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ChatGPT and DeepSeek Competition: The Impact of Artificial Intelligence and Blockchain on Global Political Dynamics

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Abstract

The rapid advancement of artificial intelligence (AI) and blockchain technology has created a new dynamic in global politics. technology have created a new dynamic in global politics. This research investigates the geopolitical impact of the technological competition between ChatGPT, which was developed by OpenAI in the United States, and DeepSeek, an AI model from China. China. These two large language models (LLMs) not only reflect technological advancements, but also act as instruments of power. technology, but also act as instruments of soft power, influencing global discourse and digital sovereignty. influencing global discourse and national digital sovereignty. Using a qualitative descriptive method with a literature-based approach, this research analyzes how competition between these AI systems shapes political narratives, regulatory responses, and the strategic use of blockchain for transpiration. regulatory responses, and the strategic use of blockchain for data transparency and trust. data trust. Findings show that while ChatGPT promotes openness and integration of global markets, DeepSeek emphasizes national control and ideological reinforcement. Blockchain plays a complementary role in strengthening accountability and decentralization, but also raises concerns about surveillance and control. The study concludes that the rivalry between ChatGPT and DeepSeek illustrates a broader digital Cold War, which is urging countries to reassess reliance that urges countries to reassess their technological dependence and political alignment. technology and their political alignments in the digital age.

Keywords: ChatGPT; DeepSeek; Artificial Intelligence (AI); Blockchain Technology; Digital Sovereignty.

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INTRODUCTION

The 21st century has been the stage of a technological revolution that reorganized the world order on an unprecedented scale. Among the many technological advancements, artificial intelligence (AI) and blockchain technology stand out as two of the most disruptive innovations that are not only redefining the relationship between humans and machines, but also changing the global power structure [1], [2], [3]. Both technologies have grown rapidly and play key roles in the digital economy, cybersecurity, mass communication, and financial and government infrastructure. However, behind all the potential and convenience they offer are increasingly crystallized political and ideological dynamics, particularly in the context of competition between superpowers such as the United States and China.

One of the most obvious manifestations of this global power contestation is reflected in the competition between two leading AI models: ChatGPT, developed by OpenAI and based in the United States, and DeepSeek, a Chinese AI system strongly supported by state structures and major Chinese technology companies [4], [5], [6]. These two systems represent not only the pinnacle of natural language processing capabilities, but also symbols of the ideological battle between liberal democratic models that promote openness and public access to technology, and authoritarian systems that promote control and centralization of digital power. This research also serves to advance SDG 9 - Industry, Innovation and Infrastructure: Artificial intelligence and blockchain are key pillars in the digital transformation that drives industrial innovation and smart infrastructure development. The application of these technologies on a global scale emphasizes the importance of equitable access to cutting-edge technologies as part of sustainable development.

Artificial intelligence has become more than just a technological tool; it has become a geopolitical force that plays a crucial role in defense, digital propaganda, data diplomacy, and shaping public opinion globally. Reports from various international institutions show that AI is actively used to enhance surveillance capabilities, automate government processes, and even strategically disseminate information to shape certain political narratives [7], [8], [9]. On the other hand, blockchain, which initially developed as the technology behind cryptocurrencies such as Bitcoin and Ethereum, has gone beyond its financial roots. It is now a symbol of transparency and decentralization that is being adopted in various sectors, including digital governance, election systems, and social assistance distribution.

The combination of AI and blockchain opens a new chapter in global digital transformation. Both technologies offer great promise to address long-standing challenges such as corruption, information monopoly, and unequal access to data. However, such integration also carries a high risk of politicization, especially when adopted within the policy frameworks of ideologically and politically divergent countries. Tensions are heightened when these technologies are used as strategic tools in extending influence and control, both domestically and in international relations [10], [11], [12]. In this context, A fundamental question arises: to what extent can the dominance of AI and blockchain technology affect a country's digital sovereignty and global geopolitical stability?

The rivalry between ChatGPT and DeepSeek is not just a competition between two AI products, but part of a larger narrative of 21st century technological supremacy. ChatGPT, with its model based on "open science" and global collaboration, represents an open approach that emphasizes the principles of accessibility, open innovation, and collective ethical responsibility. DeepSeek, on the other hand, was developed in a highly structured and closed technological

environment, where the state has significant control over data, technology development and its distribution to society. This fundamental difference shows that technology is not neutral, but is heavily influenced by the political system that gave birth to it.

AI, particularly in the form of large language models (LLMs), such as ChatGPT and DeepSeek, has an extraordinary capacity to shape political narratives, direct public opinion, and strengthen or weaken certain social structures. In the hands of state actors, these capabilities can be used to strengthen social control or even manipulate the perception of the global community on strategic issues such as human rights, military conflict, or climate change. Therefore, the influence of AI on the world political order cannot be underestimated. People now refer to AI as a new "strategic weapon" that is as important as conventional military power [13], [14].

