JRSR
JOURNAL OF REGIONAL STUDIES REVIEW

Journal of Regional Studies Review (JRSR)
Volume 4, Issue 1 (Winter 2025) | Pages: 174–183
ISSN (Online): 3006-6646
Digital Object Identifier (DOI): 10.62843/jrsr/2025.4a058
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RESEARCH ARTICLE

Rise of Generative AI: Is China still on the Track to Become AI Superpower

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Abstract: US–China strategic competition is zeitgeist of 21st century. In pursuance of Hundred Years Marathon, China aims to supplant USA as Global Superpower. However, USA's conventional military superiority has obligated China to adopt an asymmetric approach. Experiencing its sputnik moment in 2017, China crafted its "New Generation Artificial Intelligence Development Plan 2017", according to which it aims to become Global AI Superpower by 2030. China has invested huge capital to gain the lead in this field an in fact, leading in many AI fields including robotics, Self –driving cars and speech recognition. But in 2022, Development of ChatGPT by OpenAI caught China by surprise. China is caught in catch 22 situation. On one hand, it has to compete with USA in the field of Artificial Generative Intelligence, on the other hand it is compelled to adopt a measured approach due to Chinese Communist Party's (CCP) authoritarian rule and heavily censored media. China has replied to this challenge by vertical development of AI models at the same time leading the world in establishment of AI rules and regulations. USA's endeavors like banning of chips or restricting access to its Large Language Models (LLMs) may prove to be a minor hindrance, but in the longer run, a strong technological base, increasing reservoir of trained scientists and CCP's beckoning of AI industry may prove to be the winning strokes for China. However, the future is uncertain yet and AI will remain a fierce battleground between USA and China for years to come.

Keywords: Generative Artificial Intelligence, Large Language Models, Asymmetric Response, Chip War, Ethical AI

Introduction

US-China strategic competition is no hidden reality. The relationship which was buttressed by gestures of friendship and cooperation since its commencement in 1970s has transformed itself into a fierce geo-political competition in which each side vies to become the uncontested superpower of the first century. US administration is so much perturbed by China's immediate rise that its National Security Strategy (NSS) 2017 decreed China as a "Strategic Competitor" (House, 2017). With China's GDP surpassing that of the US ($ 30.622 trillion vs $25.035 trillion) (Lowy, 2023), the US is desperate to rein in China's stated ambitions to become a nation with 'pioneering global influence' by 2050 (DI, 2021).

Asymmetric conditions warrant asymmetric responses. China realizes the fact that it is better to open new vistas for strategic competition where China can maintain a lead from the start than to compete in the fields where the USA is already in a stronger position. It has found that leverage in cutting-edge technologies especially, Artificial Intelligence where its bigger population size, skilled force (Mozur & Metz, 2024) and Governance model offer it an obvious edge over the USA. China has ambitions to become a Global AI leader by 2030 as manifested in its "New Generation Artificial Intelligence Development Plan 2017". In line with this plan, huge capital has been allocated for research, talent enrollment, and AI infrastructure development (Farooq, 2023). China is already leading the world in autonomous driving, speech recognition and robotics and the gap is widening due to the enormous capital the Chinese Government is pouring in for AI development projects and education.

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Cite this Article: Abbas, Z., & Khan, F. (2025). Rise of Generative AI: Is China still on the Track to Become AI Superpower. *Journal of Regional Studies Review, 4*(1), 174-183. https://doi.org/10.62843/jrsr/2025.4a058

However, in November 2022 China was surprised again by yet another "sputnik moment" when OpenAI, launched ChatGPT, a generative AI chatbot that can process enormous amounts of data and come up with the best-optimized solutions according to user requirements. China's response is a bit measured; on one hand, it wants to compete with the USA in this field where it is slightly lagging, on the other hand, it has to find a way for the seamless symbiosis of Generative AI with China's censored domestic internet.

This research paper is an endeavor to ascertain how much impact the USA's lead in generative AI will have on China's ambition to become an AI superpower. This research paper will also analyze the reasons for China's cautious approach to adoption of generative AI. Finally, it will delve into possible scenarios emerging out of conflict vs collaboration between the US and China in the AI domain.

