnionPay system to avoid Western boycotts and economic penalties.^H According to Chinese media, Russia's SWIFT exclusion and US-Chinese trade friction could accelerate the decline of the USD as a global reserve and bring about RMB internationalization.^H But CIPS has yet to prove itself as an international SWIFT alternative. If more foreign banks join CIPS, that action could indicate a China-led payments channel is viable alternative network. For example, India-Russia trade might be an interesting testing ground to watch for increased CIPS usage^H but doubts about this prospect are high.

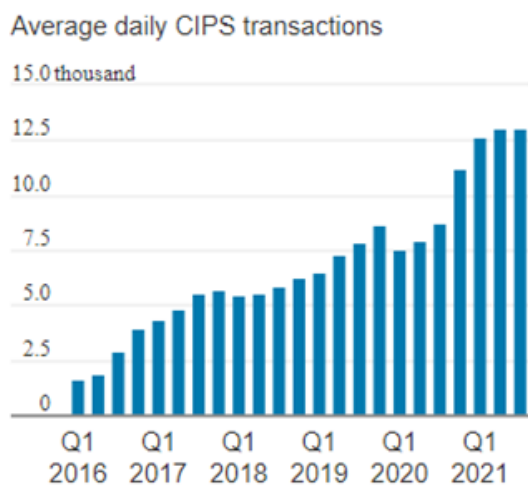


Figure 2: While CIPS has grown quickly, SWIFT dwarfs the Chinese payment network which handles 40 million daily messages

Analytic Confidence

Economic penalties like sanctions are not a magic solution, but they complement military deterrence in other domains. Analytic confidence in this estimate is moderate because the effectiveness of primary sanctions against the Russian Federation are unpredictable. The analyst has some expertise, and the sources are dependable and corroborate each other. The blindside hypothesis includes the possibility that economic sanctions will not 1) have a material impact on the Russian economy and 2) Chinese ambitions to replace the US dollar and western transactional clearing system will accelerate efforts to succeed by any means.

International trust in the RMB as a safe asset and China as a reliable actor in global finance is a necessary condition for CIPS to elevate China's influence in the global

ecosystem.^{[H](#)} Absent this kind of change, it seems unlikely CIPS and UnionPay will replace western financial networks used to sanction and deter other nations from cross-border belligerence.

Author: Eric P. Magistad

Remote Chance of Chinese Renminbi Becoming Global Reserve Currency Within Ten Years

Executive Summary

Despite some evidence the Chinese renminbi (RMB) has strengthened^H the probability the RMB will overtake the U.S. dollar (USD) as a global reserve currency over the next ten years is remote (<15 percent).^H While Chinese Communist Party (CCP) led initiatives such as ‘Made in China 2025’ and ‘China Standards 2035’ continue to underpin PRC export and trade efforts to set higher targets for domestic manufacturing,^H without major political reforms in Beijing, these efforts are insufficient to offset the RMB’s subordinate position during this time period.

Discussion

A reserve currency represents the greatest proportion of currency held by central banks and major financial institutions for use in international transactions. The United States reduces its exchange rate risk by managing the dollar as the global reserve currency since there is no need for U.S. firms to exchange currencies to conduct trade and purchase commodities from other nations. The U.S. dollar’s position as the reserve currency also helps the United States facilitate global transactions including investments and servicing international debt obligations.