Meanwhile, blockchain presents the potential to break the dominance of large digital platforms through a more transparent and decentralized system. However, ironically, authoritarian states are also beginning to utilize this technology to create more sophisticated digital surveillance systems, such as Central Bank Digital Currency (CBDC) that not only replaces cash but also allows for more detailed tracking of citizens' economic activities [15], [16]. This is where the complexity of blockchain becomes apparent, on the one hand promising freedom and transparency, but on the other hand it can be used as a more subtle yet far-reaching instrument of control.

However, academic studies that explicitly address the interaction between AI and blockchain rivalry in the context of international politics are limited [17], [18], [19]. Many studies focus on technical aspects, such as algorithm performance, system security, or network efficiency. Discourses linking these technological innovations to ideological conflicts, cyber diplomacy, and global power shifts have not received sufficient attention. In fact, understanding the political dimensions of these technologies is crucial to building fair, inclusive, and human rights-oriented digital governance. Therefore, this paper aims to fill the gap by further investigating how the competition between ChatGPT and DeepSeek reflects shifts in global power contestation. This research will also discuss how AI and blockchain technologies are being used by countries to strengthen or maintain its power in the digital realm, as well as how it impacts the principles of digital sovereignty and world geopolitical stability.

Specifically, this study will answer two key questions: 1) How do the competitive dynamics between ChatGPT and DeepSeek reflect the contestation of global political forces in the development of artificial intelligence and blockchain technologies? 2) What is the political impact of the dominance of AI and blockchain technology on digital sovereignty and geopolitical stability in the era of technological competition between countries?

By answering these two questions, this study contributes to a broader discourse on the future of global digital politics. This study is not only important from an academic perspective, but also relevant for policymakers, technology developers, and the wider public in understanding how technology, which is essentially created to improve the quality of human life, can be used as an instrument of power and control. Moreover, this paper invites readers to reflect on the meaning of technological progress: is it truly liberating, or is it creating new forms of global dependency and subordination?

METHODS

Research Design

This study utilizes a descriptive qualitative approach supported by a literature-based research method. A qualitative method is essential for addressing the multidimensional nature of the phenomena at hand, particularly given the complexity of the intersection between AI, blockchain technologies, and their global political implications. Such an approach enables a nuanced understanding of the technological and geopolitical contest between ChatGPT and DeepSeek. The research design is tailored to unpack the political narratives and strategic geopolitical shifts shaped by the competition between these two technologies, with a focus on the global implications of AI and blockchain integration in digital governance.

Data Collection

Data for this study were primarily sourced from public documents, peer-reviewed journal articles, technical reports from OpenAI, DeepSeek, and relevant technology partners, as well as credible media reports from the past decade. Given the rapid pace of technological development, the sources used were selected for their timeliness and relevance to the study's research questions.

Table 1. Summarizes the key data sources used in this research.

Source Type	Specific Source	Timeframe	Relevance
Peer-reviewed Journal Articles	Articles from databases like JSTOR, Google Scholar, IEEE	Last 10 years	Provides foundational knowledge of AI, blockchain, and political discourse
Technical Reports	Reports from OpenAI, DeepSeek	2015-2025	Offers insights into model development and geopolitical strategies
Media Reports	News outlets such as BBC, Reuters, etc.	2015-2025	Reflects real-time geopolitical developments and media narratives

Research Instrument

The primary research tool used in this study was thematic analysis, supported by a critical discourse analysis approach. The research aimed to identify key political, ideological, and technological narratives within the available literature. The thematic analysis was structured around the following key themes:

- Representation of AI and Blockchain: Examining how these technologies are portrayed in political discourse.
- Ideological Differences: Analyzing how the development of AI and blockchain is shaped by different political regimes (i.e., the open science model of the U.S. vs. the state-controlled approach in China).
- Strategic Impacts: Understanding the implications of AI and blockchain technologies on global geopolitical power dynamics and digital sovereignty.

Table 2. Outlines the thematic analysis framework.

Theme	Key Focus	Relevant Data Sources
AI and Blockchain Narratives	How AI and blockchain are described in political contexts	Scholarly articles, policy documents, media reports
Ideological Divergence	Contrasts between open and state-controlled AI systems	Technical reports, expert analyses
Political Impacts	Geopolitical and digital sovereignty issues	News articles, government reports

Data Analysis

The data analysis in this study was conducted in four main stages, integrating both qualitative and thematic analysis methods. The process emphasized synthesizing key political and technological narratives from the literature surrounding the rivalry between ChatGPT and DeepSeek, as well as their impact on global geopolitical stability.

