

Beyond the Headlines - the AI race explained: U.S. vs China

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Ilaria Sangalli, Index Research Lead

The global race for artificial intelligence supremacy is often framed as a contest between the United States and China. Recent remarks by NVIDIA CEO Jensen Huang have brought new attention to this debate when he suggested that “China is going to win the AI race,” only to later clarify that China is “nanoseconds behind America in AI.”¹

His comments reveal an intricate dynamic: while China is advancing rapidly, the U.S. retains a decisive lead, thanks to superior compute infrastructure, software ecosystems, and export controls. Yet, structural factors like energy costs and regulatory burdens in the U.S., combined with China’s cheaper power and looser rules, create a complex competitive landscape.

Huang also warned that export restrictions on advanced chips could isolate U.S. tech from China’s \$50B–\$200B AI chip market, limiting reinvestment capacity.

The debate underscores a critical question: can the U.S. maintain its lead amid structural challenges and geopolitical constraints, or will China’s scale and cost advantages narrow the gap faster than expected? The following analysis seeks to explore this question in depth.

Why Huang’s warning does not mean the U.S. is losing the AI race

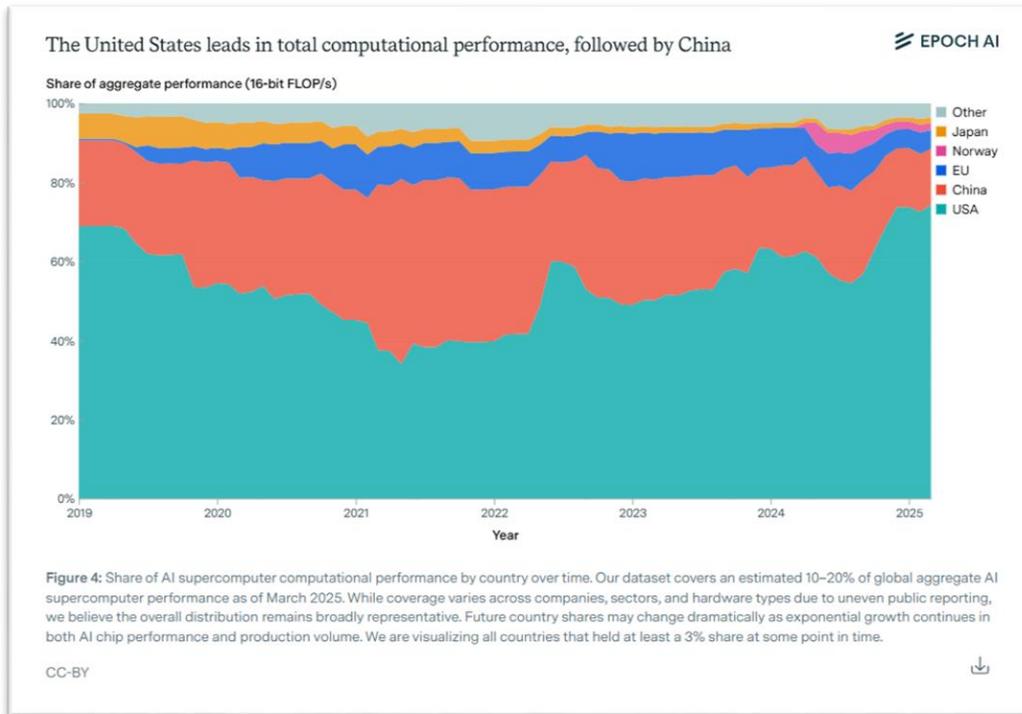
The U.S. is currently ahead in global AI development, largely due to its advantages in computational resources and semiconductor innovation. Data shows that the U.S. consistently outperforms other nations in aggregate AI computational performance.^{2,3} This competitive position derives from its substantial control of roughly 75% of global GPU cluster capacity, compared to China’s 15%. GPU clusters represent the hardware backbone of AI development.⁴

¹ <https://thehill.com/policy/technology/5592818-nvidia-jensen-huang-china-ai-race/>

² <https://epoch.ai/blog/trends-in-ai-supercomputers>

³ How much compute power countries are using for training and running AI models, measured in FLOPs.

