

THE NEW ARSENAL OF DEMOCRACY

The U.S. Commercial High-Tech
Industry's Role In Countering The
China Threat

DR. DANIEL GOURE
SENIOR VICE PRESIDENT
LEXINGTON INSTITUTE

Contents

I. Introduction.....	1
II. What If China Wins the High-Tech Competition?	5
III. Antitrust Legislation: A Self-Inflicted Wound in the Competition With China	8
IV. What Should Be Done?	12
APPENDICES.....	15
Appendix I: The State of Play in Critical Technologies	15
Appendix II: The Role of Advanced Tech in the U.S.-Chinese Military Competition.....	18
Glossary	21

I. Introduction

The character of the international order is changing. These changes encompass all elements of national power – economic, technological, social/cultural, political, and military. The United States and its democratic friends and allies are facing a host of challenges to every dimension of their security. They are facing both traditional challenges, such as the proliferation of nuclear weapons, and new ones, such as the competition in advanced technologies. According to the Biden Administration’s draft [National Security Strategy \(NSS\)](#):

“We must also contend with the reality that the distribution of power across the world is changing, creating new threats. China, in particular, has rapidly become more assertive. It is the only competitor potentially capable of combining its economic, diplomatic, military, and technological power to mount a sustained challenge to a stable and open international system.”

Central to the changes occurring in the geo-strategic environment is the emergence of a set of advanced dual-use technologies which the world’s leading nations are struggling to understand, attain, and master. Senior U.S. defense officials have identified the specific technologies that are most critical to future U.S. military superiority. These include artificial intelligence (AI), machine learning (ML), quantum technology, 5G/6G communications, microelectronics, extended reality, cybersecurity, and the Internet of Things.

In some respects, the current environment mirrors the first decades of the Cold War, when the United States and the Soviet Union competed to develop and make use of a number of modern technologies, including nuclear energy, jet propulsion, remote

What if China *wins* the race for the technologies of the future?

The world will look very different if China wins. It would mean the erosion of long-standing military advantages, the weakening of the U.S. economy, an undermining of American freedoms, and an assault on Western democratic values across the globe.

If China is able to dominate these critical advanced technologies it can impose its own totalitarian values on the way the world communicates, operates, and governs itself.

sensing, rocketry, and space systems. The ability of the U.S. to lead the world in virtually all these technologies and spin many off into the private economy led to an unprecedented era of relative peace, prosperity, expanded civil and political rights, and advancements in science.

The Department of Defense (DoD) sees the key to future military advantage as arising from the ability to acquire, move, and use information faster and better than prospective adversaries. These technologies are providing major improvements in the performance, reliability and supportability of military platforms and weapons, and when fully integrated, will be transformational.

In order to achieve this military transformation, DoD [knows](#) that it must invest in this set of advanced technologies as part of the nation’s deterrence strategy as well as to ensure the ability to project and deliver force power as needed. Advanced technologies such as AI are already critical to the U.S. effort to maintain an advantage in intelligence, command and control, and connecting sensors to shooters. These capabilities will provide the U.S. military with the ability to see, understand, decide, and act faster than an opponent, thereby

enabling the U.S. military to deter conflict or, should it occur, prevail.

Unlike the Cold War, when government-led and financed R&D led to the development of a host of dual-use advanced tech, today the U.S. is dependent on the advanced technologies produced by commercial companies for the military advantages it seeks. Private companies are now the overwhelming source of critical high-tech products and services used by the U.S. military.

Beijing too sees investments in advanced technologies as the key to establishing global preeminence, military superiority, and an international order more congenial to the Chinese Communist Party's (CCP) political and social values. It is already applying elements of advanced technology, particularly AI, cloud data storage, and 5G networking to create apps that track the behavior of its citizens. The implications of China's "high-tech" campaign for the U.S., its way of life, freedoms, economic welfare, and military security, are profound.

As part of its strategic campaign, Beijing seeks to leapfrog current U.S. military advantages to transform its own military based on advanced information technologies. The Chinese military sees the future as one based on "intelligentized" warfare in which the battle to acquire and deny information will be a dominant factor. China is investing in advanced technologies to give it decision superiority and deny the same to its adversaries.

Chinese military leaders see a world in which AI superiority is the *sine qua non* for military advantage. Like America, China [wants](#) to become information dominant and employ AI and other advanced technologies to create qualitatively new platforms, weapons, and

formations. According to DoD, the People's Liberation Army (PLA) believes that by exploiting these new information technologies it can conduct "[intelligentized warfare](#)." Acquiring and exploiting information more rapidly than an adversary results in superior decision-making, leading to decisive military superiority.

It is Beijing's [strategy](#) to become dominant in advanced technologies such as AI within a decade. It has also designated so-called [national champions](#), ostensibly private companies that it expects to dominate in these areas. The Chinese government provides direction and financial support to these national champions and encourages them to acquire Western intellectual property (IP). Because Beijing doubts it can match the U.S. in technology and speed of innovation, it also engages in a broad program of espionage to secure both private and government/classified IP. As has been the case in numerous other areas, Chinese national champions are compelled to collaborate with more advanced foreign companies until they can dominate a sector.

U.S. leaders now recognize the importance of investing in these advanced technologies. We are in a race, but it is not clear where we are in this race. [Some observers](#) believe the U.S. is only a few years ahead of China in the development of critical technologies. [Others believe](#) we are already behind in at least some of these.

If China wins the race to develop and deploy advanced technologies, the consequences for the United States and the Free World would be profound and possibly catastrophic. Were the United States to lose this technology "high ground," the effects would be slower U.S. economic growth, the loss of manufacturing capability, reduced employment, and an increase in the

imbalance of international trade. China's government could use the technology dominance of its private firms to control global networks, influence national politics, and shape international values in ways hostile to Western interests and practices. The loss of U.S. technology dominance also would undermine national security, creating the potential for this country and its allies being held hostage to Beijing's military threats.

Like China, the U.S. has a set of leading companies developing advanced technologies. These private sector companies are focused on the commercial uses of these technologies, but success in these strategic technology areas will greatly benefit U.S. national security needs as well. It is clear that the U.S. is dependent on the products and services created by these companies to provide the military and Intelligence Community (IC) with critical capabilities at an affordable price.