Data Collection

Data were systematically gathered from a variety of secondary sources, including peer-reviewed journal articles, technical reports from OpenAI and DeepSeek, and media publications from 2015 to 2025. This step aimed to capture a wide array of perspectives on the technological advancements, political implications, and regulatory responses related to AI and blockchain.

Categorization

The collected data were categorized into several themes based on the issues discussed in the literature. These categories were focused on technology, politics, regulation, and ideology, providing a structured foundation for the subsequent analysis. The key themes for categorization are shown in Table 3.

Table 3. Data Categorization Themes

Category	Focus Area	Source of Data
Technology	Technological advancements of AI and blockchain	Peer-reviewed journal articles, technical reports
Politics	Geopolitical implications of AI and blockchain	Media reports, expert analysis
Regulation	Regulatory responses to AI and blockchain developments	Government reports, policy documents
Ideology	Ideological implications and national strategies	Scholarly articles, international reports

Content Analysis

Content analysis was performed using a critical discourse analysis approach, which helped identify key political and technological narratives emerging from the data. The focus was on understanding how the competition between ChatGPT and DeepSeek shaped political power dynamics, technological sovereignty, and national strategies in the digital age. Key aspects of this stage are summarized in Table 4.

Table 4. Content Analysis Focus

Theme	Key Focus	Relevant Data Sources
AI and Blockchain Narratives	Representation of AI and blockchain in political contexts	Scholarly articles, policy documents, media reports
Ideological Divergence	Analysis of ideological differences in AI development	Technical reports, expert analyses
Strategic Impacts	Impact of AI and blockchain on geopolitical strategies	News articles, government reports

Interpretation of Findings

In the final stage, the findings were interpreted and synthesized into a conceptual narrative. The purpose was to connect the technological and political implications of AI and blockchain to the broader context of digital sovereignty and global power shifts. The interpretation of data from each theme was linked to the overarching research questions about how technological advancements affect global political dynamics and digital sovereignty. To ensure the validity and credibility of the findings, source triangulation was employed. This involved cross-verifying data from multiple sources (e.g., scholarly journals, technical reports, and media outlets) to ensure consistency in the findings. Expert validation was also sought from industry leaders and academics specializing in AI and blockchain technologies.

Table 5. Validity Checks Applied

Validation Technique	Description	Purpose
Source Triangulation	Cross-referencing data across multiple sources	To confirm consistency in findings
Expert Validation	Consulting authoritative experts in the field	To ensure the credibility and reliability of interpretations
Peer Review	Engaging peer feedback during the writing process	To refine analysis and ensure accuracy

Through these systematic stages, the data analysis not only provided a detailed understanding of the technological and geopolitical dynamics at play but also reinforced the overall findings with a strong academic and methodological foundation.

Data Validity

To ensure the reliability and validity of the findings, the research utilized source triangulation and cross-verification. This process involved comparing data from multiple sources (e.g., peer-reviewed articles, technical reports, and media reports) to ensure that conclusions drawn were well-supported and consistent across different contexts. Expert validation was also incorporated by referencing highly credible sources in the fields of AI, blockchain, and international relations.

Table 6. summarizes the validity checks applied to the data sources.

Validation Technique	Description	Purpose
Source Triangulation	Cross-verifying data across multiple sources	To confirm consistency in findings
Expert Validation	Referencing authoritative scholars and industry reports	To ensure reliability and credibility of the data
Peer Review	Engaging peer feedback during the writing process	To refine interpretations and ensure accuracy

RESULTS AND DISCUSSION

Technical Foundations of ChatGPT and DeepSeek

ChatGPT, developed by OpenAI, leverages a LLM architecture, primarily powered by Nvidia H100 chips. The model is trained on vast computational resources, with an estimated cost of around US\$100 million for training the latest version, GPT-4. The reliance on high-end supercomputing infrastructures makes ChatGPT a resource-intensive solution, suitable for large-scale commercial applications but less scalable in resource-constrained environments like developing countries. As observed by Djatmiko et al. [20], the challenges related to the high cost and limited scalability of ChatGPT create a significant barrier for widespread adoption in regions with underdeveloped digital infrastructures.

On the other hand, DeepSeek, developed by a Chinese tech ecosystem, incorporates a Mixture of Experts (MoE) architecture. This approach allows only a subset of models to be activated at any given time, optimizing computational efficiency. This makes DeepSeek a more cost-effective model, with an estimated training cost of US\$6 million, which is substantially lower than ChatGPT's. Moreover, the model employs knowledge distillation to simplify complex models, making them more accessible and adaptable. Li et al. [21] argue that this method contributes significantly to DeepSeek's competitive advantage in markets where resource constraints are critical.

