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On China's Challenge to American AI Leadership

China's Challenge to American AI Leadership

Computing Power, Brain Power, and Electrical Power

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It was less than a year ago that the release of DeepSeek's R1 model sent tech stocks sinking and drove a wave of worry about China's capabilities and America's position in artificial intelligence. Even though the hype around DeepSeek was overdone, China's capabilities remain highly competitive in many spheres. There are three key inputs to AI leadership—computing power, brain power, and electrical power. America has a substantial lead in computing power, China leads in electrical power, and the U.S. has a lead in brain power, but America's edge is deteriorating dangerously.

What does "AI leadership" mean? I am skeptical that we are headed toward an AGI threshold–a discontinuous leap in technological progress–and instead believe that AI will be transformative via application in many different economic spheres over many years. Leadership will depend on

having leading AI companies as well as broad application of AI in every economic sector. The quality of AI models won't be the sole determinant of leadership. AI leadership depends on a broad AI ecosystem: models, compute, talent, data governance frameworks, and social support for AI adoption.

In this latter view, AI will shape the future of U.S. and Chinese power by:
1. Improving productivity via application to a wide range of industries, potentially reshaping the world economy
2. Giving rise (as it already has) to important new technology companies with global scope, which will enable new capabilities for intelligence collection and political leverage
3. Intensifying the world's reliance on datacenter infrastructure that will function as a "chokepoint" technology

The geopolitical implications are substantial. Whichever country leads in the global deployment of new tools and infrastructure will gain political influence as well as economic benefits. The U.S. therefore has a critical national interest in ensuring it retains its lead in computing power and solidifies its position in brain power and electric power.

Inputs to AI Leadership

1. Computing Power

Access to advanced chips and the datacenters that house them is a critical input to artificial intelligence. All the world's leading technology companies—whether American or Chinese—are investing heavily in datacenter capacity and trying to buy the most advanced AI chips, including GPUs and high-bandwidth memory (HBM), as possible. All available evidence suggests that, in partnership with a semiconductor supply chain that includes key partners like Taiwan and Korea, the U.S. has a substantial lead in the production of the chips that enable AI.

What is the status quo today? Huawei—China's leading manufacturer of AI chips—relies on imports from Korea for most or all its HBM and smuggled chips from Taiwan for most or all its GPUs. In other words, the latest Huawei chips appear to rely on foreign-manufactured silicon for the majority of their most critical components. Some of this silicon was purchased legally before export controls were in place; some was smuggled. I assume substantial smuggling will continue, but smuggling at the scale needed to build vast datacenter infrastructure is implausible. Some U.S. semiconductor firms have suggested that smuggling chips is a "losing proposition" because of the difficulty of connecting thousands of complex chips and servers.[1] Though I believe the U.S. should intensify efforts to prevent chip smuggling, I see no evidence that smuggling is occuring at a scale that impacts the strategic balance. This is why, according to recent media reports, major Chinese tech firms are using datacenters outside of China to train

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[1] https://www.cnbc.com/2025/07/24/nvidia-ai-chips-smuggling-china-trump.html

advanced models—they can't access inside of China the quantity of chips that they need.[2]

I agree with Trump administration officials who argue that, if China comes close to catching up in semiconductor production quality and quantity, it could start exporting chips abroad at below-market prices, winning market share in third countries. This is and should be a real concern. For now, however, there is little evidence that China's domestic production is close to catching up. Researchers at the Institute for Progress recently examined all credible estimates of China's AI chip production growth, from US government sources, private sector consultancies, and media reporting. Median estimates suggest that in 2026 and 2027, China's production capacity for sub-7nm chips will be less than 5% of the West's.[3] Given that China's economy is around 20% of world GDP—and given that its tech sector aspires to lead in AI—having access to only 5% of the world's AI compute is a major roadblock.

There are several potential risks to U.S. leadership in computing power.

> **i. Computing power could become a less important input to AI training and deployment relative to software innovations.** However, big tech firms in the U.S. and in China show all continue to invest heavily in compute. The world's main tech firms are united in their belief that compute quantity will be an important factor in AI leadership.

