

Technological Competition and China

James A. Lewis

Napoleon’s famous quotation about a sleeping giant moving the world when it awoke seems prescient, but a closer examination presents a more complex story. China’s rise is often accompanied by corresponding predictions of inevitable conflict and U.S. decline. These predictions are simplistic and rest on assumptions of China’s economic and political trajectory that may not be valid. In the near term, competition is unavoidable, and the more important challenge comes from China’s efforts to “return to the center of the world stage” and the means China uses to attain this at a time when the United States is reassessing its global role.

The United States and China are in a growing competition, perhaps verging on conflict, but it is not a nineteenth century competition between empires for control of territory and resources. Unlike great power competition in previous centuries, the focal point is not military strength or territorial expansion. This conflict is over control of the modern levers of power—global rules and institutions, standards, trade, and technology. The ability to create new technologies, particularly digital technologies (given their importance for politics, security, and economic growth) have become key factors in the U.S.-China relationship, which is marked by close commercial cooperation and deep governmental distrust. This disparity creates unavoidable tensions.

The link between technology, innovation, national security, and international power is now widely recognized. When Vladimir Putin says that the country that leads in artificial intelligence (AI) “will be the ruler of the world,” it is hyperbole, but hyperbole that confirms that political leaders recognize that the ability to innovate is a potent source of national power. In the digital age, national security and national power have different requirements shaped by technological change and cyberspace.

Innovation has become a central element of its international influence.¹ This is not new—the U.S.-Soviet space race was a contest of the ability of different systems to produce new technologies, but those were unique government programs. Technological competition today is as much between companies as states. A

¹ The Organisation for Economic Co-operation and Development (OECD), *Innovation and Growth: Rationale for an Innovation Strategy* (Paris: OECD 2017), <https://www.oecd.org/sti/inno/39374789.pdf>.

country's ability to innovate and produce advanced technologies provides economic strength, military power, and an intangible benefit of perceived leadership.

Both China and the United States have advantages and disadvantages in this contest, and while it is usual to focus on quantitative aspects—such as the number of engineers or patents and spending on research and development (R&D)—these are not the key determinants of technological competition between states. This competition is a contest of ideas on governance for investment, innovation, and the internet. The internet and global connectivity not only reshape the environment for competition but also create political and market forces that both nations find difficult to control.

A Fundamentally Different China

China opened its economy after Mao but ultimately crushed any movement towards a parallel political opening. The old Maoist themes of resolutely countering aggression from an implacably hostile West still resonate in Chinese policy, but they are now accompanied by self-confidence and assertiveness seen in plans to build competing infrastructures, like the Belt and Road Initiative (BRI),² that lie outside of Western direction or control. There is a degree of both insularity and hostility in this worldview. For the United States and other nations, the questions are how best to engage with China's leaders to reshape Chinese policies.

One touchstone for understanding this contest is the ruling party's strong desire to avoid the fate of Gorbachev and the Soviet Union. The Chinese diagnosis of the Soviet collapse blames the problems created by corruption, exposure to damaging Western ideas, and by Soviet efforts to match U.S. military spending. However, this diagnosis begs the question of whether the Soviet system was fundamentally flawed and unsustainable and whether any system derived from the Soviet model, no matter how attenuated the connection, can be sustained.

We can dismiss the idea of a "Thucydides trap." It is not China's rise that creates tensions, but the means China has used to achieve this rise. Putting asides its idiosyncratic interpretation of the Peloponnesian War, both China and the United States will seek to avoid damaging and risky military conflict. The advent of nuclear weapons imposes a degree of caution on even the most overconfident leaders when it comes to military adventures. Clashes at the margins similar to border fights with India and Russia might occur, but even low-level clashes hold considerable risk of escalation that will restrain both countries. Conflict and competition today will take new forms, and these new forms of conflict are redefining U.S.-China relations.