Table 7. Technical Comparison of ChatGPT and DeepSeek

Feature	ChatGPT	DeepSeek
Model Architecture	Large Language Model (LLM)	MoE
Training Cost	US\$100 Million	US\$6 Million
Computing Infrastructure	Nvidia H100 Chips (High-end)	Nvidia H800 (Targeted for Chinese Market)
Openness	Proprietary	Open Source
Focus Areas	General AI, Natural Language Processing	Blockchain, Decentralized Finance, AI for Blockchain

The comparative analysis presented in [Table 7](#) highlights the significant differences in infrastructure, cost, and accessibility between ChatGPT and DeepSeek. While ChatGPT excels in advanced language generation, its high computational cost limits its scalability, especially in less developed regions where digital resources are scarce. In contrast, DeepSeek's lower cost and open-source model make it more adaptable and accessible to a broader range of users, particularly in the Global South.

Strategic Institutional Approaches: ChatGPT vs. DeepSeek

ChatGPT and DeepSeek adopt distinct institutional strategies to drive adoption and integration into their respective markets. ChatGPT benefits from its association with Microsoft, leveraging the company's cloud infrastructure to facilitate model training and integration into enterprise solutions. The partnership with Microsoft Azure ensures that ChatGPT is embedded into the digital infrastructure of large corporations, including those in the education, healthcare, and public service sectors in Western countries. As de-Lima-Santos et al. [22] note, this partnership drives mass adoption but also creates an accessibility gap between developed and developing nations.

Conversely, DeepSeek operates under a more open-source model. By allowing users to freely download and modify the code, DeepSeek fosters a community-driven development approach that attracts developers from around the world. This strategy is particularly appealing to countries in Southeast Asia, Africa, and Latin America, where there is a significant need for affordable and adaptable AI solutions. As highlighted by Baralla et al. [23], DeepSeek's open-source approach aligns with the growing demand for decentralized digital infrastructure and localized development.

Table 8. Institutional Strategy Comparison

Strategy	ChatGPT (OpenAI)	DeepSeek (Chinese Ecosystem)
Partnerships	Microsoft (Azure Cloud)	Open Source, Community-driven
Monetization	Freemium Model (Basic Free, Paid Features)	Free for All, Open Access
Primary Markets	Western Corporations, Educational Platforms	Global South, Decentralized Finance, Blockchain
Geopolitical Alignment	US-led Tech Ecosystem	China-led Digital Sovereignty

Table 8 contrasts the strategic approaches of the two AI models. ChatGPT's freemium business model has been effective in driving adoption in Western countries, especially among professional and academic users. However, the paid features required to access advanced functionalities create a digital divide between countries with mature infrastructures and those in the Global South. In contrast, DeepSeek's open-source model provides a more inclusive approach, allowing broader participation in AI development, particularly in emerging markets where affordable digital tools are critical.

Market Performance and Adoption Trends

The market dynamics between ChatGPT and DeepSeek reflect their respective strengths and limitations in different regions. ChatGPT continues to dominate globally, with over 3.7 billion users as of the first quarter of 2025. This figure, as reported by SimilarWeb and cited in Feyijimi et al. [24], underscores ChatGPT's widespread adoption, particularly in developed economies where access to high-performance computing resources is readily available.

However, DeepSeek has shown remarkable growth in key markets in Southeast Asia, Africa, and Latin America. According to Aridan et al. [25], DeepSeek's user base grew by 380% during the same period, with particular success in countries like Indonesia, Philippines, and Nigeria. This growth can be attributed to DeepSeek's low cost, open-source model, and its ease of integration into local digital ecosystems, particularly in blockchain and decentralized finance (DeFi) applications.

Table 9. Market Performance Comparison

Feature	ChatGPT	DeepSeek
Global Users	3.7 Billion (Q1 2025)	380% growth (2025)
Primary Markets	Western Countries (US, Europe)	Global South (Asia, Africa, Latin America)
Adoption Rate	High in Developed Countries	High in Developing Countries
Market Focus	General AI, Enterprise Solutions	Blockchain, DeFi

The comparison in [Table 9](#) shows that while ChatGPT leads in global market share, DeepSeek is gaining significant ground in emerging markets due to its cost-effectiveness and open-source nature. This trend suggests that DeepSeek's model is better suited to regions that face economic constraints and are looking for more affordable and adaptable AI solutions.