Unlike its chief competitor, the U.S. does not have a strategy for supporting and leveraging its national technology powerhouses, even though it depends on them to supply advanced capabilities to industry, consumers, and the U.S. military. Instead, the United States should support and leverage these commercial companies as this country's new Arsenal of Democracy. As the above-referenced draft NSS declares, *"The world's leading powers are racing to develop and deploy emerging technologies, such as artificial intelligence and quantum computing, that could shape everything from the economic and military balance among states to the future of work, wealth, and inequality within them."*

But instead of support and collaboration, there are several efforts underway to hamstring these technology powerhouses, restrict their ability to innovate, and thus

hand over critical corporate IP to Chinese rivals. A series of antitrust bills working their way through Congress would have a devastating impact on the ability of U.S. advanced technology companies to create value and wealth; support the creation of new businesses; invest in new, transformative capabilities; develop the kind of foundational technology that will help the US military maintain superior decision-making; support an open and accessible internet; and indirectly, counter China's efforts to impose its values and controls over the global information architecture.

The global "virtuous cycle" is catalyzed by private sector U.S. innovation.

By America building and exporting the best innovative tech for everyday applications, national economies are strengthened. U.S.-developed technologies help export and reinforce U.S. values. Global access and sales by U.S. companies, with their practices and values shaped by Western norms, enhance U.S. national security by supporting both private and governmental ties and increasing global transparency.

In considering pending antitrust legislation Congress should, at a minimum, give serious consideration to the harm these bills may cause to national security. It should seek the input of both the Department of Defense and the Intelligence Community regarding the national security implications of the proposed legislation. This paper is intended to provide the legislative branch with a broad perspective on the overall importance of advanced commercial technologies beyond military superiority, the state of play between China and the U.S. in these technologies, and the potential impact of pending antitrust legislation on our national security and economy.

The Most Innovative Companies in the World

Ranking	Company	Country Headquarters	Ranking	Company	Country Headquarters
1	Apple	USA	26	Tencent	China
2	Alphabet	USA	27	Procter & Gamble	USA
3	Amazon	USA	28	Coca-Cola	USA
4	Microsoft	USA	29	Abbott Labs	USA
5	Tesla	USA	30	Bosch	Germany
6	Samsung	South Korea	31	Xiaomi	China
7	IBM	USA	32	IKEA	Netherlands
8	Huawei	China	33	Fast Retailing	Japan
9	Sony	Japan	34	Adidas	Germany
10	Pfizer	USA	35	Merck & Co.	USA
11	Siemens	Germany	36	Novartis	Switzerland
12	LG	South Korea	37	eBay	USA
13	Facebook	USA	38	PepsiCo	USA
14	Alibaba	China	39	Hyundai	South Korea
15	Oracle	USA	40	SAP	Germany
16	Dell	USA	41	Inditex	Spain
17	Cisco	USA	42	Moderna	USA
18	Target	USA	43	Philips	Netherlands
19	HP	USA	44	Disney	USA
20	Johnson & Johnson	USA	45	Mitsubishi	Japan
21	Toyota	Japan	46	Comcast	USA
22	Salesforce	USA	47	GE	USA
23	Walmart	USA	48	Roche	Switzerland
24	Nike	USA	49	AstraZeneca	UK
25	Lenovo	China	50	Bayer	Germany

Source: BCG Global Innovation Survey, <https://web-assets.bcg.com/b6/c1/026b655c49c0ba36ecfbd1975bcf/bcg-most-innovative-companies-2021-apr-2021-rev.pdf>

U.S. companies currently dominate their Chinese rivals in BCG's innovation survey. That could change, however, if the U.S. government undermines our competitive edge.

II. What If China Wins the High-Tech Competition?

The competition between the United States and China to lead the development and deployment of advanced information technologies is real, and it is intensifying. It also is one that the United States could lose. The consequences of falling behind China could be profound and have far-reaching security, economic, and political implications. They would involve not only serious economic damage but pose a threat to the American way of life, our values, and institutions, and to the security of private and public infrastructure and governmental processes. Should China win the competition for advantage in advanced technologies, the future of western civilization and democratic governance would be at risk.

After many years of turning a blind eye towards China's efforts to advance its economic, technological, and military objectives at our expense, the U.S. has finally recognized that it is in a serious competition with a rising China. The former commander of U.S. Pacific Command, Admiral Harry Harris, [observed](#) that *"China remains our biggest long-term challenge. Without focused involvement and engagement by the United States and our allies and partners China will realize its dream of hegemony in Asia."* The Admiral went on to say, *"A geopolitical competition between free and repressive visions of world order is taking place in the Indo-Pacific."*

It is beginning to dawn on observers and decision-makers that the United States is not guaranteed to win the race to develop and deploy advanced technologies. Eric Schmidt, the former head of Google, recently [warned](#) that the U.S. could lose the high-tech competition to China. Similarly, the National Security Commission on Artificial Intelligence [observed](#) that *"China's plan,*

resources, and progress should concern all Americans. It is an AI peer in many areas and an AI leader in some applications. We take seriously China's ambition to surpass the United States as the world's AI leader within a decade."

What would the world look like if China won this competition? It would mean the erosion of long-standing military advantages, the weakening of the U.S. economy, an undermining of American freedoms, and an assault on Western democratic values across the globe.

If China is able to dominate these critical advanced technologies it can impose its own totalitarian values on the way the world communicates, operates, and governs itself.

National Security Implications

Success in modern military operations is increasingly a matter of a superior ability to acquire, move, and make use of information. Should China be successful in instituting its plan to dominate advanced technologies, it could implement its vision of "intelligentized" warfare. The PLA would be able to see, decide, and act faster than the U.S. military. With superiority in AI, China's military could achieve [control](#) over militarily relevant information; deploy "brilliant" platforms and systems able to defeat U.S. forces in all domains; shut down military, governmental, and private networks and infrastructure; and even undermine the U.S. strategic deterrent.