> **ii. Chinese firms could surprise by producing more advanced chips than expected.** This is possible, but is hard to find a credible private sector, government, or academic analyst who expects this in the short run. Financial markets are also betting heavily on the Western ecosystem retaining its lead: TSMC's market capitalization is over $1 trillion, while China's market leader—SMIC—is valued at less than $100 billion.

> **iii. Smuggling could increase dramatically.** It is hard to rule this out, though the fact that China is now banning use of foreign chips in some domestic datacenters might reduce the incentive to smuggle.

> **iv. Foreign countries could start using Chinese chips, even at small scale, building a Chinese-centric ecosystem.** There is little evidence of this happening so far, though we should be vigilant. The Trump administration's policy of allowing advanced chip exports, with security controls, to trading partners like Saudi Arabia and the UAE make it less likely that these countries will devote resources to building ecosystems based on Chinese chips.

In sum, all available evidence suggests that the U.S. and its supply chain partners are likely to retain a dramatic lead in computing power over the next several years.

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[2] https://www.ft.com/content/96fe9898-a3a4-4a33-be1d-da06bdb6cb2b
[3] https://ifp.org/the-b30a-decision/

2. Electrical Power

It is widely recognized that China has a substantial advantage in providing the electrical power that AI datacenters require. America's computing edge is constrained by an electrical system that is struggling to meet the demand growth. Data centers consumed around 4% of national electricity in 2024; the Department of Energy estimates this could rise to 12% by 2028 due to AI workloads.[4] Combined with rising power needs for advanced manufacturing and electrification, the United States already finds itself unable to fully exploit its computing advantage because of difficulties finding power.

By contrast, China has made electrical power abundance a key pillar of its industrial policy, even predating the AI boom. Unlike the US, China's electrical power expansion benefits from long-term production growth. China is adding coal, nuclear, and solar capacity at a rate unmatched by any other major country. In 2023, China added more than half the global total of renewable energy capacity.[5] Some analyses suggest China could have 400 GW of spare generation capacity by 2030, which would absorb AI demand without stressing the grid.[6] While US expansion is constrained by permitting delays, transmission bottlenecks, and local resistance, China builds multi-gigawatt power plants and datacenters on rapid timelines.

This divergence in power shapes each country's long-term AI outlook. In the US, data centers and AI workloads are growing faster than new generation and transmission can be built. The nation's largest regional grid operator is now struggling to meet AI-driven load growth.[7] In Virginia, large data centers reportedly face up to a seven year wait for electricity hookups.[8] These bottlenecks are becoming acute. Meta CEO Mark Zuckerberg said last year, "before we run into [capital constraints], we're going to run into energy constraints."[9] Secretary Wright's recent request that the Federal Energy Regulatory Commission accelerate approval of requests to connect datacenters to the power grid could help. Shortening permitting timelines would also allow more rapid building of new power plants and transmission infrastructure.

3. Brain Power

Computing power and electrical power are critical to AI, but so is brain power—smart people. It takes brilliant engineers to design the advanced semiconductors that AI systems require. More engineers are required to train AI models. Even more are needed to deploy AI at scale across the economy. America probably retains a lead in developing and attracting AI talent, but this lead is fragile and much smaller than its lead in chips. The easiest way for public policy to

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[4] https://www.pewresearch.org/short-reads/2025/10/24/what-we-know-about-energy-use-at-us-data-centers-amid-the-ai-boom; https://www.technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/

[5] https://www.reuters.com/business/energy/china-leads-renewables-charge-asia-others-need-catch-up-russell-2024-06-04/

[6] https://www.businessinsider.com/ai-data-centers-us-chips-electricity-power-crunch-shortage-goldman-2025-11

[7] https://www.reuters.com/business/energy/china-leads-renewables-charge-asia-others-need-catch-up-russell-2024-06-04/

[8] https://subscriber.politicopro.com/article/eenews/2024/09/03/data-centers-face-seven-year-wait-for-dominion-power-hookups-00176897

[9] https://www.datacenterdynamics.com/en/news/metas-mark-zuckerberg-says-energy-constraints-are-holding-back-ai-data-center-buildout/

support American AI leadership is to bolster America's lead in AI talent.