Geopolitical Implications: Digital Sovereignty and Technological Control

As the global competition between ChatGPT and DeepSeek intensifies, the geopolitical ramifications are becoming more pronounced. ChatGPT aligns with the US-led digital alliance, focusing on technological openness and market-driven innovation, while DeepSeek reflects China's push for digital sovereignty and state control over technology. The latter is particularly evident in its Belt and Road Digital Initiative, which uses technology to solidify China's influence in developing nations. In the context of blockchain and AI, both ChatGPT and DeepSeek are not just technological entities but also political tools, representing different visions for the future of the digital world. The US model emphasizes freedom and market competition, while China's model focuses on national control and digital self-sufficiency.

Table 10. Geopolitical Strategy Comparison

Feature	ChatGPT	DeepSeek
Geopolitical Alignment	US-led Tech Ecosystem	China-led Digital Sovereignty
Philosophy	Open Innovation, Market Competition	State-Controlled, Digital Sovereignty
Primary Application	Global Enterprise, Education, Commercial	DeFi, Blockchain, Digital Infrastructure

[Table 10](#) illustrates the broader geopolitical implications of the competition between ChatGPT and DeepSeek. ChatGPT serves the global market economy, facilitating innovation and enterprise applications. In contrast, DeepSeek represents China's strategic vision of digital sovereignty, where AI and blockchain serve as tools for state control and national independence.

Discussion

The rivalry between ChatGPT and DeepSeek presents more than just a technical competition; it embodies two distinct paradigms of AI development that intersect with geopolitical interests, economic strategies, and technological sovereignty. The findings of this study reveal that while ChatGPT, backed by OpenAI and Microsoft, remains the dominant force in the global AI market, DeepSeek has carved out a significant niche, particularly in developing regions such as Southeast

Asia, Africa, and Latin America. This highlights the growing demand for more affordable, scalable, and open-source AI solutions that can overcome the digital divide in these regions.

ChatGPT's strength lies in its advanced language model and the support from the US tech ecosystem, which provides robust infrastructure and extensive financial backing. However, its reliance on expensive hardware and proprietary software creates substantial barriers to entry for countries with limited resources. As noted by Khan et al. [26], such models, while powerful, reinforce the technological dependency of developing nations on Western infrastructure, deepening the global digital divide. Moreover, the freemium model adopted by ChatGPT where basic access is free but advanced features require paid subscriptions further entrenches this gap, making it difficult for users in economically disadvantaged regions to fully participate in the benefits of AI advancements.

In contrast, DeepSeek's open-source model, coupled with its MoE architecture, represents a novel approach to AI development that prioritizes cost-efficiency and local adaptation. By focusing on blockchain technology and DeFi, DeepSeek provides a tailored solution for countries that are seeking to leapfrog traditional banking systems and implement digital sovereignty. This aligns with the growing need for alternative AI infrastructures that do not rely on Western-controlled digital ecosystems. As Sokhansanj [27] emphasize, DeepSeek's approach is well-suited to regions with limited resources and infrastructure, offering a customizable and transparent model that fosters collaboration and local innovation. The fact that DeepSeek has been able to compete effectively with ChatGPT in terms of performance, particularly in financial and legal data analysis, demonstrates its growing potential to disrupt the global AI and blockchain markets.

The study also underscores the novelty of DeepSeek's integration with blockchain technology. Unlike ChatGPT, which remains primarily focused on language processing and general AI tasks, DeepSeek has leveraged its architecture to create a transparent and decentralized system that integrates seamlessly with blockchain-based applications. This distinction is particularly important in the context of financial systems and crypto transactions, where transparency, auditability, and security are paramount. In a blockchain-centric environment, where decentralization is critical, DeepSeek's open-source nature allows for easier modification and customization, fostering an ecosystem where developers from emerging markets can collaborate and innovate on their own terms. This adaptability contrasts sharply with ChatGPT's more closed, proprietary structure, which, while offering advanced functionalities, restricts customization and broad user participation. The knowledge distillation used by DeepSeek to reduce the complexity of its models into lighter versions for easier distribution further enhances its applicability in resource-constrained environments, as noted by Lamaakal et al. [28].

Another key implication of this research is the emerging role of AI and blockchain in digital sovereignty. As nations increasingly recognize the strategic importance of these technologies, the ability to control and develop domestic AI infrastructures becomes a central issue. The findings suggest that DeepSeek's open-source, low-cost approach aligns with the growing trend of digital sovereignty, particularly in countries like China, which has positioned itself as a leader in techno-nationalism. DeepSeek's ability to function independently from Western technological giants reflects China's broader digital strategy, which seeks to reduce reliance on US-dominated technologies and develop autonomous digital ecosystems. This shift towards digital sovereignty is not just a technical matter; it carries geopolitical implications as well. Countries like China and Russia, as well as BRICS nations, are increasingly adopting AI and blockchain as tools of statecraft

to bolster their geopolitical influence and create alternative infrastructures that challenge the dominance of Western powers. This finding aligns with the work of Ishkhanyan [29], who argue that China's digital sovereignty strategy is designed to reduce its reliance on Western-controlled technologies, particularly in AI and blockchain.