If China successfully undermines U.S. superiority in technologies such as AI, quantum computing, cyber, and 5G, an actual war with China still might never occur. Beijing's ability to dominate the information

space and deny it to the U.S. could leave this country's military and intelligence community deaf, dumb, and blind. China could undermine the U.S. deterrent, threaten its forces and installations, extort America's allies, and create a first-strike capability.

China could use advantages in advanced technologies to put pressure on U.S. allies to align with Beijing's policies and interests and even to distance themselves from the United States. If China is able to demonstrate a superiority in the military applications of technologies such as AI, ML, robotics, and 5G/6G this could undermine U.S. security guarantees to critical allies in the Indo-Pacific region. China could also use the economic advantages that dominance of advanced technologies would provide to put pressure on countries in the region to adhere to Beijing-dictated policies.

China's strategy to counter perceived areas of U.S. military advantage involves denying the U.S. critical information, interfering with both communications and command and control, and exercising disarming strikes against U.S. and allied forces in all domains. China could deploy robotic platforms and brilliant weapons to dominate the tactical battlespace. Using its superiority in AI, China would be able to create an anti-access/area denial capability that would undermine our ability to hold at risk critical targets in the Indo-Pacific region. It could also deny the U.S. the ability to use space for intelligence and communications purposes.

Additionally, if China dominates the development of AI, it could impact international standards for the use of force. DoD is [developing](#) military AI responsibly and in accordance with U.S. ethical principles. This includes ensuring that there is always a human decisionmaker "in the loop" when it comes to employing weapons.

China is applying a distinct set of values to the exploitation of AI [antithetical](#) to those that dominate in the West. It appears especially taken with the idea of [AI-enabled weapons](#) that can operate without human controls, and instead using a set of algorithms.

Economic Implications

Dominating the global economy and gaining superiority over the rest of the world in advanced technologies is central to Beijing's strategy to be the world's most powerful nation. China has already surpassed the United States as the world's largest manufacturing power. Now the CCP seeks to [seize an advantage](#) in high tech hoping to repeat the pattern.

The consequences for the U.S. economy and our innovation base if China seizes the advantage in advanced technologies are almost incalculable. Losing the high-tech race will be translated into a reduced gross domestic product (GDP), slower job growth, fewer high-paying jobs, and lost opportunities for trade. Commercial tech companies will be less able to compete internationally, fund critical R&D, scale critical technologies and support national security through domestically-sourced technologies. Fewer tech jobs mean even fewer students in the STEM field, exacerbating existing shortages in people with the skills to participate in the new economy.

Chinese companies could exploit their advantages in advanced technologies to disadvantage and even destroy competing U.S. and foreign companies, steal critical company IP, collect data on U.S. consumers, and even control access to critical products and services to maximize profits. In essence, a tech advantage could act as a transfer tax on

every U.S. company and citizen with the money going to Chinese companies and, eventually, into the coffers of the Beijing government. These companies would be free of the type of oversight and regulation present in the U.S. Nor would U.S. companies and citizens have recourse in the courts. U.S. companies and individuals would have to buy from Chinese companies or do without.

Political Implications

Domination of advanced technology would reinforce Beijing's efforts to web the world into its economic orbit through the Belt and Road Initiative. Chinese companies are working hard to build 5G communications networks for countries around the world. Often Belt and Road infrastructure programs are based on contracts with predatory financing clauses. The deployment of Chinese technology can pose a concern for [U.S. security relations](#) with friends and allies. Today, U.S. companies challenge their Chinese competitors across the world in the deployment of advanced technology. They also offer customers an alternative to succumbing to Beijing's [Belt and Road](#) salesmanship. If China wins the competition in advanced technology, these companies may no longer be available to counter Chinese investments abroad, leading to the enthrallment of large swaths of the globe to Chinese companies and, hence, its government.

China is exploiting advanced IT to drive what has been described by the U.S. Senate as "[digital authoritarianism](#)," a combination of ubiquitous surveillance, control over the flow of information, stifling the free flow of ideas,

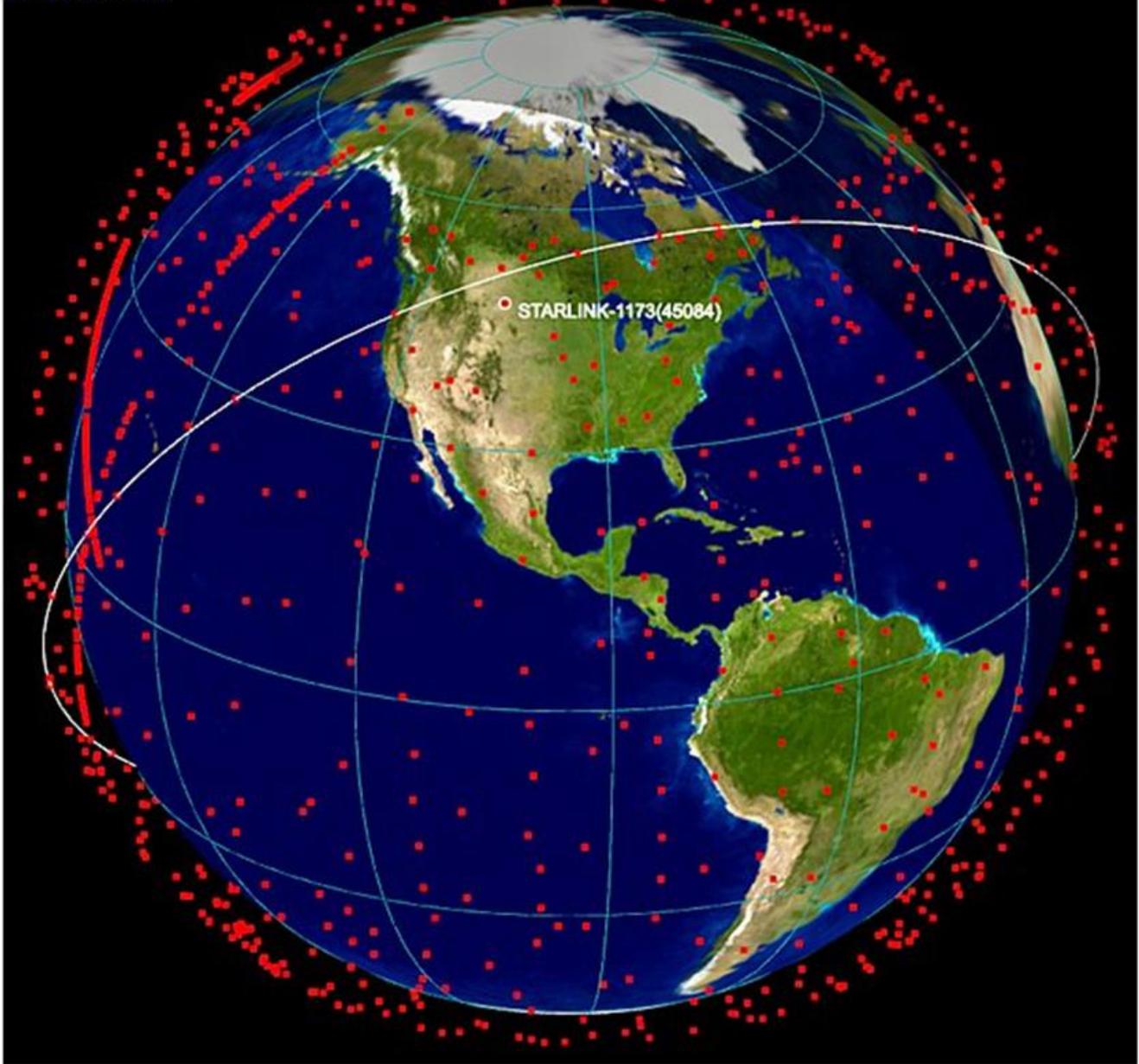
the silencing of dissent, the conducting of influence campaigns, and the imposition of a Chinese-centric world-view. China's [social credit system](#) uses control over IT to influence and coerce its citizens. Chinese companies have already been [accused](#) of placing back doors in their networking technology and passing information on to their government.