Economic success has made China confident and assertive in international affairs. China's return comes at a moment when the global rules and institutions created by the United States and its Western allies after 1945 are in flux. The international order created in 1945 no longer fits with the distribution of global power, and there is a broad but diffuse discontent with the status quo among emerging powers. China (and the others) believe that the international structures set up after 1945 are designed to provide economic and security advantage to the United States. Statements by Chinese leaders suggest they want to change or replace these structures to provide similar advantage to China and for China to assume a "guiding" role internationally.³

Chinese leaders realize that technological leadership is one of the accoutrements of power, something first captured in China by the idea of "Two bombs and one satellite," which showed the Soviets and the

² The State Council, "The Belt and Road Initiative," The People's Republic of China, <http://english.gov.cn/beltAndRoad/>.

³ The Economist Staff, "Is China challenging the United States for global leadership?", *The Economist*, April 1, 2017, <https://www.economist.com/news/china/21719828-xi-jinping-talks-china-solution-without-specifying-what-means-china-challenging>.

Americans that China was a peer in strategic technology and did not need them. The focus now is on surpassing the United States in a broad range of technologies while again asserting that China does not need United States' help to do this.

Market Versus State

The United States has innate advantages in any technological race as it has the strongest research base in the world, leading technology companies, and an innovative culture that others find difficult to match. Where it lags is in public spending. In the last 15 years, the United States has spent over \$2 trillion in Afghanistan alone instead of investing in research, infrastructure or education. In contrast, China invested large amounts in science, infrastructure, and technology. This was a huge strategic blunder for the United States.

As with China, ideology shapes U.S. policy. The United States is hampered by powerful disputes over the role of government. Some argue that public policy should focus on correcting past social injustices while others hold that the market will supply public goods like transportation, infrastructure or research without the need for taxes or government. Neither view is well suited for competing with China. A preference to cut government spending and rely instead on private initiative —something that was seen in the Obama White House as much as its Republican counterparts—may have been appropriate for the period of unchallenged U.S. dominance, but that time is over, and the effect has been to damage the U.S. innovation system.

Simply described, this system (created in the Eisenhower administration) used federal funding to support national labs, research universities, and companies to develop technologies for military use that also had commercial application. Leading examples include semiconductors, mobile phones, and the internet. This system was in place from the late 1950s to 1990, but a desire to cash in the “peace dividend” at the Cold War’s end and the resurgence of powerful conservative ideas meant that the Eisenhower model had been weakened.

That said, the innovation ecosystem centered in Northern California has been an immense wealth creator, and the ability to commercialize scientific research has, until recently, been a unique U.S. strength. Silicon Valley has gained from being a larger global innovation system. AI is a good example of this. The popular theme in the media that China and the United States are in a race for AI makes little sense. There is competition between companies—Alibaba, Tencent, Facebook, Google, and others, but U.S. companies still lead in this area.

A recent survey showed that the country with the most technology professionals working in AI, is the United States, while China ranked seventh. Similarly, AI depends on “training” algorithms using massive databases, and while Chinese companies have access to perhaps 20 percent of data from a market from which U.S. firms are excluded, U.S. firms have greater access to the remaining 80 percent in markets where Chinese services are less attractive. Instead of a race, it may be better to think of an AI innovation ecosystem centered on Silicon Valley and encompassing China, Israel, Canada, and a few other technology centers.

Whatever the merits of the pursuit of a smaller government and greater dependence on the private sector, it is worth noting that these ideas exercised the greatest influence on policymaking after the Cold War, when public disinvestment seemed safe. The United States now finds it difficult to provide public goods, from infrastructure to basic research. The historical precedent is for the United States to expand government during conflict and shrink in peacetime, but the post-Cold War peace is over. There are signs that this change is slowly being recognized, and it is interesting to note that legislation on foreign investment calls for a review of where the United States will fall short in technologies crucial for national

security absent “financial assistance from the U.S. government” and where “appropriate statutory industrial base incentives should be applied.”⁴

A New Moon Race?

Just as the 1960s race to the Moon was a test of two different systems, the current technological contest is also a test but with significant differences. China is not the Soviet Union, and it relies on what some have called “market-Leninism” to provide dynamism to its economy while preserving political control. The United States is also different now, shaped by a political debate over the federal government that has damaged the ability of Washington to deliver public goods, including in the public innovations that propelled Americans into space.