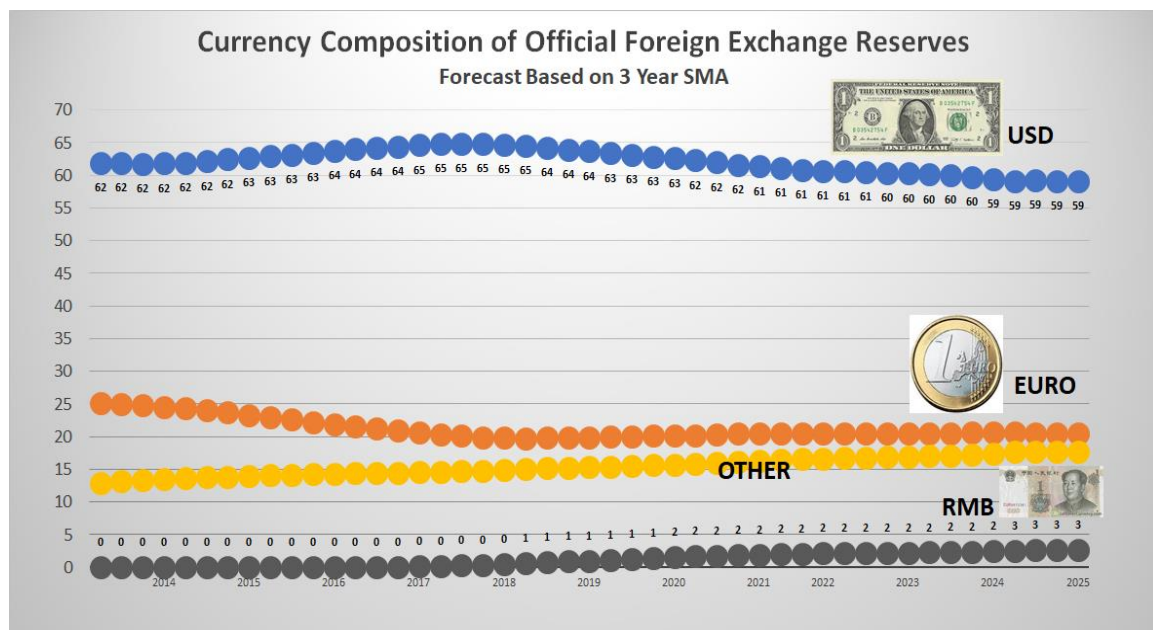


Figure 1: The projected percentage share of currency reserves held by central banks, 12 quarter simple moving average: 2014-2025 (forecast)

Since 2016 - the first year the People’s Republic of China began reporting data - the International Monetary Fund (IMF) publishes the currency composition of central banks

relative to eight primary currencies: The USD, the Euro, the Japanese yen, the RMB, the Australian dollar, the Canadian dollar, the Swiss franc, and the Pound sterling. As a percentage of the total basket of currencies, the USD's share has declined somewhat during the last twenty years (currently, ~ 59 percent share). The RMB increased its position slightly as a share of global transactions during the same period (currently, ~2.7 percent share), but today, the RMB is behind the USD and the EURO as a share of all currency transactions and central bank and institutional holdings.^h

The dollar's preeminent position is partially driven by the fact China finances US debt, where the PRC invests heavily in U.S. Treasury bonds to keep its own export prices lower.^h However, if China backs away from debt financing because of US recession risk or a more general shift away from foreign consumers, the RMB will appreciate against the dollar.^h To the extent China develops a consumption-driven economy based mostly on domestic demand, these actions will drive RMB appreciation. Paradoxically, a move away from US debt financing and making the RMB more liquid in foreign exchange markets strengthens the Chinese currency rendering Chinese exports less competitive in global consumer markets.

Researchers note the implementation of the Chinese Digital Currency Electronic Payment (DCEP) as a reason to think the RMB will appreciate and concur the DCEP will impact the global economy. According to the Belfer Center, implementation of the DCEP system could trigger a wave of foreign central banks retreating from dollar usage as the preferred reserve currency.^h According to Chinese language state-run Xinhua Finance, the DCEP service is available on more than 3,000 Beijing ATMs operated by the Industrial and Commerce Bank of China (ICBC).^m The American Enterprise Institute argues central bank digital currencies and digital payment instruments may be an important way for the United States to defend its reserve currency status.^h However, according to the CATO institute, USD dominance will not end soon because of the introduction of digital currency: "The dollar has earned its status as a safe-haven currency because it is backed by trust in U.S. institutions that safeguard basic freedoms and private property rights (where) China lacks those institutions and trust."^h According to Hong Kong based media, if Beijing wants broader confidence in the RMB, it needs to adopt a more liberal, hands-off approach, allowing its currency to float freely (i.e., fluctuating in value due to supply and market expectations) in foreign exchange markets.^h