The future could see a global Chinese Big Brother over the next-generation knowledge base. Worse, China could influence public debate, political campaigns, and even government decision-making in Western nations, resulting in bloodless coups in future conflicts.

The leadership role of U.S. private companies in developing and deploying advanced IT has created what can be described as a "virtuous cycle." By America building and exporting the best innovative tech for everyday applications, national economies are strengthened. U.S.-developed technologies help export and reinforce U.S. values. Global access and sales by U.S. companies, with their practices and values shaped by Western norms, enhance U.S. national security by supporting both private and governmental ties and increasing global transparency.

If China achieves a lead in these commercial technologies with broad applications, it could create a vicious cycle that would harm American and Western values. It would have a negative impact on standard-setting in such areas as international telecommunications, and could give China the ability to [attack](#) global societal norms, western legal systems, and democratic political institutions.

Selected Satellite: STARLINK-1481 (45742)
COSPAR ID: 2020-038-N
Orbit: 546 x 549, 53.1°



“Success in modern military operations is increasingly a matter of a superior ability to acquire, move, and make use of information.”

SpaceX’s Starlink satellite constellation allows the movement of data on a global scale.

III. Antitrust Legislation: A Self-Inflicted Wound in the Competition With China

Congress now poses a major potential roadblock to the United States' ability to compete with China in high tech. On the one hand, it is working on legislation to support high tech R&D. On the other hand, and potentially much more impactfully, Congress is considering a number of bills which could hamstring our great technology champions, interfere in the marketplace, reduce the potential for innovation, and ultimately hand victory to China in the strategic and economic competition in high tech.

Over the past two years, Congress has been faced with several bills such as the American Innovation and Online Choice Act (AICOA) with one thing in common: they would harm the U.S. high-tech sector and, consequently, the U.S. economy and national security. The proposed antitrust bills rest on two fallacious assumptions. The first is that size equals control and the second is that in the high-tech sector, competition and innovation are being restrained by a small set of large companies.

Expert analysis strongly suggests that both assumptions are wrong. The large high-tech companies are meeting the needs of customers, providing desired products and services and a competitive price, and engaged in continuous innovation. They have promoted the creation of competitors for their products and services. They provide reliable and secure infrastructure, software, platforms, and a set of standards that customers, both public and private, find beneficial. The major tech players are [disruptors](#) of the status quo rather than supporters. In fact, these companies have encouraged the rise of numerous companies that seek to compete directly with their bigger rivals. Thus, if anything, the rise of Big Tech firms has been a spur to competition.

The current set of proposed antitrust laws reflect a populist wave that seeks to use legislative “remedies” to address largely political issues. Existing laws and institutions are well suited to addressing the economic harm, if any, that concentration of economic power may produce. But, as one [noted legal scholar](#) on the subject of antitrust legislation makes clear, these are not the appropriate venues for addressing the political power that large corporations may wield:

“Most notably, antitrust institutions are poorly suited to address problems associated with the excessive political power of large corporations. The courts and the antitrust enforcement agencies know how to assess economic power and the economic effects of mergers or challenged business practices, but there are no reliable methods by which they could assess the political power of large firms. Asking the DOJ, the FTC to evaluate mergers and business conduct based on the political power of the firms involved would invite corruption by allowing the executive branch to punish its enemies and reward its allies through the antitrust cases brought, or not brought, by antitrust enforcers. On top of that, asking the courts to approve or block mergers based on the political power of the merging firms would undermine the rule of law while inevitably drawing the judicial branch into deeply political considerations.”

The effort to disadvantage large private high-tech companies as a penalty for their perceived political activities is not only misguided but could also cause positive harm to the interests of the U.S. government and private sector. For example, the revised version of AICOA may actually undermine the ability of platform operators to provide

adequate cybersecurity. Section 3(a)(4) of the proposed bill could require companies to provide competing third-party service providers, or even those that could potentially be competitors, access to back-end infrastructure including hardware, software and even source codes. The most precious IP these companies possess would be [subject to theft](#). The exception to this requirement is only if the provider company can demonstrate a substantial cybersecurity risk. But the burden of proof of such a risk would be on the companies operating these online platforms, a heavy burden that often can only be demonstrated when a security breach occurs. But how many Solar Winds and Colonial Pipeline hacks can the nation withstand?

