Primer

Executive briefing: The AI arms race—assessing U.S. and China's strategic positions

AI as the next technological offset

For decades, the United States has maintained its edge in military technology, but AI is transforming the landscape of warfare. In this new era, dominance is no longer dictated solely by firepower or fleet size, but by data, computing power, and algorithmic innovation.

A "technological offset" is a capability so disruptive that it shifts the balance of power, rendering traditional military strategies obsolete. Nuclear weapons once served this role, followed by stealth technology and precision targeting systems. Now, AI is emerging as the next offset, one that influences not only tactical operations but also strategic decision-making at unprecedented speeds.

With this rapid evolution comes an important question: How can nations ensure that AI is developed responsibly? The balance between deterrence and escalation will be critical. AI will not only be used to enhance military capabilities but also to shape international stability. The goal is to create a deterrence effect—where the mere presence of AI-driven defense capabilities discourages conflict before it begins.

Unlike previous offsets that were confined to specific weapons systems, AI's potential is broader, spanning intelligence analysis, cybersecurity, battlefield autonomy, and electronic warfare. The nation that effectively integrates AI into its defense infrastructure will gain a significant advantage—not just in combat scenarios, but in shaping the global balance of power.

The strategic divide: U.S. vs. China

In this AI-driven race, two dominant players have emerged: the U.S. and China. While the U.S. has long led in AI research and development, its focus has historically been on commercial applications. Large language models, generative AI, and automation tools have primarily been developed for business, consumer technology, and scientific research. Defense applications, though present, were not always the priority.

China, on the other hand, has made AI a core pillar of its military modernization, integrating commercial and defense research under its military-civil fusion strategy. Its dominance in computer vision, facial recognition, and drone technology underscores a national strategy of integrating AI across both civil and defense sectors. The result is a stark contrast: while American tech firms historically distanced themselves from defense contracts, Chinese technology firms have been embedded within state-driven defense initiatives from the start. The People's Liberation Army (PLA) is actively developing AI-enabled warfare technologies, leveraging advancements in data processing, automation, and decision-making at scale. Meanwhile, global semiconductor supply chains, data access policies, and research priorities are shifting, further shaping the AI landscape.

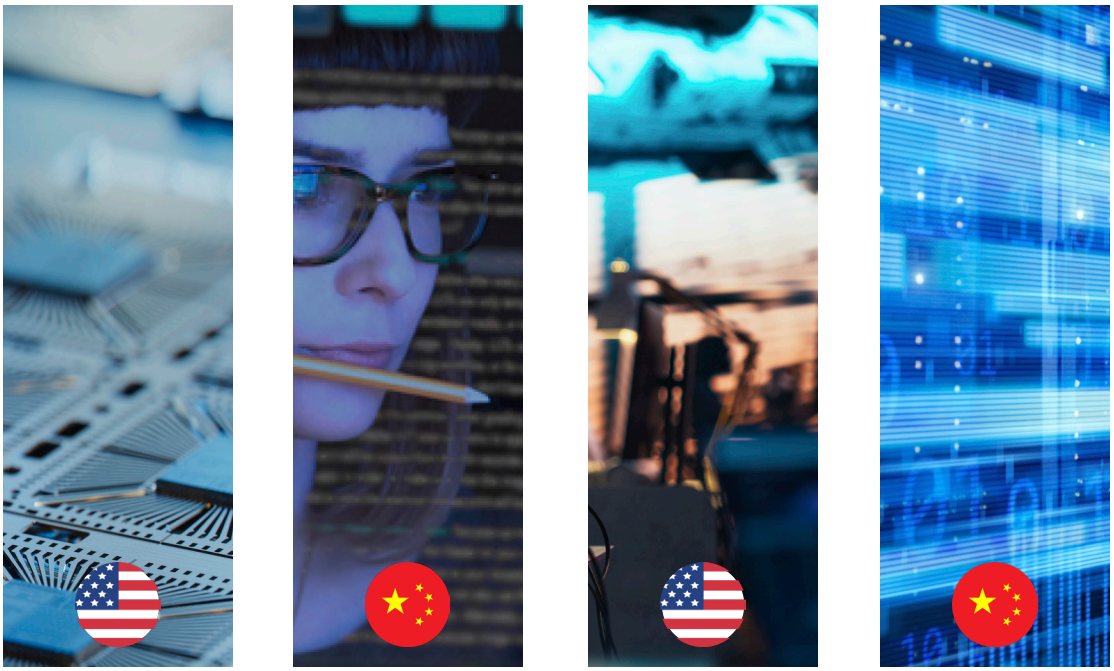
Understanding these dynamics is essential for those responsible for defense strategy, intelligence operations, and technological development. The question is no longer who leads in AI innovation today, but who can deploy and adapt these technologies faster to shape the future of warfare.