Analytic Confidence

Analytic confidence in this estimate is high because the analyst had adequate time to digest multiple reporting streams. Similarly, the analyst compared multiple univariate forecast methods using IMF time-series data: Simple moving averages against ARIMA-

based forecasts of central bank currency composition. Moreover, qualitative sources from esteemed think tanks and media corroborate these quantitative projections.

Author: Eric P. Magistad

China's Initiatives Increase Likelihood Of Arctic Dominance By 2049

Executive Summary

China is likely (56-70 percent) to achieve its Arctic goals by 2030 and will likely reach a dominant regional presence by 2049 due to expanding sea access, international partnerships, and maritime security investments. This new Polar Silk Road is key to the Belt and Road Initiative (BRI) and expanded global influence strategy. Despite increased global competition from Arctic sovereign nations, strained relations with international partners, and economic uncertainty over the next two decades, the People's Republic of China (PRC) will secure and grow its national interests in the Arctic.

Discussion

China's Arctic Policy outlines its aspiration to become a polar great power by 2030.^{[H](#)} In 2018, President Xi Jinping proclaimed the PRC as a "near-Arctic state"^{[H](#)} and the Polar Silk Road as a vital component of the BRI. He directed the pursuit of Arctic interests through global partnerships and maritime infrastructure investment.^{[H](#)} Internationally, China is an Observer nation in the Arctic Council (AC)¹ and participates in multiple intergovernmental fora to address polar issues, including climate change, shared access, and trade.^{[H](#)} The PRC and Russia partner on several polar economic ventures. In 2016, the country provided USD \$12 billion to finance various Russian natural gas and oil mining operations with an additional 9.5 billion to develop ports and shipyards along the Northern Sea Route (NSR).^{[H](#)} In 2020, Sino-Russian strategic cooperation completed the Chinese BeiDou satellite system to improve high north GPS navigation^{[H](#)} with touted accuracy down to 0.41 meters versus the U.S. 0.5 meters.^{[M](#)}



Figure 1: China's Xue Long 2 Icebreaker

The PRC's interest in Arctic affairs involves access to natural resources and sea lines of communication.^{[H](#)} Melting polar ice exposes new maritime routes, reducing thousands of miles off voyages between Asia and Europe, reducing shipping cost and time.^{[H](#)}

Polar routes provide an added advantage by circumventing contested southern courses aligned with the United States.^{[H](#)} China's primary interest lies with the NSR, expected to be ice-free year-round by 2030, reducing the shipping distance between China and Europe by 23 percent.^{[H](#)} Beijing

seeks to exploit the Arctic's vast fishing grounds and undiscovered energy reserves estimated at 30 percent of global natural gas and 13 percent of crude oil.^H

Domestic maritime and security improvement is another Chinese strategic focus area in the Arctic. In 2017, the PRC purchased an icebreaker, the Xue Long, and successfully traversed Canada's Northwest Passage.^H The following year, China launched the Xue Long 2 (Figure 1), expanding its icebreaker fleet to eight vessels with 37 completed Arctic missions by year's end.^H The PRC views the Arctic as a zone of future military competition and plans to expand the People's Liberation Army-Navy (PLAN) role to include surface and subsurface patrols and exercises.^H Further, Finland hired Huawei Marine to lay 13,800 kilometers of undersea cable to improve digital communications which raises concern about potential Chinese dual-use intelligence gathering and data transfers not reliant on foreign cabling.^H

China's Arctic ambitions face many challenges. The lack of AC membership limits them from affecting polar policy decisions. Russia remains wary of growing influence and incursion.^H As Russia faces international sanctions and isolation, Beijing is eager to temper relations to avoid economic repercussions, placing joint NSR collaborative projects on hold indefinitely.^M Sino-Swedish and Norwegian relations remain strained following economic coercion and restrictions on Nordic fish exports.^H International financial volatility and domestic spending priorities pose additional risks to available capital to support China's polar goals^H but their long-term strategy, partnerships, and investment will likely succeed despite these concerns.