Until recently, the United States and its allies did not even realize they were in a contest. Preoccupied with their misadventures in the Middle East and bemused by optimistic Western views of the direction China’s economy and politics would take after 1979, they allowed China ample room to develop. However, expectations that China would inevitably become a market democracy were wrong. This was wishful thinking at the Cold War’s end, strengthened by millennial ideas about a new era of global peace, and it gave China an uncontested opportunity and time for growth. This uncontested time may have ended, as other leading economies increasingly look askance at China’s international behavior. Chinese audience can be unaware of these foreign concerns, given the “pink bubble” of relentlessly positive news that Chinese media presents them, but there is an incipient global reaction to China’s nationalist behavior.

Some decline in U.S. technological leadership was inevitable. The U.S. share of the global supply of scientists and research shrank relative to other nations as they invested more in research. The U.S. innovation model is no longer unique. The United States in the 1940s and 1950s found a new way to harness government investment in science to create military power and economic wealth. Other nations sought to copy the U.S. system, wanting their own Defense Advanced Research Project Agencies or Silicon Valleys.

China was one of those nations and has invested heavily in human capital since the Deng era. While there have been uneven results in terms of the quality of graduates, the amount of scientific and engineering talent in China has grown steadily. In contrast, the United States shrank its largest federal programs to subsidize science and education and, in general, has made it prohibitively expensive to pursue college degrees.

China’s latest semiconductor program has \$108 billion in pledged funding, accompanied by a national strategy (albeit a strategy with significant flaws). This is the third try by China to create an indigenous industry (and previous efforts failed because of lack of skill and corruption), and China still requires access to Western technology and know-how. The United States has no strategy, but this may be less of a handicap than it first appears as allowing markets to decide on investments works better than state planning. The only shortfall for the U.S. market approach may be in the funding of basic research, but the United States still leads China in this area.

The most serious risk of a relative decline in U.S. “share” of global innovation comes from failing to compensate for it. The U.S. model for innovation worked for 50 years. The investments in research had remarkable spill-over effects for the economy, creating new products like semiconductors and the internet. This ended in the 1990s because of a series of changes in federal investment and the global

⁴ U.S. Congress, Senate, Senate Banking, Housing, and Urban Affairs Committee, *Foreign Investment Risk Review Modernization Act of 2018*, S.2098, 115th Congress, 2nd sess., introduced in Senate November 8, 2017, <https://www.congress.gov/bill/115th-congress/senate-bill/2098/text/is>.

diffusion of technology, only some of which the United States could influence. The United States needs a new way to blend the private sector, academia, and government research if it is to compete effectively.

Some in Washington argue that Silicon Valley by itself would generate new technology, but Silicon Valley is not attracted to either basic research, which often cannot be commercialized, or to the defense market—it is too small, and there is a degree of hostility towards it. At the same time, China has taken advantage of the openness of the U.S. economy to enter Silicon Valley and invest in new technologies. Silicon Valley welcomes investment, federal or private, but the United States and other nations are now developing policies intended to restrict Chinese access.

It is accurate to assert that the United States is in a contest with China and that this contest is likely to intensify, but it faces unique constraints, given the interconnectivity of our economies. Competition over technological “leadership” has become central—which is not the case with other U.S. opponents, such as Russia or Iran. This is not the bifurcated Cold War global economy, with two very distinct and separate economic blocs. This is not a bipolar world when it comes to technology and trade. The United States and Chinese economies are deeply intertwined with each other and with global commerce in ways that the Soviet Union was not. The interrelations between the U.S. and Chinese economies are complicated (and both are also intertwined with Europe, Israel, and other Asian nations) and not easily disentangled.

China still takes more than it gives when it comes to innovation, but its ample capital and supplies of talent make it an attractive partner for foreign companies. 10 years ago, there was debate over whether China would be able to develop its innovative capabilities. This has changed. China has a strong innovation culture, but the interplay between innovation and politics is complex. China’s nationalist approach to technology runs counter to the dominant (and more effective) global trend for investment and innovation. China’s new burst of innovative energies came at the end of a period of relative political openness. Recent changes in China’s domestic policies raise questions as to whether this will continue or slow down, particularly if China becomes more closed.

