Deeper Than DeepSeek: China’s AI Ascendancy

By Chengyi Lin , INSEAD

How China built a robust AI ecosystem to challenge American dominance.

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In early 2025, Chinese company DeepSeek released a new open-source LLM (large language model) that sent the tech world – and the stock market – into a frenzy. DeepSeek-R1 does not only perform on a par with, if not better than, leading LLMs including GPT-4, Llama 3.1 and Claude – it also requires less training time and data to develop and comes with a substantially **cheaper** price tag.

How did DeepSeek, only founded in May 2023, break through so quickly? Is it a one-time wonder, or a sign of things to come from China? Indeed, following the launch of DeepSeek-R1, Chinese tech titans Tencent, Alibaba and ByteDance announced LLMs of their own, with both **Tencent** and **Alibaba** claiming that their models surpassed the capabilities of DeepSeek-R1.

Could this be the start of accelerated AI development in China? Below, I unpack how the country has carefully built up the core components of its AI

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ecosystem to set itself up for success.

1. **Investing in academic and applied research**

The foundation of AI is research. Since the 2000s, China has stepped up its investment in academic and applied research around AI, buoyed by the Chinese government's ambitious **goals and plans** in its bid to level the playing field with the United States.

To build a solid base for AI development, **top Chinese academic institutions** have leveraged their decades of engineering and computer science expertise and invested heavily in AI research. Leading universities, as well as regional and local institutions across the country, have expanded enrolment. Chinese government venture funds have also **exceeded US$912 billion** in the past two decades, comparable to US spending on all government industrial policies in the same period. AI-related firms across China were allocated 23 percent of this amount.

As a result, AI **paper publication** and **patent filing** from China have both surpassed those from the US since the 2010s. The World Intellectual Property Organisation **reported** that between 2014 and 2023, Chinese investor-led AI patent filing was six times that of the US. However, Chinese research is less noticed and underutilised compared to American research. For example, the citation count for Chinese patents was **much smaller** than American ones, despite the higher base number of Chinese patents.

Although the recent availability of large data sets via cloud technology has allowed algorithm development to accelerate, China's AI growth, as well as that of its broader digital ecosystem, has been powered by conscious investment in research and resources. These are key to establishing a lasting competitive advantage.

2. **Doubling down on talent development**

Another critical resource for AI is talent. In the past decade, Chinese tech giants have employed and developed thousands of programmers and data scientists across e-commerce, gaming and marketing. China has reportedly **one-upped** the US in producing AI talent, and plans to add another 500,000 individuals to its AI talent pool in the coming years.

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Ironically, the recent tech crackdown by the Chinese government released many engineers from the likes of Alibaba, Tencent and Baidu into the vibrant start-up world to hone new inventions. There are currently an estimated **1.67 million** Chinese AI-related companies, of which over 237,000 were added in the first half of 2024 alone.

Private investment in China has followed the **government-backed funding push** for AI and digital technologies, with venture capital and private equity funds diverting their attention to cultivating new AI unicorns. These investments can lead to significant waste, as we have seen from the previous "gold rush" towards bike-sharing platforms and last-mile delivery services. But they can also markedly accelerate the growth of a nascent industry, encourage talent development and increase the likelihood of success for firms.

Take Kaifu Li, an ex-Microsoft and Google executive turned private investor who launched his own AI venture, 01.ai. Within a short period, the company debuted its Yi-Lightning LLM, which **matches up** against well-known models like GPT-4. Similar to DeepSeek-R1, only 2,000 GPUs and a modest budget of US$3 million were required to train it, **roughly 3 to 4 percent** of what OpenAI needed to develop GPT-4.

3. **Turning constraints into opportunities**

The Silicon Valley approach to AI development has focused on advancing technologies on all fronts – from chips and servers to algorithms and data collection. Across the Pacific Ocean, China has faced increasing constraints being outside the American and Western AI ecosystem. The US government placed an **export ban** on chips to China in 2022, which became **more restrictive** over the years. At the same time, top AI minds from China continue to relocate to the US.

Although these constraints give the US an edge, they hardly slowed down Chinese AI development. It is well established that constraints can fuel innovations – even disruptive ones – as an alternative to heavy investment.

Huawei, SenseTime and Xiaomi are just a few Chinese firms that have been working on advancing AI hardware, including chip development. Alibaba and Tencent have made continuous efforts to bring top AI talent back to China after their studies abroad. Moreover, companies like DeepSeek have approached these constraints as challenges that can be overcome. For

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example, one of DeepSeek's objectives is to develop an LLM that can run on older-generation chips.

Alibaba and Tencent have worked on another key challenge of AI: the high energy consumption of LLMs. Alibaba's **Qwen2.5-Turbo** search engine is significantly cheaper to run than **GPT-4 Turbo**.

4. **Practicing frugal innovation for scaling**

Another major hurdle hidden from the public eye is scaling competition within China. With a population of over 1.4 billion, China is an attractive market for both domestic and international companies. The key to success here is scaling.

The speed of scaling depends heavily on both price and quality. Most companies in China compete to drive down costs while innovating on products and solutions. Global markets have already witnessed the shift of wind and solar industries to low-cost and high-quality production in China through **frugal innovation** and internal competition. AI is no exception.

Rapid scaling and high competition are not without its drawbacks – something China must keep an eye on as the AI industry continues to grow. Heavy government-directed investment paired with competition at the regional and local levels can generate significant waste. Take China's electric vehicle industry: More than 200 competing brands have contributed to an overcapacity problem. Yet, utilising the frugal innovation approach to scaling remains an effective way to succeed in the Chinese market and beyond.

5. **Cultivating robust internal competition**

DeepSeek is just one of many start-ups that have emerged from intense internal competition. Interestingly, it was not even listed on the **Hurun China AI Enterprise Top 50** list in 2024. The list provides a glimpse of the Chinese AI ecosystem beyond well-known tech behemoths. Firms span multiple sectors including mobility, communications, entertainment and healthcare, and diverse expertise such as hardware development, data analytics, language processing and image and voice recognition.

In addition, firms are spread across China's main economic development areas, including Beijing, Shanghai, Zhejiang and Guangzhou. The youngest firms on the list were incorporated only in 2023. Beijing tops the list with 20

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firms while Guangzhou and Shenzhen notch a combined 12 companies. Competition is also robust within industries – in mobility alone, 11 firms that work on autonomous driving appeared on the list.

The diversity of the top AI firms in China is evidence of its competitive internal market, as encouraged by the government's strategic vision. The country has employed a similar model to accelerate growth in other nascent industries, including solar, wind and **electric vehicles**.

Such internal competition has led to low prices and mature products, which then rapidly enter the global market. On the other hand, the American AI sector is mostly led by industry titans. Since 2015, Microsoft has established seven industry verticals to explore AI use cases with its clients. Google has quietly embedded AI into its analytical toolboxes. This heavy reliance on big players risks driving out alternative pathways to innovation.

US stocks largely recovered from the DeepSeek surprise. But the potential of China's AI development runs deep, and it's only a matter of time before the next market-shattering invention. Businesses and investors need to pay attention to and draw lessons from the growth of China's AI ecosystem, or risk falling behind in the global AI race.

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About the author(s)

Chengyi Lin is an Affiliate Professor of Strategy at INSEAD. His research primarily focuses on digital transformation and innovation for global and multi-national organisations.

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