Analytic Confidence

The analytic confidence for this estimate is *moderate* and accounts for potential blindside bias. Sources were very reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Given the extended time horizon of this estimate, this report is sensitive to emerging information.

Author: Johannes E. Castro

China Highly Likely to Increase African Trade to Stimulate Future Growth

Executive Summary

China is highly likely (71-85 percent) to increase its political and economic investments across Africa over the 10-15 years in its quest for dominance. The continent provides Beijing with opportunities to expand its global geopolitical influence, obtain critical energy and natural resources, and access fast-growing economies. Despite current continental trade comprising only 3 percent of their international total, increased future trade will partially mitigate Western efforts to decouple from China as a supplier.

Discussion

Since 1991, China's Foreign Ministers have taken their first trip of the new year to the continent, demonstrating the value of the relationship.^H Africans view the relationship positively as well, with 86 percent of survey respondents viewing China's economic and

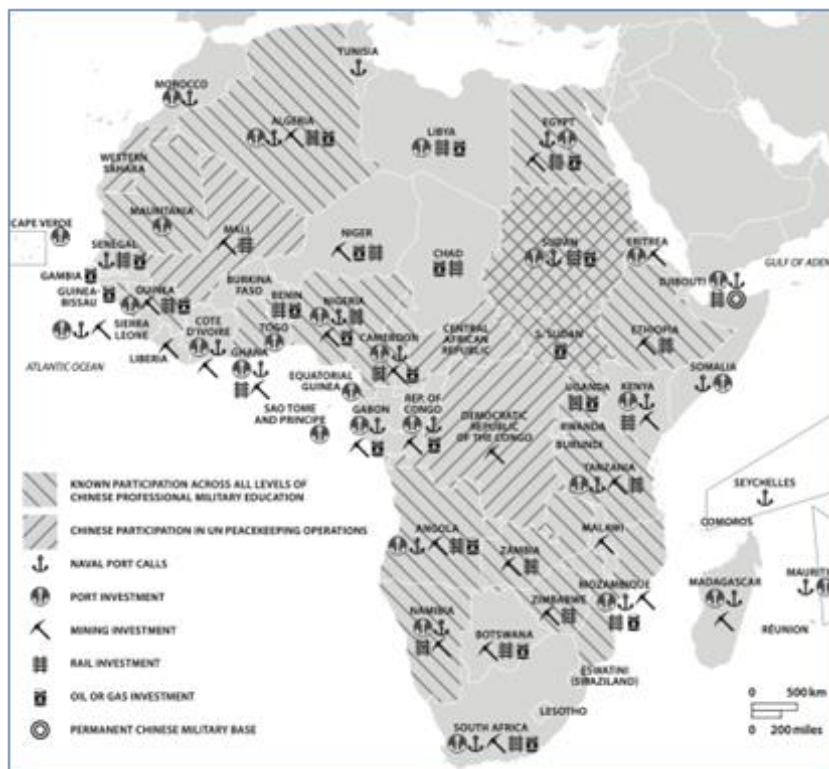
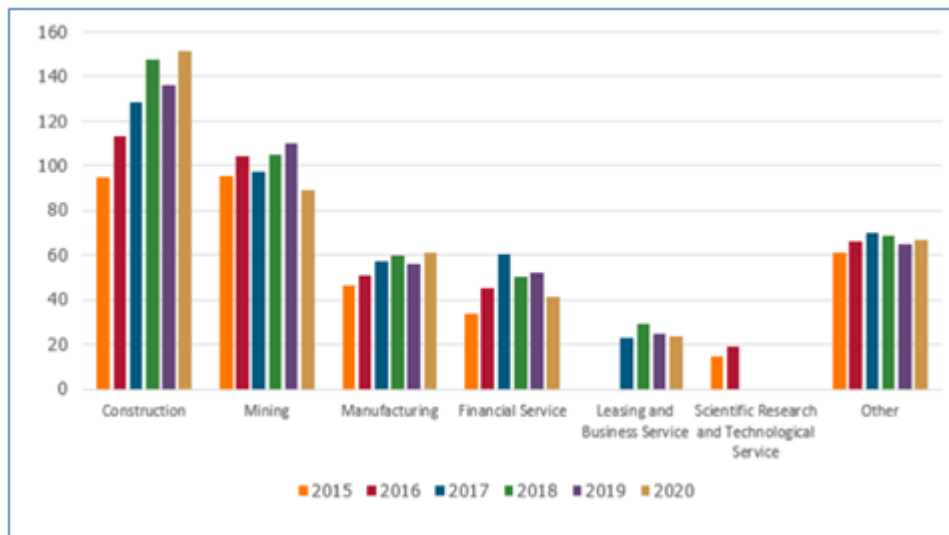