The four pillars of AI warfare

AI warfare is underpinned by four strategic pillars:

1. **Computing power and advanced chips** – AI requires immense computational resources, and access to cutting-edge semiconductors is critical.
2. **Data and labeling** – AI models are only as effective as the data they are trained on; China's data access advantages are significant.
3. **Innovation** – Research and development drive breakthroughs.
4. **Deployment speed and operationalization** – The ability to move AI solutions from concept to field use dictates effectiveness in real-world scenarios.

Each of these pillars influences the strategic balance between the U.S. and China, shaping the future of military power, geopolitical competition, and technological leadership.





Pillar 1: AI computing power and advanced chips

The ability to train and deploy large-scale AI models requires immense computational resources, making high-performance chips a strategic asset in geopolitical competition. The United States currently leads in semiconductor design, with companies like NVIDIA at the forefront of the global AI hardware market. NVIDIA has seen its market capitalization surpass $2 trillion, largely due to its role in powering the AI revolution.[1] However, the production of these chips is highly concentrated in Taiwan, home to the Taiwan Semiconductor Manufacturing Company (TSMC), which manufactures over 90% of the world's most advanced chips. [2]

To reduce reliance on Taiwan, the U.S. has aggressively pushed for domestic semiconductor production. In March 2025, TSMC announced a $100 billion investment in U.S.-based fabs, marking a significant expansion of onshore manufacturing capacity.[3] However, Taiwanese government officials later clarified that the most advanced chipmaking technology will remain in Taiwan, despite initial claims that the U.S. would gain access to cutting-edge nodes.[4] This raises uncertainty over the actual impact of the deal on U.S. semiconductor self-sufficiency.

Meanwhile, U.S. export restrictions on high-performance AI chips remain in place to limit China's access to advanced semiconductor technology. Yet, China has continued to advance its AI capabilities, raising questions about how it has achieved such rapid progress. In early 2025, DeepSeek released DeepSeek-V3, an advanced large language model that rivals Western AI capabilities. Three prevailing theories attempt to explain this advancement:

1. **Smuggling of restricted chips** – Some reports suggest that China illegally acquired advanced NVIDIA chips, bypassing U.S. export controls to power DeepSeek's training clusters. Investigations indicate that chips may have been smuggled into China through illicit supply chains, circumventing trade restrictions. Singaporean authorities recently charged individuals with fraud in cases linked to the unauthorized movement of advanced NVIDIA chips to China's AI firm DeepSeek. [5]
2. **Use of NVIDIA's H800 chips before the ban** – DeepSeek may have leveraged NVIDIA's H800 GPUs, which were initially approved for export to China but later banned in October 2023. The company reportedly used a cluster of 2,048 H800 GPUs to train DeepSeek-V3 before these restrictions took effect. [6]
3. **Proprietary computational efficiency innovations** – An alternative theory posits that DeepSeek achieved breakthroughs in algorithmic efficiency, allowing it to train models with fewer computational resources while maintaining competitive performance. [7]