⁴ <https://www.bloomberg.com/professional/insights/artificial-intelligence/global-insight-who-innovates-who-benefits-gauging-the-ai-race/>



US and China Vie for Advantages in AI Race

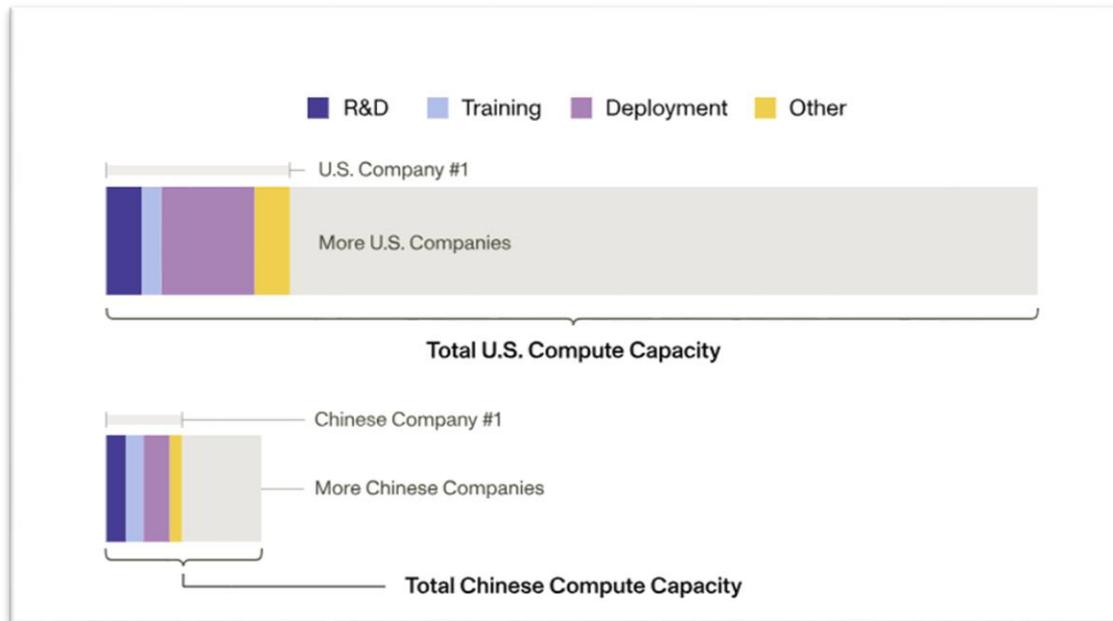
	United States	China
Share of global GPU clusters	75%	15%
Internet users	321m	1.108b
Electricity generation	4387.26 TWh	10072.6 TWh
Share of top AI talent	42%	28%

Source: China Internet Network Information Center, Statista, Ember, Paulson Institute, Epoch AI, Bloomberg Economics. Note: Share of top AI talent measures nation's share of AI researchers among NeurIPS paper authors.

China, despite having far greater electricity generation capacity and the world's largest internet user base, has not yet translated these advantages into comparable AI compute power. While Chinese models are closing the gap on performance benchmarks, experts argue that America's real edge lies in its ability to sustain leadership through superior infrastructure. U.S. firms are three generations ahead in advanced semiconductor manufacturing, enabling unmatched capacity to train and deploy frontier models. For example, Nvidia shipped 3.76 million AI chips in 2023, while Huawei produced only 200,000.³

According to leading compute researcher Lennart Heim, China's AI progress is genuine but constrained. Its models are improving and narrowing the performance gap with U.S. counterparts, particularly on benchmarks and applications. However, this advancement reflects model quality rather than underlying infrastructure. Limited compute capacity forces Chinese firms to concentrate

resources on priority projects instead of scaling broadly. While both nations invest in R&D, model training, and deployment, the U.S. operates at a far larger scale. China can still produce competitive models by focusing scarce compute on select initiatives, but its smaller overall capacity restricts the number of frontier firms, parallel model training, and deployment scale, ultimately slowing the breadth and speed of its AI ecosystem development.⁵