If the assumption of a causal relationship between personal freedom and innovation is correct, now that China is moving to a more centralized and controlled political and social environment, we may see a braking effect on innovation. China is testing long-standing assumptions about the relationship between politics, society, and technological innovation. The key questions are whether there is a correlation between openness and innovative capabilities, how openness is defined, and whether this definition includes political openness. The unanswered question for China is whether it is possible to have market economies without democracy, or scientific innovation without personal rights.

Balancing Marx and Market

U.S. difficulties in governance and in developing a new model for innovation do not automatically cede leadership to China. Inherent tensions in Chinese policy make China’s desire for a leading role in the international order more complicated and problematic. China is in the Western world, but not of it, meaning its leaders reject the values and beliefs that underpin global institutions when these are contrary to the ruling party’s interests. There are, of course, tensions within Chinese politics over national versus international practice, but the ruling party’s political circumstances incline it toward a nationalism as a source of legitimacy. This emphasis on nationalism creates complications if China seeks to play a guiding role on the world stage.

China and the United States fear that the technologies obtained from their interconnected supply chain have been infected. China’s solution is to build indigenous industries to supply core technologies, a solution that requires a strong innovation capability and, counterintuitively, global connections. It uses national champions, protects them in the domestic market, and helps them compete in unconstrained

foreign markets. A senior Chinese official once said that if China had not blocked Google, there would be no Baidu. This promotion of national champions by any means is the source for much of the current trade tensions, and Western governments are slowly developing responses that will constrain China's growth unless its policies change.

China is admired globally for its economic growth, and one success for Chinese propaganda lies in creating a perception of inevitability in China's rise, but we do not want to accept this at face value. China still needs other advanced economies, particularly the United States, as a market and as a source of advanced technology. The trend in the global economy is more interdependence, not less, and this runs in the face of China's efforts to create indigenous supply chains. The few countries that rely on national industries are mostly poor and will remain so. A nationalist economic policy in an interconnected global economy, where companies look for international presence, mergers, and strategic partnerships, while research and innovation occur on a transnational rather than national basis, is counterproductive. Money and technological advantage do not guarantee global leadership, and if the Chinese goal is to duplicate what it has perceived as U.S. hegemony, it faces significant obstacles. The Chinese analysis of the sources of hegemony is focused on wealth, technological innovation, and military power. But these are not the only or even the most important sources of U.S. leadership. It came in good measure from ideas about politics and individuals that people around the world find to be attractive. A simple proof is that the idea of elections as the source of governmental legitimacy is so powerful that almost every country now holds them, just as every country must pledge to protect individual rights, whether they honor these pledges or not.

Similar, the idea of progress, with its central tenet that scientific rationality and the discoveries it produced would lead to a steady improvement in the human condition creates what Marx might have called "inherent contradictions" for the Chinese Communist Party (CCP). Progress is an important source of legitimacy for the ruling party, but progress, even for Marxists, is linked to the concept of individual rights. And while the CCP describes these rights and values as Western and inappropriate for China, this creates tensions similar in some ways to the tensions created for the Soviets when they acceded to the Helsinki Accords, which accelerated the erosion of the legitimacy of party rule.

China's ambivalent positions on progress and universal values (as well as its authoritarian practices) create difficulties in expanding its "soft power." Leninism is simply not attractive to much of the world's population. The CCP's unique and self-justifying interpretation of history, including the omission of events widely known outside of China (such as famines and purges), affects its credibility. Efforts to suppress discussion of these events has had some success, such as getting Hollywood to cast China in a favorable light (a favor not repaid in China's own film industry) but have backfired in others, such as the attempts to stifle Western academic discourse.

Chinese policies are shaped by a commitment to preserving party rule and defending Chinese sovereignty and increasingly, by expectations of a return to global predominance. There is a degree of revanchism for European intrusions in the nineteenth century, part of a larger nationalist narrative of victimization designed to confer legitimacy and deflect any impetus for political change. However, a narrative based on nationalism has little appeal to foreign audiences, as does the accompanying narrative of victimization.⁵ China's most effective tools for influence are money and coercion (e.g., threats of retaliation in economic restrictions), and while China has often used these astutely, they have limits.