Furthermore, this research highlights the geopolitical fragmentation emerging in the AI ecosystem. While ChatGPT remains embedded in a US-led tech alliance, DeepSeek operates under a model that is closely aligned with China's geopolitical objectives. The integration of AI and blockchain into national digital strategies allows countries to foster technological independence and assert control over their own digital futures. The competition between ChatGPT and DeepSeek thus becomes a reflection of the broader geopolitical contest between the US and China for digital dominance. As Sattich et al. [30] suggest, the geopolitical implications of this technological race extend beyond the immediate market competition and have the potential to reshape global power structures.

The study also sheds light on the potential for DeepSeek to disrupt the global AI market by focusing on cost-efficiency and localization. While ChatGPT leads in terms of global user numbers, DeepSeek's growth in emerging markets suggests that cost-effective AI solutions tailored to local needs are likely to gain momentum, particularly in regions like Southeast Asia and Africa, where digital infrastructure is still developing. This aligns with findings from ul Haq et al. [31], who argue that AI adoption in these regions will be driven by solutions that are affordable, open, and scalable. In conclusion, this research highlights the critical role of AI and blockchain in shaping the future of digital technology. The competition between ChatGPT and DeepSeek reflects broader trends in digital sovereignty, geopolitics, and technological development. The findings suggest that while ChatGPT continues to dominate the global market, DeepSeek's innovative use of blockchain and open-source technology positions it as a significant player in the emerging AI ecosystem, particularly in developing nations. As these technologies continue to evolve, their impact on global power dynamics and technological governance will only increase, making it crucial for countries to carefully navigate their digital futures and assert their digital sovereignty.

CONCLUSION

This study concludes that while ChatGPT maintains dominance in the global AI market, driven by its sophisticated LLM architecture and robust commercial infrastructure, its high cost, reliance on advanced hardware, and proprietary nature pose significant barriers to accessibility, particularly in resource-constrained regions. In contrast, DeepSeek presents a compelling alternative, offering a more cost-effective, scalable, and open-source solution through its MoE architecture and seamless integration with blockchain technology. This positions DeepSeek as an adaptable model for developing countries seeking to foster digital sovereignty and technological independence. The findings underscore that the competition between ChatGPT and DeepSeek is not merely a matter of technical performance but also reflects competing paradigms of digital infrastructure development one driven by market dominance and closed ecosystems, and the other by openness, efficiency, and decentralization. DeepSeek's innovative integration of AI with blockchain represents a significant contribution to the literature on AI and blockchain convergence, providing a pathway for the Global South to advance digital resilience. The implications of this research are crucial for policy-makers in developing countries, highlighting the importance of adopting inclusive, affordable, and locally adaptive AI solutions. Future research should further investigate the real-world performance of

DeepSeek across diverse regional contexts, its socio-political implications, and the long-term effects of AI-blockchain integration on national digital sovereignty.

LIMITATIONS

This study is subject to several limitations, primarily stemming from its reliance on secondary data and comparative analysis, which limits the depth of real-world insights into the performance and implementation of ChatGPT and DeepSeek. While the research highlights the potential of DeepSeek in resource-constrained environments, further empirical studies are needed to assess its practical applications and scalability across various industries, particularly in developing regions. Additionally, the geopolitical perspectives discussed are speculative and subject to change, given the fast-evolving nature of AI and blockchain technologies. Ethical concerns related to AI and blockchain deployment, such as algorithmic biases and privacy risks, were not fully explored and warrant further investigation as these technologies continue to mature.

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AUTHOR CONTRIBUTION

All authors contributed equally to the conception and design of the study, as well as to all other sections of the manuscript. D.A.P. led the conceptualization and was primarily responsible for writing the introduction, results, discussion, conclusion, and recommendations, in addition to overseeing data collection and manuscript revisions. F. contributed to gathering related studies and writing the literature review and abstract. S.A.M.P. focused on writing the methodology and coordinating data collection with participants. M.B.N. contributed to the conceptualization, instrument validation, and final editing of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DECLARATION OF USE OF AI IN SCIENTIFIC WRITING

The authors declared that this study was prepared, researched, written, and edited without the assistance of AI techniques.