This provision would not only permit legitimate competitors access to the platform providers' crown jewels but malign actors operating a "front" company. Dozens of federal departments and agencies, thousands of companies, and tens of millions of individuals use the services of these platform providers based, in part, on the assurance that their information is secure. In a world where foreign actors are constantly trying to attack government and corporate networks, do we want the strongest security regulations or the least discriminatory?

Legislators and government officials need to fully appreciate the role of the private sector's ecosystem in providing the means and mechanisms for advancing U.S. technologies, such as AI and extended reality. Government is no longer the driver for investment and innovation. [Two-thirds](#) of U.S. investments in R&D comes from the private sector. In AI, as an example, U.S. companies currently attract some [60 percent](#) (\$25 billion) of annual global private equity investments.

An additional problem with these bills is that they would damage R&D spending. NASDAQ found that in 2020, the five biggest U.S. tech companies invested \$127 billion in R&D. But [one study](#) estimated that the immediate cost of these antitrust bills would be [approximately \\$300 billion](#), resulting in fewer resources available to fund innovation.

These same companies provide significant funding to spur many startups as well. The [strategic objective](#) of most high-tech startups is to be acquired. In the United States, [58 percent](#) of startup founders have as their goal acquisition by a larger company, whereas only 17 percent want to go public via an initial public offering (IPO). There is [good evidence](#) that for many startups, acquisition is the only path forward. They lack the size, resources, and sophistication to pursue an IPO. As a result, if their innovations are to reach the market, they need the support of a larger company. Large companies, with their resources and experience, can take a startup's innovation and bring it faster to market at scale. The proposed antitrust laws, by restricting the ability of large U.S. tech companies to acquire startups, would severely damage the innovation ecosystem, making it harder to raise capital.

The proposed antitrust legislation [fails to appreciate](#) the Venture Capital (VC)-based innovation ecosystem that exists in the U.S. and its central role in spurring the explosion in IT-related goods and services that has so benefited U.S. economic and national security. The legislation could do serious damage to this ecosystem, reducing the potential resources available to startups, limiting their options for growth or acquisition, and suffocating the entrepreneurial drive that has been so central to the advanced technology environment.

Another proposed bill would prevent major technology companies from merging with other, presumably smaller firms. The “[Platform Competition and Opportunity Act \(PCOA\)](#),” aims to prevent the operators of large platforms from engaging in merger and acquisition activities. This would have a chilling effect on innovation throughout the high-tech economy, discouraging investment, and reducing employment.

Both this bill and AICOA have similar thresholds for determining which companies are subject to the regulation. In both bills, the definitions of the illegal actions are overly broad, and if passed, would characterize almost any action by a covered platform that would increase the size or scope of its operations as illegal. PCOA would not just harm the high-tech innovation ecosystem, it could destroy it.

These proposed antitrust laws also would damage the national economy, the job market, and national security. They would unfairly restrain major U.S. high-tech companies to the benefit of foreign, particularly Chinese, competitors. These companies would then build and maintain a dominant position in their home market while acquiring greater access to the U.S. tech sector and economy. For example, U.S. tech companies [could not buy](#) or invest in some U.S. startups, but Chinese companies could, resulting in a boon to Chinese companies and the Chinese intelligence services with which they cooperate. The large U.S. tech

companies could even be prohibited from taking a minority share in another company.

There is a consensus in the national security community that restricting the ability of large U.S. high-tech firms to compete against China poses a threat to U.S. national security. In a recent report on the state of the U.S.-China tech competition, the [Atlantic Council](#) called on Congress to avoid punitive actions against the U.S. high-tech sector. Last year, a bipartisan group of former national security officials sent a letter to U.S. House Speaker Nancy Pelosi and Minority Leader Kevin McCarthy warning them about the negative consequences of proposed antitrust legislation.

It [read](#): “*At the very least, legislation intended to ban new acquisitions and force break-ups of some of the largest U.S. tech companies – and, in particular, those focused on consumer markets – deserves more study. Provisions in these bills that target a narrow group of U.S. companies without requiring similar oversight of Chinese tech giants such as Huawei, Tencent, Baidu, and Alibaba would place these already formidable competitors in a better position to assume global preeminence.*”

Proposed antitrust laws will do precisely what the proponents of this kind of legislation say they seek to prevent. They will limit competition, constrain new entrants, and slow down tech progress. If they become law, these proposals will be self-inflicted wounds to the U.S. in its competition with China.

IV. What Should Be Done?

The international competition in high tech is intensifying. It is not a given that the U.S. will succeed in dominating this century's competition as it did in the last. Right now, China has a number of advantages. It has a clear strategy and concept for taking advantage of advanced technologies for national gain. Beijing [spends](#) nearly as much on technology R&D as the U.S. does. At the turn of the century, China spent approximately [one-tenth](#) of what the U.S. did. Now it is spending is some 90 percent of the U.S. level. As a percentage of GDP, China's R&D spending exceeds that of the U.S., and on the current trajectory, China will soon surpass the U.S. in R&D spending. There is strong evidence to suggest that China has, at a minimum, [caught up](#) with the U.S. in AI, and may even be spending more in this critical area.

In addition, China has a growing roster of national champions and innovative companies, many of which are receiving government support. It has a large, well-educated cadre of scientists, technicians, and engineers. It has numerous laboratories and research centers. Most importantly, there is a close partnership between the government and private sector.

The U.S. lacks many of these advantages. The U.S. government lacks a focused strategy for high tech, most notably AI. It has taken a market approach, making it largely dependent on an industry primarily focused on commercial applications. Former NATO Supreme Commander Admiral James Stavridis (Ret.) [warned](#): “While some U.S. government and university labs are engaged in AI research...and the military is contracting some of this work, the approach is thus far too *laissez-faire*.” In addition, the

U.S. is behind other industrialized nations in STEM education.

What seems to be a national policy of benign neglect, if not outright hostility, to the development of advanced technologies and private sector innovators is no longer acceptable. The development and deployment of advanced technologies are vitally important for the future of the U.S. economy and the protection of our society and democratic values.