Source: Rand

Export controls have further widened this gap. Following U.S. restrictions on advanced chip exports, America's share of global AI computing power surged from 51% to 74%, while China's fell from 33% to 14%.⁶ Huawei's Ascend 910C chips, though improving, deliver only about 60% of the performance of Nvidia's H100 for inference, a critical workload as inference becomes the dominant source of compute demand. To match a cluster of 100,000 Nvidia B200s, China would need roughly 300,000 Ascend 910Cs, creating significant challenges in energy consumption and engineering complexity.^{7,8}

Hardware leadership is reinforced by software dominance. The U.S. benefits from Nvidia's CUDA, a mature and widely adopted platform for GPU programming first released in 2007, whereas Chinese ecosystems are relatively new and still evolving. Developers often encounter frequent errors during training or deployment, which slows progress. Limited or unclear documentation makes it hard for engineers to troubleshoot or optimize performance.

Interconnect technology is another weak spot for China: while its chips are improving faster in raw compute and memory bandwidth, they lag far behind in interconnect speed. Nvidia's NVLink is more

⁵ <https://www.rand.org/pubs/commentary/2025/05/chinas-ai-models-are-closing-the-gap-but-americas-real.html>

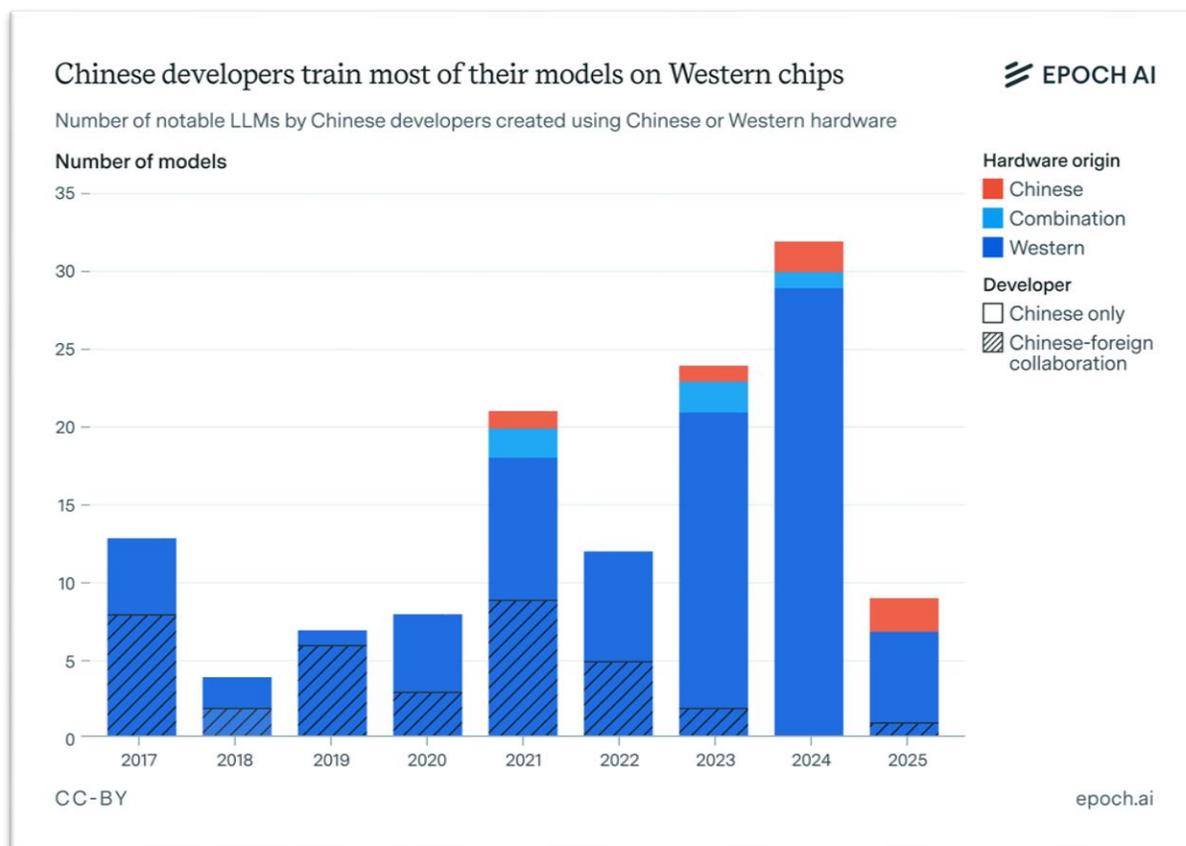
⁶ <https://www.washingtonpost.com/opinions/2025/08/27/trump-nvidia-chips-deal-china/>