Theoretical Framework

The US-China AI competition is best examined through the lens of defensive realism, which asserts that states pursue technological and strategic advantages to enhance their security in an anarchic international system. Both the United States and China recognize artificial intelligence as a critical domain for national power, leading to significant investments in AI research, infrastructure, and talent acquisition. As AI becomes the cornerstone of economic and military power, both states are engaged in a sustained competition to prevent the other from achieving decisive superiority.

China's approach aligns with defensive realism by prioritizing asymmetric strategies to counterbalance U.S. dominance in foundational AI research and semiconductor technology. Given the constraints imposed by U.S. export controls and restrictions on advanced AI chips, China has focused on indigenous innovation and state-led AI initiatives to achieve self-sufficiency. The United States, on the other hand, seeks to maintain its lead by restricting China's access to cutting-edge AI technologies while reinforcing alliances with key players in the global AI ecosystem.

Despite its initial lag in generative AI, China is rapidly bridging the gap through vertical integration of AI development, state-backed funding, and regulatory frameworks designed to accelerate domestic advancements. The emergence of advanced models of DeepSeek , Ernie Bot and Launch of autonomous agent "Manus" reflects China's ability to develop competitive alternatives to OpenAI's ChatGPT. Additionally, China's AI strategy leverages its vast data reservoirs, engineering talent, and central planning mechanisms to refine large language models tailored for both domestic and international applications. This calculated progression underscores China's long-term ambition to lead in AI, even as it grapples with the inherent challenges of an authoritarian governance model that necessitates content moderation and censorship in generative AI deployment.

This research primarily investigates how the United States' lead in generative AI affects China's ambition to become an AI superpower and how China is dealing with the challenge. Additionally, it explores scenarios where limited cooperation in AI governance and regulation might emerge despite the prevailing strategic competition. The research is qualitative, however quantitative data like no of AI patents, researchers, investment figures have been incorporated to enhance reliability and validity of the research.

China's Sputnik Moment

The year 2017 is regarded as a "China's Sputnik Moment" when Google's AlphaGo, an AI program beat World Go no 1 Ke-Jie in the Go game. China's prescient leadership quickly ascertained that AI would be the new arena of geo-political competition where the US and China would compete for supremacy.

According to a development plan for new-generation AI, China aims to become the world's majorAI innovation center by 2030, with the scale of its AI core industry exceeding 1 trillion yuan (about 140.9billion U.S. dollars), and the scale of related industries exceeding 10 trillion yuan (1.38 trillion Dollars). China's new-generation AI Development Plan has three stages. The first step was to achieve the same level of competency

as leading countries, such as the United States, and to develop an industry worth at least RMB 150 billion by 2020. The second step is to become a country that regularly makes breakthroughs in AI and develop an industry worth at least RMB 400 billion by 2025. For the finalstep, to be achieved by 2030, China aims to become the leading AI power with an industry worth at least RMB 1000 billion. The announcement gained a lot of traction and provided impetus to capital markets within China to invest in these technologies (Zheng, 2024).

China's artificial intelligence (AI) strategy represents a strategic blend of government-led initiatives and national development goals, aiming to establish a substantial presence in the global AI market. Characterized by extensive government investment, a domestically led tech ecosystem, and sector-wide AI integration, this strategy is rapidly advancing China's position as a technological superpower. Moreover, China's pursuit of AI leadership is reshaping China's technological and socioeconomic landscape, with significant implications for global power, global economic dynamics, and global governance of cutting-edge technologies.