Figure 1: China's Economic and Security Activities in Africa

political influence on the continent as positive.^H The relationship deepened following the Forum on China-Africa Cooperation (FOCAC) creation in 2000. FOCAC includes all African states except Eswatini (which maintains diplomatic ties with Taiwan) and is considered the most far-reaching continental multilateral partnership in scope and level of cooperation.^H China invests in almost every African Nation (Figure 1),^H with forty-six nations participating in the Belt and Road (BRI) initiative.^H

Africa is critical to Beijing's efforts to shape the international order. The continent holds 54 seats (or 28 percent) of the votes in the UN General Assembly and supports them on issues critical to China.^H In 2020, 25 African countries backed them during the UN

Humans Rights Council over Hong Kong.^h Several months later, no African nation signed the rebuke of human rights violations in Xinjiang, Hong Kong, and Tibet.^h In return, Beijing advocates and provides funding for increased UN peacekeeping support to the continent, increasing African stability with the added benefit of protecting Chinese economic interests.^h In addition to funding, China deployed peacekeepers under UN missions to the Democratic Republic of the Congo, Mali, and Sudan, where China has significant economic interests (Figure 1).^h



China requires access to the continent's vast energy and natural resources to continue its economic growth. In 2019, it imported

Figure 2: Top 5 African Industries for Chinese Investment (in 100 million USD)

approximately 18 percent ^h of its oil requirements from nearly 20 African nations with the potential to provide more.^h A new pipeline under construction from Ethiopia to Djibouti will have the annual capacity (12 billion cubic meters) to replace their 2021 liquid natural gas imports from the US.^h China's significant BRI development investment on the continent provides them an advantage importing mineral and resources including the rare earth metals needed for green technology.^h China even uses resource-backed loans as part of BRI infrastructure loans paid to secure access to resources.^h Mining is the second top industry for Beijing FDI stock in Africa, increasing from 2015 to 2019 before declining due to COVID restrictions (Figure 2).^h

The continent's demographics also offer significant economic growth opportunities. Its population of 1.4 billion people has a medium age of just 19.7 years,^h with five of the world's ten fastest-growing economies in 2020 (Guyana, South Sudan, Rwanda, Ethiopia, and Tanzania).^h The population will reach 1.8 billion in 2035^h and 2.5 billion (25 percent of the world's population) by 2050,^h with half of its population still under 21 years old.^h The World Bank estimates the African Continental Free Trade Area (AfCFTA) will lift 30 million Africans out of poverty and increase the continent's spending power by USD 6.7 trillion by 2030. The projected urbanized middle class, over 800 million strong by 2035, provides China with a significant export growth market.^h