One of the most obvious areas where the outcome of competition over advanced technologies could have dramatic political and military outcome is AI. As Deputy Secretary of Defense Kathleen Hicks [observed recently](#): “Beijing talks about using AI for a host of operations and missions, ranging from reconnaissance to targeted strikes. The PRC views AI as not just the means to offset conventional U.S. superiority, but as a pathway to surpass the United States militarily – and the [People's Liberation Army] is making progress.”

The threat posed by China's pursuit of dominance in AI has not gone unnoticed. Responding to this requires that government and industry take the threat seriously and respond appropriately. Eric Schmidt of the National Security Commission on AI [observed](#): “But we must win the AI competition that is intensifying the strategic competition with China. China's plans, resources, and progress should concern all Americans. It is an AI peer in many areas and an AI leader in some applications. We take seriously China's ambition to surpass the United States as the world's AI leader within a decade.”

Mr. Schmidt and the Commission went on to call for a partnership between government, academia, and the private sector to advance American AI. Given the limits on the behavior of large tech companies in proposed antitrust legislation, it would be impossible for the U.S. government to establish such a partnership with industry.

The U.S. military is pursuing new special relationships with big high-tech companies. For example, the U.S. Navy's Postgraduate School recently signed an agreement with Microsoft on a collaborative research and development project. They will work together in such areas as intelligent edge computing solutions and cloud-enhanced networks, gaming, exercising, modeling, and simulation to improve military capability development and command decision-making. As part of the agreement, the Navy will get access to Microsoft technologies before they are available to the broader market. Would this relationship be challenged if pending antitrust legislation became law?

Likewise, what will it take to win the competition for high tech? As Schmidt and others argue, the United States must change the way it looks at and treats the tech economy. We are in an era unlike the industrial age. Solutions need to be different and appropriate. Congress needs to recognize that this is a competition on multiple fronts – economic, political, societal, and military. Simply put, as the new Arsenal of Democracy, major high-tech firms need to be supported so long as they adhere to the law. They must not be penalized for their size, economic clout, or success. Indeed, those factors have allowed these firms to make unprecedented progress on a host of advanced capabilities for both the commercial and defense markets.

There is a case to be made for protecting and supporting not just investments in high tech, but also of major private companies that are leaders in developing and providing advanced technologies in areas of critical importance to the national defense, such as AI. They need to be treated the way the U.S. government has treated the largest and most sophisticated members of the aerospace and defense industrial base – companies such as Lockheed Martin, Boeing, General Dynamics, Raytheon, and Northrop Grumman. There is no discussion of breaking them up, forcing them to divest, or requiring them to provide proprietary corporate information to competitors or foreign firms. Existing antitrust laws have been [applied](#) to the acquisitions and actions of these companies on a case-by-case basis.

The same approach should be applied to major high-tech companies. Where there is evidence of harm to consumers, existing antitrust laws are a remedy. There are ongoing investigations by the Federal Trade Commission (FTC) and Department of Justice. They should be allowed to unfold before any new legislation is considered.

There is a growing [perception](#) that proposed antitrust legislation is punitive and political in nature, rather than being designed to solve problems. Before Congress decides to act on antitrust legislation, policymakers and the nation need, at a minimum, to consider the national security implications of their proposals more carefully. The defense department and the intelligence community need to weigh in strongly on proposed antitrust legislation to ensure that Congress is fully informed regarding the unintended consequences of their current efforts. A national commission should be created to study the issue and provide a report with recommendations for meeting antitrust

concerns while also protecting the viability of the new Arsenal of Democracy.



“The United States should support and leverage these commercial companies as this country’s new Arsenal of Democracy.”

APPENDICES

Appendix I: The State of Play in Critical Technologies

The technologies at the heart of the global drive for economic prosperity and military advantage in the 21st century include AI, quantum technologies for computing, communications, sensing, and encryption, 5G, cybersecurity, and extended reality. These technologies have been developed and produced largely by private companies to meet the demands of commercial markets. The U.S. government recognizes that in virtually all these areas, a [vibrant commercial sector](#) is best able to create advances rapidly and at scale. It also recognizes that only by partnering with the private sector can it acquire the most advanced capabilities for the Nation's defense at an affordable price.

Not long ago, it was generally believed that the United States held a commanding lead in the technologies that will shape this century. However, China has invested heavily in these same capabilities, while emphasizing science, technology, engineering, and math (STEM) education, creating a large and capable cadre of engineers to fuel further advances.

The [National Counterintelligence and Security Center](#) writes that Beijing's self-declared strategy is to dominate high tech by 2030. China, at a minimum, is now what one source terms a ["full spectrum competitor"](#) with the U.S. in most advanced technology areas, especially AI, 5G, and quantum computing. Some observers believe that China is [actually ahead](#) in several areas. The [America Competes Act of 2022](#) recognizes that the U.S. has become vulnerable to Chinese advances in Big Tech, particularly semiconductor manufacturing. As President Biden [declared](#): "Together, we have an opportunity to show China and the rest of the

world that the 21st century will be the American century – forged by the ingenuity and hard work of our innovators, workers, and businesses."

Artificial Intelligence

There is general agreement that AI could become the most powerful tool for shaping future societies and benefiting humanity. U.S. and Chinese military leaders see superiority in AI as central to victory on future high-tech battlefields. The U.S. military is committed to employing AI in ways that are ethical and conform to national and international laws. China has made no such commitment. China also has demonstrated the ability to employ AI to exploit its massive data collection efforts to impose Beijing's political and ideological values on others.

In his recent [address](#) to the graduating class at West Point, the Chairman of the Joint Chiefs of Staff, General Mark Milley, spoke about the impact of advanced technologies on economics, society, and the military. He stressed the profound changes to the future of warfare that will be created by AI:

"And finally, there is the mother of all technologies — artificial intelligence — where machines are actually developing the capacity to learn and to reason. These rapidly converging developments in time and space are resulting in that profound change — the most profound change ever in human history. And whatever overmatch we, the United States, enjoy militarily ... the United States is challenged in every domain of warfare: space, cyber, maritime, air and land."

It is clear that leading in AI will provide incalculable economic benefits in the decades to come. The ability to process increasing amounts of data and to extract from masses of data useful information has already created an array of new products and services while improving the efficiency and effectiveness of existing economic activities. According to [one estimate](#), by 2030 AI could add more than \$15 trillion to the global economy. The country that leads in AI will be able to garner the largest share of that increased wealth.