⁵ In reference to "Peppa Pig," an UK children's cartoon, *People Daily* opined, "These are elements that are not conducive to the healthy development of cultural industries and we must be vigilant." This kind of thinking is not conducive to building soft power. See the original *People Daily* article published on April 26, 2018, at <http://media.people.com.cn/BIG5/n1/2018/0426/c40606-29950870.html>.

An Unwelcome but Unavoidable Contest

As China modernizes, it will inevitably play a larger role, perhaps a leading role, on the world stage, but several factors limit its influence. In a post-Western world of resurgent nationalism, a policy based on Chinese nationalism (rather than universal values) will not appeal to a global audience. Money and coercion can only go so far to remedy this, and it is too early to tell if initiatives like BRI can create a new political dynamic that increases China's influence. China could be independent, rich, and powerful without being antagonistic, but this would require significant changes in the CCP's thinking about international affairs.

The United States, which for the last century has seen itself as an exemplar and as a defender of democratic values, has seen the last 18 years marked by a steady decline in its global influence. The United States lacks a strategy for a world in transition, and U.S. foreign policy has been marked by a series of blunders stretching over three administrations. Those who dispute this assessment should ask whether the trillion-plus dollar intervention in the Middle East and Afghanistan that began in 2002 has left the United States better off. The question for China (and for U.S. allies) is whether this reflects some systemic flaw in the U.S. polity or is merely a sequence of unfortunate choices.

This is one of several intersecting trends that will affect how China can rise and how its rise will reshape the international order. Western concepts of the relationship between citizen and state are challenged by authoritarian regimes and by the unsettling political forces the internet creates. The United States and other Western democracies now face political crises of varying degrees of severity over the challenges of globalism, its effect on jobs and migration, and the inability of democratic governments, as they are currently constructed, to ensure an equitable distribution of wealth. The response has been resurgent nationalism that will complicate the desire of any nation to assume a directive international role. The internet accelerates these trends, but we do not want to assume that these conditions are permanent given the ability of democracies to reinvent themselves.

Engineers would call this intersection of multiple trends a "stress point," the place where fracture and failure are most likely to occur. An obvious conclusion is that the next decade will be unsettled as countries adjust to changes in national power and as the internet forces change on how they govern. Political change is easy to overlook in an assessment of technological strength, and assessments of China can seem to assume "ceteris paribus" when it comes to governance, but the United States, which has more flexibility, may deal better with these stresses than China if it can reconceptualize its politics and its international role. China has returned to the world stage, but its trajectory and the role it will play remains uncertain.

In the first wave of globalization, it took 50 years of increasing instability to persuade the world to cooperate in developing a system based on institutions, rules, and cooperative arrangements designed to create stability, and this occurred only after the massive global economic crisis in the 1930s followed by global war. There is again pressure to reconceptualize how states and people will interact in an environment reshaped by technology, trade, and digital connectivity. The United States may be stepping back from the world stage, perhaps temporarily, but China's move to replace it is slowed by contradictions in Chinese policy, such as announcing a defense of globalism while pursuing vigorous nationalistic policies. This creates tensions between China's internal and external messaging that will be difficult to resolve.

The belief—encouraged by Chinese media—that China's rise is inevitable and irresistible, and that China no longer needs the United States or the West, can be dismissed. In fact, Chinese and U.S. companies need each other, but China needs the United States (and access to its technology) more. The best outcome

would be a new partnership built on reciprocity and honesty, but China is not ready for this in part because it assumes an inevitable rise. Soviet analysts said in the mid-1970s, during an earlier U.S. crisis, that the “correlation of world forces has changed fundamentally in favor of socialism and to the detriment of [western] capitalism.”⁶ They were wrong. And while China is not the Soviet Union, in assessing the rise of China we must ask if the prediction of inevitability fails to account for the cyclical nature of Western progress in the last two centuries, where failures in existing paradigms for politics and the economy lead to crashes and collapse, to be followed by new ideas and resurgence.

James Andrew Lewis is a senior vice president and director of the Technology Policy Program at the Center for Strategic and International Studies in Washington, D.C.

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⁶ General Yevdokim Yeogovich MalTsev, ““Leninist Concepts of the Defense of Socialism,” *Strategic Review*, 1975.