Since 1776, the United States has pursued two parallel talent strategies: first, investing heavily in training domestic brain power in advanced technology; and second, removing some of the world's smartest minds from our adversaries and bringing them to build the American economy instead. Investing in AI expertise is critical both for developing leading-edge capabilities, but also for deploying AI across many facets of our economy.

The United States has for over a century been a world leader in educating its population, ensuring that workers have the skills to implement new technologies across the economy. AI is already proving important in spheres from agriculture to medicine to logistics. That's why it is critical that we not only invest in education AI researchers, but also broadly invest in giving workers the skills to deploy AI, regardless of the field they work in. High schools, vocational training programs, community colleges, and universities all have a role to play in develop a broadly AI-capable workforce.

The second prong of America's talent strategy has been brain drain: taking the world's smartest minds from our adversaries and employing them in the U.S. to build the American economy instead. This has a dual benefit for the United States: it slows down adversaries and benefits us. It has supported U.S. technological leadership for generations, from space travel to the early computers. It is equally important today. For example, of the 10 most valuable U.S. publicly traded companies, half are led by foreign-born CEOs.

In AI, it is particularly important that we ensure the leading researchers are building our companies, not our adversaries'. One 2023 estimate found that, while only 18% of the world's leading AI researchers were American origin, the U.S. employed 42% of the world's top researchers. 47% of the world's leading researchers were Chinese, but only 28% of the leading researchers worked in China. That's because of a substantial brain drain in America's favor: 38% of leading researchers at U.S. universities were Chinese, as opposed to 37% who were American.[10] As of the 2023 data, in other words, around 40% of Chinese-origin top AI researchers worked in the U.S. This is an extraordinary brain drain in America's favor.

There is strong evidence that this trend is changing in ways that undermine our lead. Chinese AI researchers are much less likely to work in the U.S. now relative to several years ago. First, China has discouraged certain types of researchers from studying and working abroad. Second, the pandemic years made it difficult for Chinese students to study abroad. DeepSeek's success was driven by teams of young researchers that had no opportunity to study abroad during the pandemic. They stayed in China and built China's AI capabilities. This is also why China reportedly seized the passports of DeepSeek researchers to limit their ability to leave the country.[11] China is now considering a new "K visa" program intended to attract highly skilled engineers from abroad.[12] Third, the United States has failed to prioritize the attraction of top

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[10] https://archivemacropolo.org/interactive/digital-projects/the-global-ai-talent-tracker/
[11] https://www.theverge.com/tech/629946/deepseek-engineers-have-handed-in-their-china-passports
[12] https://english.www.gov.cn/policies/latestreleases/202508/14/content_WS689dd0d3c6d0868f4e8f4d1e.html

experts from around the world, making it more difficult to put them to work building American technology and American companies.

President Trump has twice recently noted the importance of attracting high-skilled workers to our technological leadership. The easiest way for Congress to support America's AI leadership would be to ensure American companies benefit from the world's smartest minds—and that our adversaries can't.

Conclusion

The three key factors shaping AI competition are computing power, brain power, and electrical power. America has a severe disadvantage relative to China in electrical power, though accelerating permitting and interconnection approval can improve our position. The U.S. has a commanding lead in computing power, which would be undermined if the Trump administration authorizes large-scale advanced chip sales to China. Brain power used to be a decisive U.S. advantage, but China is keeping a larger share of its AI experts at home, and we are failing to attract as many. China has now embraced our strategy of attracting AI experts with special visas for engineers. The Trump administration's goal of AI dominance requires solving our electrical power deficits, preserving our computing power lead, and restoring our dominance in attracting the world's smartest minds to build American AI capabilities.