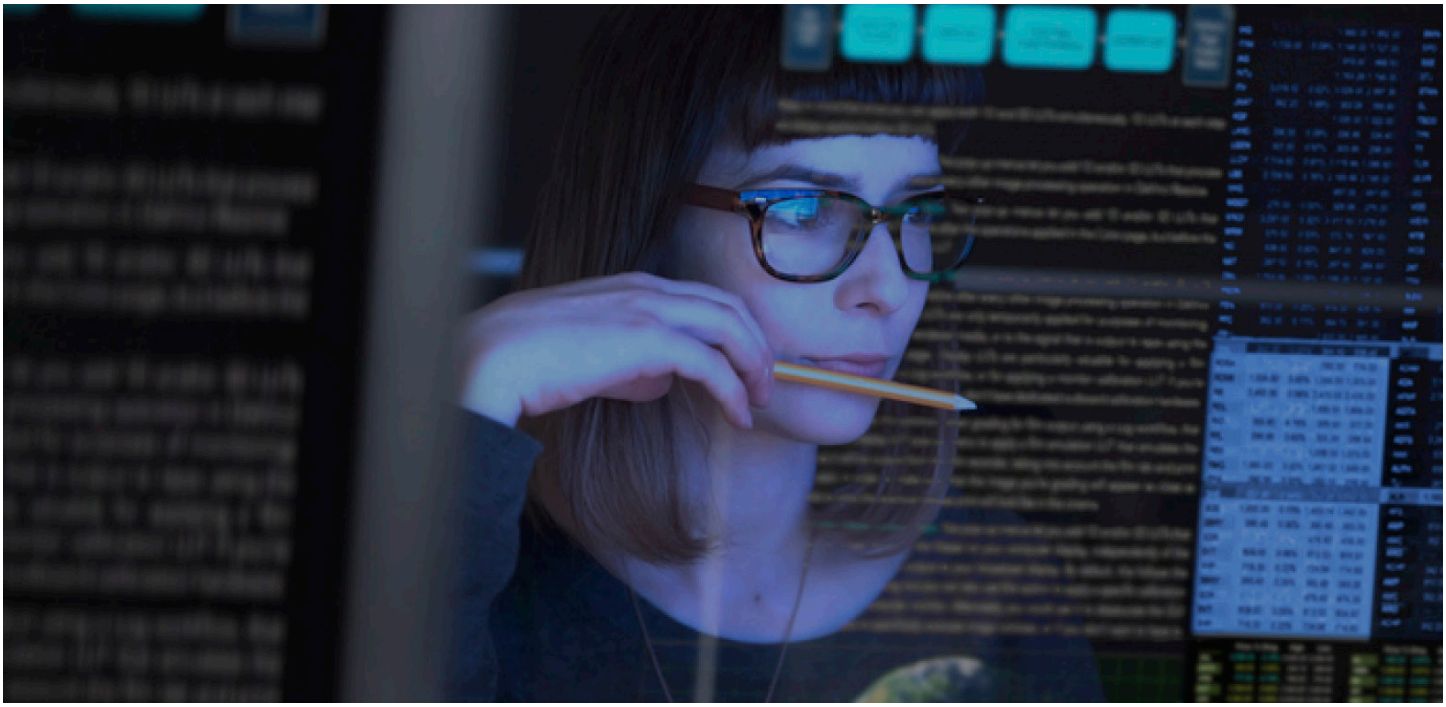
Regardless of which theory holds the most weight, these developments highlight the difficulty of enforcing export controls and the ease of bypassing restrictions.

More broadly, the fragility of global semiconductor supply chains presents a strategic risk. Taiwan's dominance in advanced chip manufacturing means any geopolitical shift could disrupt AI development, defense capabilities, and commercial industries worldwide. With demand for high-performance computing continuing to rise, resilience in a compute-constrained world remains an ongoing challenge.

While the U.S. is investing in domestic semiconductor production through initiatives like the CHIPS and Science Act, efforts to localize advanced chip fabrication face regulatory hurdles, supply chain constraints, and workforce shortages.[8] TSMC's Arizona facility, intended to reduce reliance on Taiwan, has encountered delays due to complex permitting processes and higher production costs, slowing the availability of next-generation semiconductor technology in the U.S.[9] As a result, major American tech firms remain dependent on Taiwan-based plants in the near term, increasing their exposure to geopolitical risks.

With demand for high-performance computing continuing to rise, resilience in a compute-constrained world remains an ongoing challenge. The concentration of advanced semiconductor manufacturing in a single region presents risks for national security, technology development, and economic stability, underscoring the importance of diversified and sustainable access to AI hardware in the years ahead.

Advantage: 



Pillar 2: data and labeling

AI systems rely on vast amounts of data for training and operational effectiveness. The ability to collect, process, and label data at scale is a key factor in AI-driven decision-making, intelligence analysis, and military applications. China benefits from several strategic advantages in this area: Scale – China's population of 1.4 billion generates an immense volume of data across digital platforms, communications networks, and surveillance systems. This data provides a significant advantage in training AI for predictive modeling, targeting analysis, and decision-support systems.

Policy-driven data access – Chinese firms operate with fewer privacy constraints, integrating government-collected data into AI development.[10] In January 2025, China formalized a policy allowing the use of public data for AI labeling, promoting cross-sector collaboration between government and enterprise. [11] This directive facilitates large-scale AI model training, including applications in military intelligence and cybersecurity.