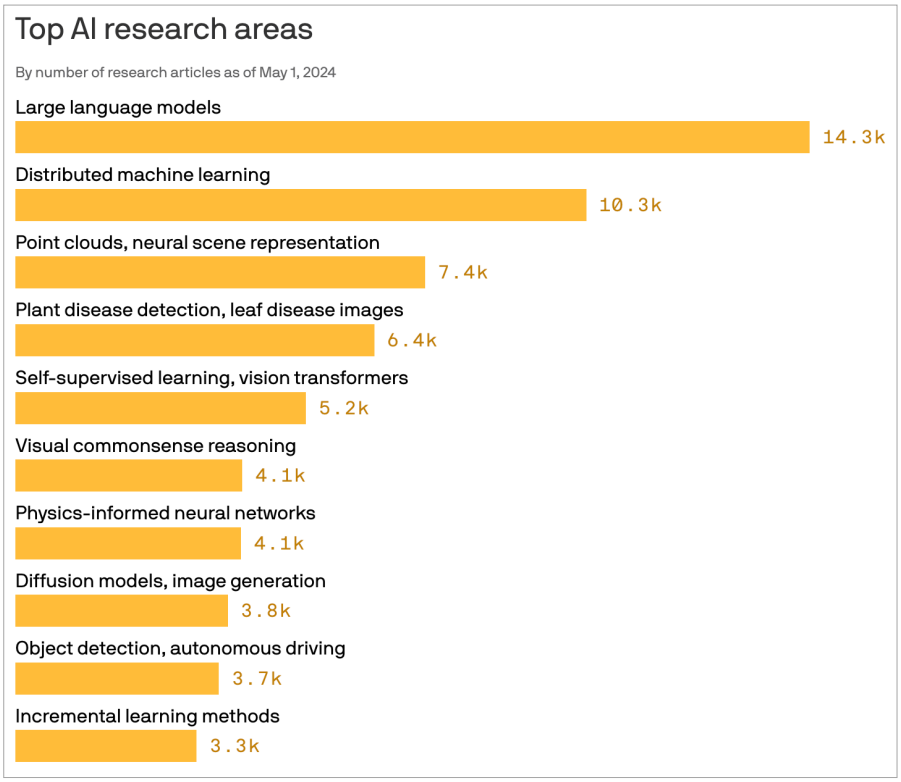
Is China Sticking to the Timeline?

The pace of AI development in China is astonishing. China already houses many of the top- performing AI institutions and entities. These companies include Baidu, Tencent, Alibaba, and SenseTime,which are already acquiring top AI talent in the world (Farooq, 2023).

China is already leading the world in autonomous vehicles, swarm drones, robotics, and computer vision. According to data released by Georgetown University's Center for Security and Emerging Technology (CSET), China is already leading the research works in more than half of AI's most lucrative fields. This achievement is more significant because several AI research papers have seen more than a hundred percent increase between 2017 and 2022 (Snyder, 2024).

Figure 1

Top AI Research Area



The leading five AI research paper producers by quantity are Chinese institutions led by the Chinese Academy of Sciences. For many years, the West remained a victim of complacency with self-generated narratives of sub-standard quality of Chinese Research Papers. However, when CSET carried out the qualitative analysis, the Chinese Academy of Sciences was still the world leader. The only field where the US has a clear edge over China is natural language processing (NLP) with Google and Microsoft in the lead in this cluster of research.

The Rise of Generative AI – China's Yet Another Sputnik Moment

Everything seemed to be working in favor of China until 2022 when the rise of ChatGPT, a chatbotpowered by Large Language Models (LLMs) with the capability to process loads of data and come up withthe best-optimized solutions in seconds, upset its plans. According to McKinsey & Company's report on The Economic Potential of Generative AI, this field can add from 2.6 to 4.4 trillion dollars through 63 areasof its potential use mentioned in the report (Chui et al, 2023). These areas include R&D, computer coding,creative art, and test, customer operations, and sales.

Generative AI's rise has kick started a strategic re-orientation in China, highlighting the requirement for high-performance microchips, enhanced computational power, and substantial data centercapabilities (Lee, 2024). While U.S. organizations such as Open AI, Google, and Microsoft are at the forefront of research and software innovation, attention in China is towards the hardware and infrastructuralelements that are crucial for AI advancement. However, it does not mean that Chinese firms have ignored the USA's lead in Generative AI, and by tapping into the open-source realm of Large Language Model (LLM) research and through the generation of rival Chinese chatbot Models, these firms are swiftly bridging the gap.

China although caught off-guard is not as far behind as it is often portrayed. Cyberspace Administration of China has mentioned that up till March 2024, it has verified 117 Generative AI Models. Although the Governance Model of China is intrinsically averse to the growth of this technology, Chinese single-party rule provides it the flexibility to quickly mold and re-mold regulations toalign themselves with economic policies.

A critical development in China's AI rise is the emergence of DeepSeek, a generative AI firm challenging the US-dominated technological landscape. DeepSeek's R1 model has disrupted industry norms by delivering comparable performance to OpenAI's GPT-4 while using far fewer resources, costing under $ 6 million to train with Nvidia's H800 chips, which were optimized due to US export restrictions (Leswig, 2025). This is a stark contrast to the $100 million OpenAI reportedly spent training GPT-4, which used significantly more advanced H100 GPUs (AMAX, 2025). Innovations like the "mixture-of-experts" system and dynamic computation scaling have made DeepSeek's model more efficient and cost-effective, presenting a viable alternative to traditional AI models.