⁷ <https://www.csis.org/analysis/deepseek-huawei-export-controls-and-future-us-china-ai-race>

⁸ <https://www.rand.org/pubs/commentary/2025/05/chinas-ai-models-are-closing-the-gap-but-americas-real.html>

than ten times faster than Huawei's Unified Bus, giving the U.S. a decisive advantage in scaling massive training systems.⁹

While DeepSeek's algorithmic innovations are real, China faces structural challenges in replicating the U.S. advantage in AI chips and compute. SMIC, Huawei's AI chip manufacturing partner, struggles with low production yields (around 20%) and lacks access to EUV lithography, blocking progress beyond 7nm nodes and preventing 5nm+ production due to export controls from the Netherlands on the leading provider of this technology (ASML) and allied restrictions.¹⁰ These limitations reinforce reliance on NVIDIA chips among leading Chinese AI developers.



This compute superiority translates into leadership in frontier AI models. The latest LLMStats leaderboard shows U.S.-based models such as OpenAI's GPT-5, Anthropic's Claude Opus, and Google's Gemini 3 Pro, dominating across benchmarks like GPQA (graduate-level reasoning), AIME (advanced math), MMLU (multitask knowledge), and HumanEval (coding). Chinese models such as Qwen3 and DeepSeek are improving rapidly and offer competitive performance at lower cost, but the U.S. remains ahead.¹¹

⁹ <https://epoch.ai/gradient-updates/why-china-isnt-about-to-leap-ahead-of-the-west-on-compute>

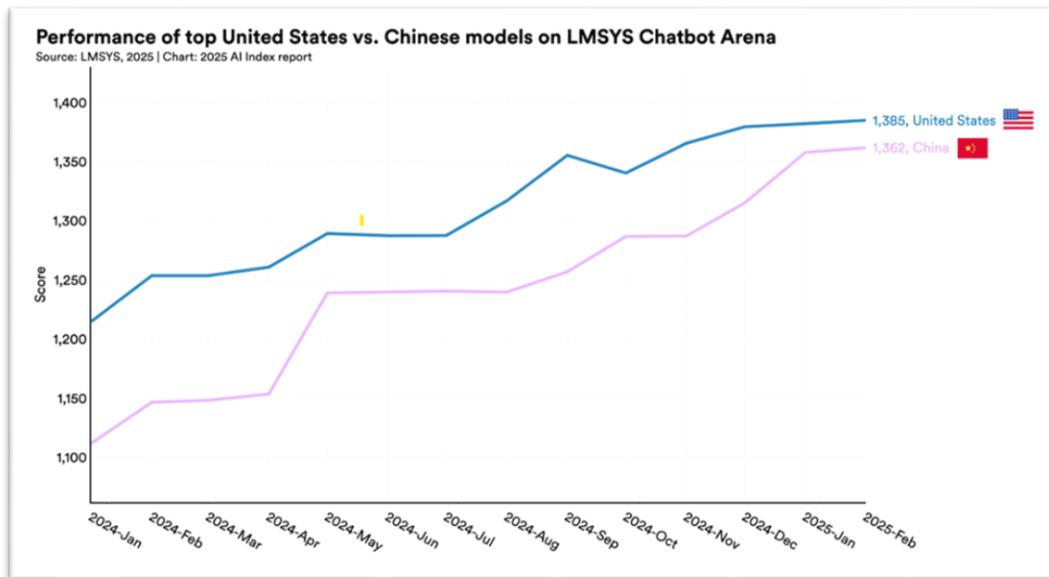
¹⁰ <https://www.csis.org/analysis/deepseek-huawei-export-controls-and-future-us-china-ai-race>