State-supported data labeling industry – In 2023, China established the National Data Administration (NDA) to coordinate data resource integration and AI development.[12] The NDA's roadmap aims for a 20%+ annual growth in data labeling by 2027, with strategic investments in multimodal annotation, automation, and talent pipelines.[13] This initiative aligns with military-civil fusion policies that accelerate AI adoption in both commercial and defense applications.

Human annotation – China employs millions of low-cost data labelers, manually annotating images, video, text, and sensor data to train AI models.[14] This workforce advantage enables China to rapidly improve AI capabilities in object recognition, autonomous targeting, and battlefield decision-making.

China's AI advantage is largely driven by its ability to collect and process vast amounts of data with minimal restrictions. The same infrastructure that supports AI development also enables widespread surveillance and state control.

In contrast, U.S. defense AI development faces challenges due to data-sharing limitations, classification barriers, and regulatory constraints.[15] These restrictions result in siloed, outdated datasets, slowing real-time adaptability and operational AI deployment. While efforts exist to modernize data fusion across agencies, the process is slow compared to China's streamlined approach.

Advantage: 



Pillar 3: Innovation

The U.S. has traditionally led in fundamental AI research and development, with Silicon Valley, academic institutions, and defense investments driving breakthroughs in machine learning, neural networks, and autonomous systems.[16,17] The U.S. maintains a strong presence in top-tier AI conferences such as NeurIPS, ICML, and CVPR, where American researchers consistently publish the highest-impact papers. Institutions like DARPA, MIT, and Stanford continue to set global benchmarks in AI model performance, particularly in areas critical to national security and industrial applications. Additionally, the U.S. remains the largest investor in AI, with over $328 billion in government funding between 2019 and 2023, outpacing China by approximately $195 billion during the same period.[18]

However, China is rapidly closing the gap in AI research and intellectual property. It now leads the U.S. in the volume of AI-related research papers, though the U.S. retains a slight edge in quality-based metrics.[19] China-based inventors have filed more than 38,000 generative AI patents between 2014 and 2023—six times the number filed in the U.S.—giving China a dominant position in global GenAI innovation.[20]

This rapid acceleration is fueled by open-access AI research, contributions from China's global diaspora, and relatively lax data protection policies. China has effectively closed the time lag in addressing key AI research topics, signaling a shift from imitation to independent innovation.

The Chinese government actively funds AI research through initiatives like the New Generation AI Development Plan, fostering close collaboration between state-backed institutions and private firms.[21] This development strategy has accelerated innovation, enabling rapid adoption of AI technologies into military applications.

China's AI research ecosystem has evolved from replicating Western advancements to setting its own innovation trajectory. While the U.S. still holds an edge in cutting-edge research, the pace of China's progress suggests a narrowing lead. Investment in AI research, aggressive patent filings, and integration of commercial and military AI applications have positioned China as a major competitor in shaping the next generation of AI capabilities.

The defining factor in AI leadership will not be research output alone but the ability to operationalize innovations into real-world applications.

Advantage: 



Pillar 4: deployment speed and operationalization

The ability to rapidly deploy AI technologies is a decisive factor in modern warfare—but only if they reach the field in time to make an impact. The speed at which AI is tested, approved, and operationalized directly influences battlefield readiness and strategic deterrence.

The U.S. Department of Defense (DoD) often encounters extended procurement cycles for artificial intelligence (AI) systems, leading to delays in fielding new technologies. For instance, a Government Accountability Office (GAO) report highlighted that the DoD lacks comprehensive, department-wide guidance for AI acquisitions, which could result in inconsistent approaches across services. Additionally, experts have noted that prolonged procurement processes can render AI tools obsolete by the time they are deployed, as the data they were trained on may become outdated. [22]

In contrast, China's military-civil fusion strategy facilitates the swift integration of civilian technological advancements into military applications.[23] This approach allows for rapid deployment of AI technologies to enhance the operational capabilities of the People's Liberation Army (PLA).[24] By leveraging this strategy, China can expedite the transition of AI innovations from development to active use, thereby maintaining a competitive edge in modern warfare.

These differing approaches underscore a strategic divergence: while the U.S. grapples with bureaucratic challenges that slow AI deployment, China's integrated model enables more immediate operationalization of AI advancements.