Coupled with it is an another major development; rise of autonomous agent "Manus. Manus represents a major shift in artificial intelligence, redefining autonomous decision-making and computational efficiency. Unlike conventional AI, which operates within predefined constraints and requires human oversight, Manus functions independently, executing complex tasks across diverse fields with remarkable speed and precision. Its deployment moves AI beyond human collaboration, assuming control over decision-making in areas such as finance and recruitment. This transition raises critical questions about economic productivity, labor displacement, and regulatory challenges, as it minimizes inefficiencies linked to human intervention. Moreover, its development highlights China's growing influence in AI, challenging Silicon Valley's leadership and reshaping global technological power dynamics (Smith, 2025).

Now when we analyze the main tenets of China's approach toward the adoption of generative AI, the following high points merit attention: -

- This technology's capability to create and propagate enormous amounts of data will challenge CCP's control over information and will bring safety, privacy, and validity issuesto the fore. Generative AI's technological traits are compelling the Chinese Government toadopt a cautious approach and refine existing rules and regulations to achieve a balance between the state's censorship policy and technological innovation.
- However, the economic prospects of this technology are enticing and persuasive enough toease existing restrictions. So far, rules and regulations on Generative AI have been administered by the Cyberspace Administration of China (Chen, 2024). China has quicklylearned that the traditional hardline approach

to tackling new challenges will not work.

- A new Chinese Law regulating the use of AI was enforced on 15 August 2023. Being the first law specifically targeting Generative AI, it gives a definite edge to China for leading the world in the establishment of Generative AI norms. Critics posit that compared to an earlier draft, the implemented version is scaled down to give more space to tech firms for innovation. In contrast, the USA is seen nowhere near charting some AI policies due to itslaissez-faire approach (Roberts & Hine, 2023).
- In addition, China's progress in the promotion of ethical AI and data security, particularlyin generative AI models, indicates an increasing compliance with global trends. This development is a critical constituent of China's multi-dimensional AI strategy, which encourages technological autarky, global influence, and adherence to evolving global norms in AI applications. This approach is going to further augment China's soft power prong.
- A more pragmatic approach has been adopted by Chinese Large tech firms for the adoptionof AI. While endeavors for the development of LLMs are at hand, companies prefer to develop applications focusing on a particular field (vertical development of models), e.g. medical, business, etc (Chang, 2024). The SenseNora system developed by SenseTime offers a range of features that will assist industries in a variety of financial and marketing tasks. Alibaba, an online shopping platform is experimenting with boosting its e-commerceplatforms using Chatbot technology to boost sales. Chinese firms are also using AI in medical research and diagnosis. Medlinker, an internet-based medical platform has recently inaugurated MedGPT, a chatbot especially designed to facilitate disease identification and medicine prescription (Morgan, 2024). The same approach is being adopted in the automotive industry as well.
- This targeted approach is more in line with CCP's objectives, which is more inclined to harness generative AI's potential for industrial growth.
- While focusing on application-based models, China is paying due attention to LLM-drivenchatbots. Major cloud players such as Alibaba, Baidu, Huawei, and Tencent etc, have vertical proficiencies and a formidable client base, sufficient enough to train their models.Some transformation will occur here as better models appear, but all the leading firms haveenough data resources to continue ameliorating models for the conceivable future (Trilio & Perera, 2024).
- The government's Work Report of 2024 has already highlighted an upcoming initiative, "AI Plus" that will further integrate AI with the economy for the production and trade of goods and services (Dobberstein, 2024).
- China's strengths include huge data resources and multiple industrial application scenarios.The US although has a better innovation eco-system, especially in the private sector and better chips and other critical technologies. But the gap is rapidly narrowing.
- The Global AI Talent Chaser, developed by MacroPolo, a think tank focused on global economic issues, investigated the trends and activities of AI researchers worldwide. According to its report, China has already become the World Leader in the AI talent pool.In 2022, China became house to an astonishing 47% of the world's top AI researchers, anda noteworthy increase from 29% in 2019 (Sri Lanka Guardian, 2024). Chinese scientists constitute 38% of the total AI workforce in US institutions, dwarfing even the Americans (37%). However, keeping in view the political scenario in the US and the growing suspicions against Chinese researchers, this situation might change in the future (BBC, 2024).