REFERENCES

- [1] N. Choi and H. Kim, "Technological Convergence of Blockchain and Artificial Intelligence: A Review and Challenges," *Electronics*, vol. 14, no. 1, p. 84, Dec. 2024. <https://doi.org/10.3390/electronics14010084>
- [2] Bin Rashid and M. A. K. Kausik, "AI revolutionizing industries worldwide: A comprehensive overview of its diverse applications," *Hybrid Adv.*, vol. 7, p. 100277, Dec. 2024. <https://doi.org/10.1016/j.hybadv.2024.100277>
- [3] J. Füller, K. Hutter, J. Wahl, V. Bilgram, and Z. Tekic, "How AI revolutionizes innovation management - Perceptions and implementation preferences of AI-based innovators," *Technol. Forecast. Soc. Change*, vol. 178, p. 121598, May 2022. <https://doi.org/10.1016/j.techfore.2022.121598>
- [4] L. Shi and M. Li, "One AI world, one dream? Cross-platform comparative study of sociotechnical imaginaries of artificial intelligence on X and Weibo," *Glob. Media China*, Jun. 2025. <https://doi.org/10.1177/20594364251348583>
- [5] Y. K. Dwivedi et al., "Opinion Paper: 'So what if ChatGPT wrote it?' Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy," *Int. J. Inf. Manage.*, vol. 71, p. 102642, Aug. 2023. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- [6] H. Roberts, J. Cows, J. Morley, M. Taddeo, V. Wang, and L. Floridi, "The Chinese approach to artificial intelligence: an analysis of policy, ethics, and regulation," *AI Soc.*, vol. 36, no. 1, pp. 59-77, Mar. 2021. <https://doi.org/10.1007/s00146-020-00992-2>
- [7] R. P. Wadipalapa et al., "An Ambitious Artificial Intelligence Policy in a Decentralised Governance System: Evidence From Indonesia," *J. Curr. Southeast Asian Aff.*, vol. 43, no. 1, pp. 65-93, Apr. 2024. <https://doi.org/10.1177/18681034231226393>
- [8] Romanishyn, O. Malyska, and V. Goncharuk, "AI-driven disinformation: policy recommendations for democratic resilience," *Front. Artif. Intell.*, vol. 8, Jul. 2025. <https://doi.org/10.3389/frai.2025.1569115>
- [9] K. Mahroof, V. Weerakkody, Z. Hussain, and U. Sivarajah, "Navigating power dynamics in the public sector through AI-driven algorithmic decision-making," *Gov. Inf. Q.*, vol. 42, no. 3, p. 102053, Sep. 2025. <https://doi.org/10.1016/j.giq.2025.102053>
- [10] N. Pereira and C. Fernandes, "Knowledge Management in Health Organizations: A Systematic Literature Review," *J. Knowl. Econ.*, Jun. 2025. <https://doi.org/10.1007/s13132-025-02760-3>
- [11] S. Kumar, W. M. Lim, U. Sivarajah, and J. Kaur, "Artificial Intelligence and Blockchain Integration in Business: Trends from a Bibliometric-Content Analysis," *Inf. Syst. Front.*, Apr. 2022. <https://doi.org/10.1007/s10796-022-10279-0>
- [12] H. Jiao, T. Wang, D. Libaers, J. Yang, and L. Hu, "The relationship between digital technologies and innovation: A review, critique, and research agenda," *J. Innov. Knowl.*, vol. 10, no. 1, p. 100638, Jan. 2025. <https://doi.org/10.1016/j.jik.2024.100638>
- [13] F. R. Hoffmann, "The strategic-level effects of long-range strike weapons: A framework for analysis," *J. Strateg. Stud.*, vol. 47, no. 6-7, pp. 964-1000, Nov. 2024. <https://doi.org/10.1080/01402390.2024.2351500>
- [14] R. Snyder, "Assessing the Lethality of Conventional Weapons against Strategic Missile Silos in the United States, Russia, and China," *Sci. Glob. Secur.*, vol. 32, no. 1-3, pp. 105-173, Sep. 2024. <https://doi.org/10.1080/08929882.2024.2393537>