As its workforce declines and local wages increase, China will increasingly outsource labor-intensive production to the continent to take advantage of favorable demographics, low wages, and the geographic proximity to Europe.^H FDI stock in African manufacturing increased from 2015 to 2020 even during COVID (Figure 2).^H China is funding industrial estates and special economic zones to produce goods for local consumers and export to Europe and the US.^H An estimated 10 thousand Chinese-owned companies already operate on the continent, with one-third in manufacturing.^H China is forecasted to export up to 60 million manufacturing jobs to Africa in the near term.^M As an example, Ethiopia now hosts labor-intensive industries funded by Chinese investors, including garments, textile, and leather. During FOCAC 2021, China pledged to deliver a billion vaccine doses with 40% produced on the continent, demonstrating a new commitment to developing pharmaceutical manufacturing in Africa.^H

Increasing trade across the continent will mitigate trade losses as the US attempts to decouple from Chinese supply chains. While African trade with the US (USD 755 billion in 2021)^H dwarfs US trade with Africa (254 billion),^H potential growth from African markets could substantially reduce the overall impact. Trade increased by USD 67 billion (36 percent) from 2020 to 2021, demonstrating the high growth potential for China.^H African nations are also more willing to conduct commerce using the Chinese digital Yuan due to faster and lower-cost transactions providing the added benefit of protecting investments against US sanctions and reducing the dominance of the USD.^H

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources on the Chinese-African trade were generally reliable and tended to corroborate. However, the global economy is complex, and it is unclear if US decoupling efforts will be successful. Studying the 54 African nations as a single economic unit increases the risk of over-generalization. There was adequate time, but the analyst worked alone and did not use a structured method. Furthermore, given the lengthy time frame of the estimate, this report is sensitive to change due to new information.

Author: Andrew J. Wiker

Growing China-Iran Partnership Certain To Increase Middle East Tensions

Executive Summary

China is almost certain (86-99 percent) to advance relations with Iran due to historical ties, shared economic interests, technology, and security cooperation which will expand mutual influence in the Middle East and support Beijing's goal of global dominance by 2049. Despite investment and arms sales to Iranian rivals, coercive economic policies, cultural mistrust, and Tehran's growing ties to Russia, Sino-Iranian relations will expand in the Middle East.

Discussion

China and Iran have maintained friendly relations since the Iran-Iraq War of the 1980s.^{[H](#)} Both nations emerged from pro-American regimes^{[H](#)} and fostered ties based on shared strategic, economic, and security interests with shared animosity toward the United

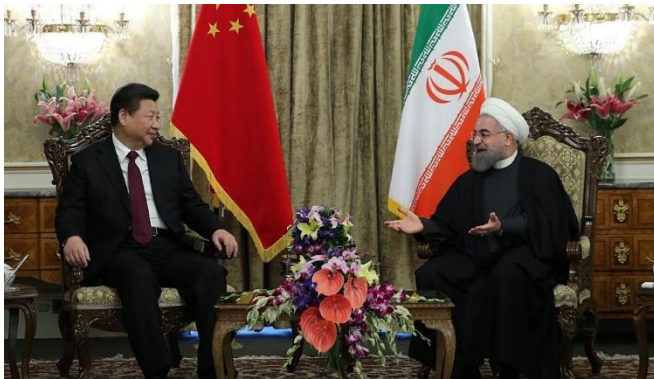


Figure 1: China's President Xi Jinping and Iran's President Hassan Rouhani

States.^{[H](#)} Iran lacks powerful international allies;^{[H](#)} hence, a union with the PRC provides a global superpower with political, economic, and military support to counter U.S. sanctions.^{[H](#)} Iran allows access to vast energy resources and the opportunity to expand its influence in the Middle East.^{[H](#)} In addition, Iran's powerful Shia allies in Iraq, Yemen, Syria, and Lebanon

provide an added measure of safety to regional Belt and Road Initiative (BRI) projects^{[H](#)} such as Beijing's USD 10 billion civil infrastructure investment in Iraq.^{[M](#)}