The Chip War – Is it Hampering Chinese AI Development

USA's approach to counter Chinese advancements in generative AI is a desperate one; ban the salesof GPUs that are used for training of LLM Models. This decision seems to hurt the American economy more than it will impede the development of Generative AI in China. China has a two-fold solution to thispredicament; encourage domestic industry and stash enough GPUs for the duration required by Chinese chip manufacturers to build their GPUs.

American Leading Chip Companies are frustrated by this decision. Nvidia used to earn 20 to 25 percent of its data center revenue from sales to China (Robinson, 2024). The company is now being compelled to sell its chips at prices lower than its Chinese rival Huawei, and prices are likely to be further dropped due to their abundant supply in the market.

USA's ban on sales of chips to China may slightly slow down their performance but will drive innovation and encourage China to become self-sufficient in the longer run. Currently, China is still procuring advanced Chips through third parties at the same time progressing with its chip manufacturing at a rapid pace (Wodecki, 2024). As Jensen Huang mentioned, "If China can't buy from the United States, they'll just build it themselves. So the US has to be careful. China is a very important market for the technology industry (Murgia et al, 2023). China has already replaced imported quantum computer components with a domestic product (high-density microwave interconnect module) less than a week after US sanctions, making a powerful gesture (Peng, 2024).

Also, in the wake of U.S. sanctions, an illegal market for such chips in China has arisen. Chinese vendors gather surplus stock that finds its way to the market after fulfilling the requirements of big U.S. firms or importing through companies located in places such as Taiwan, India, and Singapore (Baptista, 2024).

Chinese Possible Future Course

By assessing China's cautious approach in adoption of Generative AI, it seems imminent that Chinese authorities are willing to delay their 2030 dream if at all, they have to decide between AI supremacy and political stability. Keeping in view the vast potential of AI chatbots for manipulations, the generation of fake content, propaganda, and cyber operations, this measured approach seems more pragmatic and long-lasting.

Chinese chatbots may initially be at a loss due to China's comparatively stricter AI regulations and use of Mandarin as their primary language (though Chinese chatbots can operate in English as well). A larger market and hold of US chatbots will urge even Chinese researchers and scientists to publish more content in English than in Mandarin. However, in the longer run, Chinese chatbots may have the best of both Worlds as lower prices (Baidu is charging only 59 yuans per month for its most advanced Ernie 4.0 model as compared to Chatgpt's cost of 20 $ a month and compatible performance of these bots in comparison to US Chatbots will attract users from all across the globe, at the same time retaining domestic market due to their better optimization to Chinese (At International Conference on Learning Representation 2024, Zhipu AI (an AI Company) shared information highlighting that best ChatGLM's version obtained 90 percent of scores achieved by ChatGPT-4 on several benchmarks (Baptista, 2024). These tests include general knowledge, common sense, and mathematics. ChatGLM also outshined GPT-4 on a yardstick of optimization of LLMs to Chinese) (Biever, 2024). In addition to Indigenous data, Chinese chatbots can use US open-source models for training LLM models (Chinese engineers and companies have utilized OpenAI's services using special tools like VPNs to hide their network addresses and design software and programs imitating OpenAI's model).

These self-learning models train themselves by data fed to them. Thorough fact-checking and corroboration of generated outcomes may be time-consuming in the start but in the longer run is surely going to win the confidence of users. If Chinese Generative AI startups find a way to control omissions, errors, and deliberate manipulations of CHATBOTs, this progress will surely raise the status of Chinese chatbots as trustworthy and will help China to grab a larger market share.

In addition, it will place China in a strong position to lead the world in the establishment of AI norms and ethics. This move is particularly important in the context that recently, Open AI safety experts Ilya Sutskever and Jan Leike resigned in the backdrop of threats posed by AI. Their resignation led Altman to profess that the best move in this regard is the establishment of an International Agency that will ensure

necessary safety checks in AI development (Varansi, 2024). China is on visible lead in this field as the US Congress has not commenced even rudimentary procedures to erect AI safety laws.