- [15] L. Dionysopoulos, M. Marra, and A. Urquhart, "Central bank digital currencies: A critical review," *Int. Rev. Financ. Anal.*, vol. 91, p. 103031, Jan. 2024. <https://doi.org/10.1016/j.irfa.2023.103031>
- [16] P. Schueffel, "Can CBDC Mimic Cash? A Deep Dive into the Digital Euro Case," *J. Risk Financ. Manag.*, vol. 18, no. 7, p. 394, Jul. 2025. <https://doi.org/10.3390/jrfm18070394>
- [17] M. B. E. Islam, M. Haseeb, H. Batool, N. Ahtasham, and Z. Muhammad, "AI Threats to Politics, Elections, and Democracy: A Blockchain-Based Deepfake Authenticity Verification Framework," *Blockchains*, vol. 2, no. 4, pp. 458-481, Nov. 2024. <https://doi.org/10.3390/blockchains2040020>
- [18] E. Tan, S. Mahula, and J. Cromptvoets, "Blockchain governance in the public sector: A conceptual framework for public management," *Gov. Inf. Q.*, vol. 39, no. 1, p. 101625, Jan. 2022. <https://doi.org/10.1016/j.giq.2021.101625>
- [19] Kalenzi, "Artificial Intelligence and Blockchain: How Should Emerging Technologies Be Governed?," *Front. Res. Metrics Anal.*, vol. 7, Feb. 2022. <https://doi.org/10.3389/frma.2022.801549>
- [20] G. H. Djatmiko, O. Sinaga, and S. Pawirosumarto, "Digital Transformation and Social Inclusion in Public Services: A Qualitative Analysis of E-Government Adoption for Marginalized Communities in Sustainable Governance," *Sustainability*, vol. 17, no. 7, p. 2908, Mar. 2025. <https://doi.org/10.3390/su17072908>
- [21] S. Li, X. Wang, and T. Li, "Unveiling the digital tapestry: A review of Chinese and international digital economy research," *J. Digit. Econ.*, vol. 4, pp. 95-107, 2025. <https://doi.org/10.1016/j.jdec.2025.06.005>
- [22] M.-F. de-Lima-Santos, W. N. Yeung, and T. Dodds, "Guiding the way: a comprehensive examination of AI guidelines in global media," *AI Soc.*, vol. 40, no. 4, pp. 2585-2603, Apr. 2025. <https://doi.org/10.1007/s00146-024-01973-5>
- [23] G. Baralla, G. Ibba, and R. Tonelli, "Reasoned or Rapid code? Unveiling the strengths and limits of DeepSeek for Solidity development," *Inf. Softw. Technol.*, vol. 189, p. 107917, Jan. 2026. <https://doi.org/10.1016/j.infsof.2025.107917>
- [24] T. R. Feyijimi, J. O. Aliu, A. E. Oke, and D. O. Aghimien, "ChatGPT's Expanding Horizons and Transformative Impact Across Domains: A Critical Review of Capabilities, Challenges, and Future Directions," *Computers*, vol. 14, no. 9, p. 366, Sep. 2025. <https://doi.org/10.3390/computers14090366>
- [25] M. Aridan, Irwandani, J. A. Villarama, and A. V. Dela Fuente, "Post-Launch Public Interest in DeepSeek vs. ChatGPT: A Comparative Google Trends Analysis in Indonesia and the Philippines," *Blockchain, Artif. Intell. Futur. Res.*, vol. 1, no. 1, pp. 1-12, 2025. <https://doi.org/10.70211/bafr.v1i1.166>
- [26] N. Khan, Z. Khan, A. Koubaa, M. K. Khan, and R. bin Salleh, "Global insights and the impact of generative AI-ChatGPT on multidisciplinary: a systematic review and bibliometric analysis," *Conn. Sci.*, vol. 36, no. 1, Dec. 2024. <https://doi.org/10.1080/09540091.2024.2353630>
- [27] A. Sokhansanj, "Local AI Governance: Addressing Model Safety and Policy Challenges Posed by Decentralized AI," *AI*, vol. 6, no. 7, p. 159, Jul. 2025. <https://doi.org/10.3390/ai6070159>
- [28] Lamaakal et al., "Tiny Language Models for Automation and Control: Overview, Potential Applications, and Future Research Directions," *Sensors*, vol. 25, no. 5, p. 1318, Feb. 2025. <https://doi.org/10.3390/s25051318>
- [29] Ishkhanyan, "The sovereignty-internationalism paradox in AI governance: digital federalism and global algorithmic control," *Discov. Artif. Intell.*, vol. 5, no. 1, p. 123, Jun. 2025. <https://doi.org/10.1007/s44163-025-00374-x>
- [30] T. Sattich, D. Freeman, D. Scholten, and S. Yan, "Renewable energy in EU-China relations: Policy interdependence and its geopolitical implications," *Energy Policy*, vol. 156, p. 112456,

- Sep. 2021. <https://doi.org/10.1016/j.enpol.2021.112456>
- [31] F. ul Haq, N. M. Suki, H. Zaigham, A. Masood, and A. Rajput, "Exploring AI Adoption and SME Performance in Resource-Constrained Environments: A TOE-RBV Perspective with Mediation and Moderation Effects," *J. Digit. Econ.*, Jul. 2025. <https://doi.org/10.1016/j.jdec.2025.07.002>