The National Security Commission on Artificial Intelligence [concluded](#) that the U.S. could lose the battle for AI in the next decade, and with it, this country's technological preeminence. China has [stated its intention](#) to lead the world in AI by 2030. Beijing has identified so-called AI champions, including familiar names such as Alibaba, Baidu, Tencent, SenseTime, and iFlytek.

The U.S. is home to an impressive array of major AI companies including Microsoft, Alphabet, Meta, IBM, and SAS. The domestic tech sector also continuously incubates new entrants. The U.S. economy and government, including DoD, are increasingly dependent on commercially developed AI. Yet, as the [National Security Commission](#) observed, the U.S. lacks both an overall national strategy and a policy of partnering with industry to ensure technological preeminence.

Radio Access Networks (5G, 6G)

[5G communications networks](#) offer ultra-fast, reliable, high bandwidth connections with trillions of sensors, computers, and other electronic devices able to be supported. 5G and 6G will enable entirely new modes of communications and create entirely new industries and capabilities, such as driverless

cars. It is the key to the integrated, global, near-real-time command and control capabilities both the U.S. military and PLA seek to create.

China is [currently judged](#) to be the world's leader in the development and deployment of 5G technologies. Chinese companies, such as Huawei and ZTE, are building 5G networks around the world. U.S. companies such as Qualcomm design and produce some of the most advanced 5G components and devices, but they do not sell 5G infrastructure abroad. A study by the [Atlantic Council](#) concluded that *"If China controls the digital infrastructure of the 21st [C]entury, it will exploit this position for its national security purposes and be capable of coercive leverage over the United States and allies."*

Quantum Technologies

[Quantum technologies](#) could create faster, more powerful computers and communications networks, new types of sensors, and unique software. Together with AI, it promises to change the way users collect, utilize, and transmit enormous amounts of information. China sees quantum sciences as one of the key technology areas it must dominate and has [invested](#) tens of billions to achieve this goal. The Biden Administration recently [sounded the alarm](#) regarding the potential for quantum computing advances by U.S. adversaries to break currently unbreakable codes.

Baidu Research, Huawei Cloud, Tencent, Origin Quantum, and ZTE are the key [big companies](#) on which Beijing is relying to bring it victory in the race for quantum technologies. In the U.S., research into quantum sciences is primarily the purview of private companies, such as Google, IBM, and Amazon.

Extended Reality/VR/AR

Virtual reality (VR), augmented reality (AR), and extended reality (XR) technologies are set to change the way people work and think and how countries fight. These are the quintessential dual-use technologies. This area was called out in China's [13th Five Year Plan](#) for directed government investments. Even local governments in China are [encouraging investment](#) in metaverse-related capabilities such as supercomputing centers.

China's [leading high-tech firms](#), including "national champions" Tencent, Baidu, Huawei and SenseTime, are deeply involved in this area. Chinese companies have already filed thousands of patents and are spending heavily on the [development](#) of hardware, software, and critical infrastructure. These companies see the possibility that they can leap ahead of their foreign rivals and dominate the metaverse.

The largest U.S. technology firms are investing heavily in VR/AR/XR technologies. Meta has invested \$10 billion in equipment and software to provide VR capabilities within the metaverse, Microsoft is working closely with the U.S. Army on the Integrated Visual Augmentation System (IVAS) to enhance the effectiveness and safety of soldiers, and it also plans significant investments in AR.

Cybersecurity

[Successive administrations](#) have identified computing technologies in general and

cybersecurity in particular as priority areas for the sustainment of U.S. economic and national security. Cyber espionage is a major means by which China acquires U.S. IP. It is the [judgement](#) of the U.S. government that *"the Chinese government...engages in malicious cyber activities to pursue its national interests."*

It is clear that government alone cannot provide the nation an adequate defense against cyber threats. It requires a whole-of-nation approach. The major U.S. technology firms are in the forefront of the fight for cybersecurity. This is both good business and good public stewardship. Companies, such as Amazon, Apple, and Microsoft have spent decades creating secure operating environments and cloud storage in support of both commercial and government demands. The Department of Defense and IC are taking advantage of commercial cloud services in part because they have confidence in the security features that these private sector companies have created. These companies also have [committed billions](#) to enhancing the country's cybersecurity. Amazon, Microsoft and Alphabet have been selected to be the leads in the Joint Defense Cyber Collective, a [government-organized consortium](#) focused on enhancing cloud cybersecurity. DoD has recognized the reality of the Internet of Military Things and is to implement zero trust in all its networks. It is also working to implement a program known as Comply-to-Connect to prevent unauthorized devices from accessing its networks.

Appendix II: The Role of Advanced Tech in the U.S.- Chinese Military Competition

The history of warfare has been marked by [cycles](#) of technological innovation driving military adaptation resulting in new ways of organizing and conducting operations. Two recent examples of this phenomenon are the mechanization of warfare in the early 20th century and the introduction of nuclear weapons in 1945.

Now a [new cycle](#) is underway, one focused on the potential for conflict between the United States and great power competitors, such as Russia and China. Unlike previous revolutions, which generally relied on governments to develop and deploy the critical technologies (e.g., tanks, submarines, rockets, and nuclear weapons), the current one is being driven largely by advances in commercial technologies, such as AI, machine learning, 5G, quantum computing, extended reality, and cybersecurity. These are the strategic digital technologies critical to our economic security and the functioning of civil society.

Both the U.S. and Chinese militaries are focused on the adoption of these new technologies. Both have discovered a truth long known by high-tech companies – future superiority hinges on collecting, moving, and exploiting data. It means creating a data fabric that extends around the world and from top headquarters down to the tactical edge and ultimately to the warfighter. It also means there will be a battle for control of that information, with each side attempting to acquire the knowledge it needs to act faster than its adversary while denying them the same.

The Chinese military is aggressively pursuing what it has called “intelligentized” warfare. This is an element of Beijing’s so-called [Military-Civil Fusion](#), a whole-of-

government approach that fuses national economic, social, and security development strategies into integrated strategic systems and capabilities. Intelligentized warfare will leverage the new technologies, but especially [AI](#), to attempt to leapfrog the U.S. military.