In the United States, there is quite slow progress in the establishment of AI norms and regulations. Although a significant amount of capital has been invested in AI R&D, governance remains decentralizedand unreliable. The U.S. still lags in formulating a unified AI strategy comparable to the European Union'supcoming Artificial Intelligence Act. Instead, the US is following a disjointed approach consisting of voluntary recommendations and non-binding regulations (Au, 2023).

When it comes to data, China has a large population base of over 1.5 Billion giving it a far bigger database to train Generative AI models and catch up with rival chatbots. However, to increase efficiency, models will require to be trained on heterogeneous data from various zones across the globe. However, the low cost of Chinese chatbots may eventually attract a large user base and solve the homogeneity issue.

China's state-controlled economic policy provides it flexibility to increase investments in the AI sector on a need basis. In comparison, private firms lead AI innovation in the USA, which is more sensitiveto market fluctuations. Furthermore, the Chinese carefully steered course with Generative AI is more pragmatic to counter AI's cyber espionage and disinformation propagation capabilities than the USA's laissez-faire approach to AI, especially in the context of upcoming Presidential elections in 2024.

Keeping in view, above mentioned facts and figures, it seems that China has the capability and vision to reverse US advances in the field of Generative AI. However, instead of adopting a reactionary mode, China is yet again looking for an "out of the box" solution to surprise the US once again.

Is there a Chance of US-China Collaboration in AI?

There is always a chance that complex interdependence comes into play. Growing caveats about AI's unbridled development may compel the US and China to sit on negotiation tables and find common groundsto cooperate. Burgeoning pressure from the scientific community and other states is already forcing both countries to sit at the discussion table and come up with a unified strategy for the development of safe and ethical AI.

China and the United States initiated the first intergovernmental discourse in Geneva on 14 May 2024. The two sides welcomed this development and evinced approval to address areas of concern and craft joint approaches to counter risks associated with AI, with a special emphasis on security issues related to advanced systems. It was an important and critical step to ensure better collaboration between the two sides to mitigate potential threats related to AI effectively (Xu & Chenghao, 2024).

Of course, there are challenges such as mistrust and geo-political rivalries between both sides. But, increased track 1.5 and 2 diplomacy and involvement of a greater pool of AI data scientists and researchers along with bureaucrats and military officials is going to assist in better comprehension of the looming threat and countering it timely.

Conclusion and Summing Up

China and the USA are still engaged in a race for AI supremacy but with slightly different approaches. Rather than blindly rushing to launch its own GPT models after being surprised by ChatGPT, China's calculated response made it evident that it is again searching for "out of the box" solutions to gain supremacy in the field of Generative AI.

China emphasizes a balance between economic growth and political stability. The central government's relatively firm control over digital developments underscores its emphasis on cyber security, national harmony, and cohesion. The strategy of vertical development of chatbot models that specialize in a

particular field i.e. medical, business, or engineering is more in line with the Chinese Government policy of harnessing AI's potential to drive economic growth and industry development.

At the same time, China is not lagging in the development of chatbots powered by LLMs. Leading tech companies like Tencent, Baidu, Bytedance, etc have sufficient databases to develop their own LLM models. In addition, these have easy access to US open-source models as well. Lower prices and better Mandarin optimization will assist Chinese models to grab a large share of both Chinese and Western markets. Concommitantly, rise of Deep Seek and Manus has yet again proved that China is not as far behind in development of Generative AI as was previously perceived.

China has a clear edge over the US when it comes to the establishment of AI norms and regulations. While a new Chinese law regulating the use of Generative AI has already come into force in August 2023, there is no comprehensive regulation regarding AI implemented in the US. It will grant China the status of undisputed champion of AI norms and ethics.

Where private companies lead AI development in the USA, the Chinese state's patronage of AI innovation gives it the flexibility to increase investment capital at will. But among all this competition, there is a silver lining. The recently held conference in Geneva is the first of its kind, where US and Chinese counterparts met to discuss prospects of the development of responsible and ethical AI. There is a possibility that both nations setting their differences aside may work together to save the world from the perils linked to unabated AI development as prophesized by leading AI experts like Geoffrey Hinton (Rothman, 2023). But keeping in view the lightning pace of AI innovations coupled with intensified geostrategic competition, the future course adopted by both nations is still shrouded by mystery.

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