¹¹ <https://llm-stats.com/leaderboards/llm-leaderboard>

Organization	Country	Model	Multimodal	Input \$/M	Output \$/M	GPQA	AIME 2025	SWE-bench Verified	HLE
	US	Gemini 3 Pro	✓	\$2.00	\$12.00	91.9%	100.0%	76.2%	-
	US	Grok-4 Heavy <small>UNRELEASED</small>	✓	-	-	88.4%	100.0%	-	-
	US	GPT-5.1	✓	\$1.25	\$10.00	88.1%	94.0%	76.3%	-
	US	GPT-5.1 Instant	✓	\$1.25	\$10.00	88.1%	94.0%	76.3%	-
	US	GPT-5.1 Thinking	✓	\$1.25	\$10.00	88.1%	94.0%	76.3%	-
	US	Grok-4	✓	\$3.00	\$15.00	87.5%	91.7%	-	-
	US	Claude Opus 4.5 <small>NEW</small>	✓	\$5.00	\$25.00	87.0%	-	80.9%	-
	US	Gemini 2.5 Pro Preview 06-05	✓	\$1.25	\$10.00	86.4%	88.0%	67.2%	-
	US	GPT-5	✓	\$1.25	\$10.00	85.7%	94.6%	74.9%	-
	US	Grok 4 Fast	✓	\$0.20	\$0.50	85.7%	92.0%	-	20.0%
	US	Claude 3.7 Sonnet	✓	\$3.00	\$15.00	84.8%	54.8%	70.3%	-
	US	Grok-3	✓	\$3.00	\$15.00	84.6%	93.3%	-	-
	US	Grok-3 Mini	✓	\$0.30	\$0.50	84.0%	90.8%	-	-
	US	Claude Sonnet 4.5	✓	\$3.00	\$15.00	83.4%	87.0%	-	-
	US	o3	✓	\$2.00	\$8.00	83.3%	86.4%	69.1%	-

Source: LLM Stats

However, according to Stanford's AI Index Report, China is closing the performance gap. In 2024, U.S.-based institutions produced 40 notable AI models, compared to 15 from China and 3 from Europe. Performance differences on major benchmarks such as MMLU and HumanEval shrank from double digits in 2023 to near parity in 2024.¹²



Source: Stanford's AI Index Report

¹² <https://hai.stanford.edu/ai-index/2025-ai-index-report>

China's strengths lie elsewhere. It leads in AI publications and patents and produces nearly half of the world's elite AI researchers. However, the U.S. remains their primary destination for employment, hosting 42% of global AI talent and 60% of the top tier. China also holds a power advantage: its electricity generation capacity is more than double that of the U.S., enabling large-scale deployment of less efficient chips to offset hardware gaps. In contrast, America faces looming grid constraints, with AI-driven demand projected to push data centers to consume 8.6% of national electricity by 2035.¹³

Conclusion

Despite China's rapid progress in AI research and model development, the U.S. currently maintains a lead in compute infrastructure, software ecosystems, and talent concentration. Export controls have reinforced this advantage, even as they create commercial tensions for U.S. firms. Based on current trends, China's strengths (low-cost power, regulatory flexibility, and growing algorithmic innovation) could narrow the gap over time, but structural bottlenecks in hardware and interconnects remain substantial. In short, Huang's "nanoseconds behind" remark captures the essence of the race: China is advancing, but the U.S. currently leads and must sustain forward momentum to safeguard its position.

¹³ <https://www.bloomberg.com/professional/insights/artificial-intelligence/global-insight-who-innovates-who-benefits-gauging-the-ai-race/>

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