A future U.S.-China conflict will be a battle of competing information systems and networks. As envisioned, the PLA’s [future systems](#), including clouds of unmanned platforms, will execute swift, paralyzing attacks on an adversary’s command and control networks to jam or blind sensors, platforms, and weapons systems. For the PLA, the “[smartest](#)” AI will decide the next war.

The U.S. military also sees the importance of IT in future military operations. It is key to the Pentagon’s concept of [JADC2](#), which seeks primarily to connect sensors to shooters regardless of where they are or to which service they belong. Eventually, JADC2 could connect headquarters, and military units from CONUS down to the tactical edge. In order to realize the vision of JADC2, it is necessary to collect, process, understand, and move massive amounts of data rapidly and continuously. JADC2 requires the fruits of current work on AI, cloud computing, 5G, quantum technologies, the Internet of Things, and enhanced visualization.

Each of the U.S. Armed Services have a similar concept for connecting and commanding their respective forces and equipment. Technology-enabled command, control, communications, and intelligence is at the heart of how each military service plans future operations. Whether it is the **Army’s Project Convergence**, the **Air Force’s Advanced Battle Management System**, or the **Navy’s Project Overmatch**, each

envisioning using advanced technologies to dominate the fight for information and make better and faster decisions. By integrating AI, cloud computing, advanced sensing, and ultra-high-speed networks, [Project Convergence](#) has demonstrated the ability to reduce the needed time to conduct tactical engagements at long distance from many minutes to a handful of seconds.

The U.S. military and the intelligence community (IC) are increasingly investing in advanced technologies. The IC currently operates [two classified clouds](#), one built by Amazon Web Services (AWS) and the other by Microsoft. AWS also recently won a massive [cloud computing contract](#) to support the National Security Agency (NSA). DoD is currently pursuing the [Joint Warfighting Cloud Capability](#), intended to provide access to the best cloud computing technologies from AWS, Microsoft, Google, Oracle, IBM and perhaps others.

Advanced technologies, but especially AI and quantum computing, will play paramount roles in the battle for information. AI will enable the processing of massive amounts of information and allow it to be exploited more rapidly in new ways. Quantum computing will not only allow for improved sensing and faster communications but result in a revolution in network security.

As a senior U.S. official [observed](#) regarding the national security directive on quantum computing, “*Current research shows that at some point in the not-too-distant future, when quantum information science matures, quantum computers...will be capable of breaking much of the cryptography that currently secures our digital communication.*”

Autonomous systems will have a key role to play in future conflicts. We have already seen

how unmanned aerial systems have impacted the Armenian-Azeri conflict and the current war between Ukraine and Russia. Both China and the U.S. are investing heavily in developing unmanned military systems for operations on land, sea, and air. The U.S. is working on unmanned wingmen to support advanced fighters, a wide range of ultra-smart munitions, robotic surface and undersea vessels of diverse sizes, and land robots for transportation and ground combat. Critical to the roles these new platforms will play is the state of development of advanced technologies, particularly AI, ML, and 5G/6G.

As the Department of Defense collects ever-greater amounts of data to exploit faster and more accurately, and as it looks to develop unmanned land, sea and air platforms, the military’s need for AI is growing exponentially. Half of all projects currently [funded](#) by the Defense Advanced Research Projects Agency (DARPA) are seeking to use AI in new ways. The Pentagon recently instituted the [AI and Data Acceleration \(ADA\)](#) Initiative as a way to, among other things, accelerate adoption of interoperable AI-enabled sensor fusion, asset tasking, mission autonomy, and real-time decision planning tools.

Whether it is cloud computing, AI, or other advanced information technologies, it is clear that most of what is available now or in the near future will be provided by private sector companies. Advanced commercial AI is being used to [combine](#) commercial satellite imagery, other unclassified data sources, and 3D visualization to provide the Ukrainian military with actionable intelligence. [SpaceX](#) has been able to provide Kyiv with continuous battlefield communications and the ability to defeat Russian cyberattacks.

Increasingly, technological power equals geopolitical power. If the United States is to maintain its own security and continue to act as the world's sole political and economic superpower, it must lead in a host of technology areas, driven by a strong and innovative private technology sector. As Michael Brown, former Director of the Defense Innovation Unit, [observed](#), "*We need technological advantage to prevail in this strategic competition with China. For the military, that means that we've got to*

modernize faster. We [have] got to use more commercial technology."

China is America's pacing strategic threat. That pace is set by technological competition between Beijing and Washington. The U.S. military knows it must win the battle to adopt new technologies. This country's ability to prevail in that competition – economically, militarily, and politically – will be based on garnering fruits of innovation by private sector firms, the same ones that Chinese and U.S. companies are competing in.

Funding for the preparation of this white paper was provided by the American Edge Project. The American Edge Project is a coalition dedicated to the proposition that American innovators are an essential part of U.S. economic health, national security and individual freedoms.

Glossary

ABMS	Advanced Battle Management System
AI	Artificial Intelligence
AICOA	The American Innovation and Choice Online Act
AWS	Amazon Web Services
CCP	Chinese Communist Party
DARPA	Defense Advanced Research Projects Agency
DoD	Department of Defense
FTC	Federal Trade Commission
GDP	Gross Domestic Product
IC	Intelligence Community
IVAS	Integrated Visual Augmentation System
IP	Intellectual Property
IoT	Internet of Things
JADC2	Joint All-Domain Command and Control
ML	Machine Learning
NATO	North Atlantic Treaty Organization
NSA	National Security Agency
PLA	People's Liberation Army
R&D	Research and Development
STEM	Science, Technology, Engineering and Mathematics
XR/AR/VR	Extended Reality/Augmented Reality/Virtual Reality
3D	Three Dimensional
5G/6G	Fifth/Sixth Generation telecoms



1600 Wilson Boulevard, Suite 203 • Arlington, VA 22209 • Phone: 703.522.5828 • Fax: 703.522.5837
<http://www.lexingtoninstitute.org> • email: mail@lexingtoninstitute.org