China's ability to deploy AI at scale is already reshaping military competition. If the U.S. cannot accelerate AI deployment, it may soon find itself reacting to the future rather than shaping it.

Advantage:



The AI arms race—who leads and where?

Artificial intelligence is reshaping warfare, and the U.S.-China competition is narrowing across key areas. While the U.S. leads in chip design, cutting-edge research, and AI innovation, China is advancing rapidly in data access, military integration, and deployment speed.

Computing power and advanced chips → U.S.

- The U.S. leads in semiconductor design, but Taiwan controls the world's most advanced fabrication.
- The recent TSMC investment in U.S. fabs aims to strengthen domestic chip manufacturing, though Taiwan has stated it will retain its most advanced processes.
- Despite export restrictions, China has continued advancing in AI compute, potentially through a combination of chip stockpiling, efficiency gains, and alternative supply routes.

Data and labeling→ China

- China's large population and permissive data policies provide a significant advantage in AI training.
- Government-backed programs actively support data annotation at scale, enhancing AI development.
- U.S. defense AI faces challenges due to privacy regulations and siloed data, limiting real-time adaptability.

Algorithms and innovation→ U.S.

- The U.S. excels in high-impact AI research, with DARPA, MIT, and Stanford setting global benchmarks.
- China now surpasses the U.S. in the volume of AI research papers and generative AI patents, reflecting rapid acceleration.
- China's shift from imitation to independent innovation suggests increasing competitiveness in AI breakthroughs.

Deployment speed→China

- U.S. bureaucratic processes and multi-year procurement cycles slow AI integration into defense operations.
- China's military-civil fusion model enables rapid application of AI technologies across both military and commercial sectors.

The AI arms race is not solely about technological supremacy but about who can adapt and integrate AI capabilities into national security operations most effectively. As geopolitical tensions rise, the nation that defines AI warfare will define the next century of global power.

References:

[1] https://www.wsj.com/tech/ai/nvidia-stock-market-cap-2-trillion-b1c839c8

[2] https://www.reuters.com/investigates/special-report/taiwan-china-chips

[3] https://www.nytimes.com/2025/03/03/technology/tsmc-investment-trump.html

[4] https://www.theguardian.com/business/2025/mar/04/taiwan-trump-semiconductor-deal-tsmc

[5] https://www.reuters.com/technology/singapore-charges-three-with-fraud-that-media-link-nvidia-chips-2025-02-28/

[6] https://www.techradar.com/pro/a-look-at-the-unbelievable-nvidia-gpu-that-powers-deepseeks-ai-global-ambition

[7] https://spectrum.ieee.org/deepseek

[8] https://www.reuters.com/technology/tsmcs-us-plant-unlikely-get-latest-chip-tech-before-taiwan-ceo-says-2025-01-17/

[9] https://www.cio.com/article/3806430/delays-in-tsmcs-arizona-plant-spark-supply-chain-worries.html

[10] https://news.harvard.edu/gazette/story/2023/03/why-china-has-an-edge-on-artificial-intelligence

[11] https://www.scmp.com/economy/china-economy/article/3294867/chinas-ai-aspirations-boosted-public-data-allowed-labelling

[12] https://www.technologyreview.com/2023/03/15/1069814/china-new-bureau-data-economiy/

[13] https://www.chinatalk.media/p/li-qiang-deepseek-data-labeling-subsidies

[14] https://www.nytimes.com/2018/11/25/business/china-artificial-intelligence-labeling.html

[15] https://www.nytimes.com/2024/07/19/technology/ai-data-restrictions.html

[16] https://www.wired.com/story/boston-dynamics-led-a-robot-revolution-now-its-machines-are-teaching-themselves-new-tricks

[17] https://www.businessinsider.com/us-allies-ai-target-enemies-like-would-war-first-time-2024-8

[18] https://www.aiprm.com/ai-statistics/

[19] https://arxiv.org/abs/2307.10198

[20] https://www.wipo.int/pressroom/en/articles/2024/article_0009.html

[21] https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/

[22] https://www.c4isrnet.com/artificial-intelligence/2023/07/18/sluggish-procurement-stalling-pentagon-progress-on-ai-experts-say/

[23] https://www.uscc.gov/sites/default/files/2024-02/Jacob_Stokes_Testimony.pdf

[24] https://www.state.gov/wp-content/uploads/2020/05/What-is-MCF-One-Pager.pdf

Learn more: www.primer.ai