Economic ties based on oil and trade between both nations continue to grow. Since 1993, Chinese reliance on Iranian oil has continued to increase.^{[H](#)} The PRC is Tehran's top oil consumer and the world's largest crude importer, with almost half from the Middle East.^{[H](#)} In the past year alone, oil exports to Beijing quadrupled, making access to the region a key concern among trade partners.^{[H](#)} Iran has the world's largest oil and natural gas field, a coveted resource.^{[H](#)} The Middle East lies at the crossroads between Asia, Africa, and Europe, making the region crucial to BRI economic expansion goals.^{[H](#)} In 2021, China agreed to invest USD 400 billion over the next 25 years to modernize Iran's oil, gas, and transportation infrastructure in exchange for oil.^{[H](#)} The PRC helped Iran obtain full membership in the Shanghai Cooperation Organization (SCO) to gain market access to member nations accounting for one-third of the world's landmass and nearly one-quarter of global GDP.^{[H](#)}

They play a critical role in Iranian weapons development and technology to foster defense cooperation.^{[H](#)} In the 1980s, Beijing provided weapons spanning from small arms to missiles, but more recently, the focus shifted to developing an indigenous Iranian military-industrial complex.^{[H](#)} Chinese technology forms the basis of Iranian missiles ranging from the short-range Oghab and Nazeat series to the long-range Shahab-3 and other modern cruise and anti-ship missiles worth 10 billion.^{[H](#)} The country supplied Iran with non-military nuclear reactor technology,^{[H](#)} and allegations continue that defense cooperation include covert development of an Iranian chemical weapons program.^{[M](#)}

The sino-Iranian collaboration includes strategic, maritime, and domestic security concerns. Foremost is preserving access to the Persian Gulf and Straits of Hormuz without U.S. intervention.^{[H](#)} In 2021, both nations signed the *Comprehensive Strategic Partnership*, which formally established combined military training exercises, weapons development, and intelligence sharing over the next 25-years.^{[H](#)} Last December, the PRC, Iran, and Russia conducted the Security Belt 2022 naval exercise in the Gulf of Oman to improve cooperation, focusing on anti-air, counter-piracy, and nighttime naval operations to maintain security and navigation in contested sea lanes.^{[H](#)} The PRC provides Iran with domestic security assistance focused on monitoring and suppressing internal Iranian opposition, telecommunications tracking technology, and crowd control methods.^{[H](#)}

Beijing's Middle Eastern aspirations face many concerns. Their divided loyalties between Iran and its regional rivals erode trust. From 2010 to 2020, China invested USD 18 billion in Iran but 31 and 30 billion in Saudi Arabia and UAE.^{[H](#)} The PRC also provides ballistic missile technology to Saudi Arabia to counter Iranian capabilities.^{[H](#)} They employ economic coercion by exploiting Iranian sanctions to obtain a deeply discounted oil price, deducting oil payments from Tehran's outstanding debt, and charging fees exceeding 12 percent to transfer funds coded as "humanitarian transactions" to evade international bans.^{[H](#)} Iran's liberal population views Beijing as exploiting their nation and enabling a repressive regime fueling cultural tensions.^{[H](#)} Regardless of these issues, expanded relations with Iran provide China with energy resources, secure Persian Gulf access, regional political and economic influence, defense cooperation, and a long-term strategic ally against the United States and its allies.

Analytic Confidence

The analytic confidence for this estimate is *moderate*. Sources were very reliable and tended to corroborate one another. There was adequate time, but the analyst worked alone and did not use a structured method. Given the extended time horizon of this estimate, this report is sensitive to emerging information.

Author: Johannes E. Castro