

Original Paper

The Operational Mechanism, Risk Challenges, and Development Paths of Generative Artificial Intelligence Empowering New Productive Forces

Dongze Cheng¹

¹ School of Marxism, Nanjing Vocational Institute of Railway Technology, Nanjing, 210031, Jiangsu, China

Received: October 8, 2025 Accepted: October 28, 2025 Online Published: November 10, 2025
doi:10.22158/jepf.v11n4p32 URL: <http://dx.doi.org/10.22158/jepf.v11n4p32>

Abstract

The empowerment of new productive forces by generative artificial intelligence has become a new trend. Examining the development of generative artificial intelligence empowering new productive forces based on Marxist views of science and technology provides a viable reference for the current global economic recovery. Research methods based on mechanisms, risks, and paths are employed. From the perspective of operational mechanisms, it is the era manifestation of Marxist views of science and technology, adhering to the path of green development, embodying the theme of high-quality development, and embedding the core elements of scientific and technological innovation; from the perspective of risk challenges, there are risks such as technological monopoly hindering scientific and technological innovation, algorithm recommendation eroding subject creativity, data leakage challenging ethical risks, and protectionism impeding international cooperation; from the perspective of development paths, feasible strategies are proposed, including strengthening scientific and technological self-reliance to deepen scientific and technological innovation, open-sourcing algorithms to unleash subjective initiative, implementing supervision to establish data authority, and promoting talent exchange through international cooperation. It is concluded that empowering new productive forces by generative artificial intelligence must adhere to Marxist views of science and technology.

Keywords

Generative AI New Quality Productivity Green development, Algorithm recommendation, Technological innovation, Chinese modernization

1. Introduction

The development of new-quality productive forces is an inevitable outcome and a new chapter in technological innovation in the era of generative artificial intelligence (hereinafter referred to as GenAI). Zhou Wen and Zhang Yihan (2024) pointed out: "New-quality productive forces are advanced productive forces formed in the practice of China's economic development amidst the wave of a new round of technological revolution and industrial transformation". Essentially, new-quality productive forces are a new state of productive forces that have achieved a qualitative leap through the optimized combination of laborers, labor materials, and labor objects, with technological innovation as the core element. They are in line with the new development concept and are themselves green productive forces. GenAI is also a crystallization of the times under technological innovation. The collision and convergence of GenAI and new-quality productive forces, as well as their mutual promotion and common development, have become a new field of academic attention. Accurately grasping the operational mechanism, risk challenges, and development paths of GenAI empowering new-quality productive forces will undoubtedly create more opportunities for the dialectical and benign development of the two, injecting new momentum into the global economy.

2. Operating Mechanism: The Mechanism by Which Generative Artificial Intelligence Empowers New Productive Forces

Marx and Engels attached great importance to the role of technology in social development. As a representative of the world's advanced science and technology, GenAI and new-quality productive forces, which are the latest driving forces of advanced productive forces, namely the highly developed economy and society, will inevitably produce a positive "chemical reaction". The empowerment of new-quality productive forces by GenAI is approached from the operational mechanisms of Marxist views on science and technology, green development, high-quality development, and scientific and technological innovation.

2.1 Theory: Marxist View of Science and Technology

The Marxist view of science and technology has undergone a formation process, which provides philosophical guidance for the development of new productive forces empowered by GenAI. During the period of his doctoral dissertation, Marx proposed the concept of "freedom in existence (Huang Nansen et al., 1996)" to form the initial natural philosophy centered on self-consciousness, and put forward the viewpoint that "nature is 'non-conscious rationality', while self-consciousness is 'freedom in existence'". In "The Holy Family" and "The German Ideology", Marx and Engels focused on the social historical practice as the medium for the formation of a dialectical materialist view of nature. In "Das Kapital", they formed their view of science and technology. Finally, in "Dialectics of Nature", Engels systematically expounded on the Marxist view of nature and science. It fully demonstrates that Marx and Engels shifted from emphasizing the subjective ability of creativity and the subjective initiative of self-consciousness in nature to emphasizing the significance of social historical practice, discovering the

significant impact of science and technology on social productive forces in the mode of social production, and ultimately systematically forming a scientific view. When science is correctly applied to social production, it will greatly promote the progress of productive forces. GenAI is a representative of advanced science and technology, and its application to new productive forces will undoubtedly bring tremendous development to economic and social development, especially to productive forces. It is evident that they attach great importance to respecting the regularity of natural development, emphasizing the influence of human subjective initiative and creativity on the development of science and technology, and highly valuing the positive role of science and technology in economic and social development. However, they also need to prevent the negative effects of technological development on economic and social development, such as the risk of alienation and threat mentioned in "Das Kapital". The scientific and technological view of Marx and Engels is the "development key" that must be adhered to for the healthy development of new productive forces empowered by GenAI.

2.2 Approach: Green Development

GenAI is dedicated to empowering the development of new-quality productive forces in line with the principle of green development. Green development involves respecting, conforming to, and protecting nature. It embodies the concept that clear waters and lush mountains are invaluable assets, represents the harmonious coexistence between humans and nature, and signifies the sustained and healthy progress of scientific and technological innovation. Green development has become a "booster" for the development of new-quality productive forces in the era of generative artificial intelligence, and it is the developmental mechanism that new-quality productive forces should follow. Fang Shinan (2025) pointed out: "The value orientation of green productive forces, the characteristics of green technology, the guarantees of green systems, and the support of green humanities embodied in new-quality productive forces", highlighting the high correlation between new-quality productive forces and green development, and that new-quality productive forces themselves are green productive forces. New-quality productive forces encompass the fundamental prescriptive nature of green development. In the era of generative artificial intelligence, adhering to the principle of green development to develop new-quality productive forces should progress from a multidimensional system of worldview, methodology, and values. Under the principle of green development, GenAI empowers new-quality productive forces with new characteristics such as high technology, high efficiency, and high skills, promoting multidimensional coordinated development between humans, society, and nature. Firstly, adhering to the worldview of ecological priority and green development. GenAI empowers new-quality productive forces by integrating high-quality scientific and technological innovation, implementing green development throughout the process, and inevitably leading to the improvement of ecological environment quality as a result. Xun Qingzhi (2023) pointed out that the theoretical implication of the ecological view of Chinese path to modernization is "the green transformation of world modernization development". Marxist ecology places particular emphasis on ecological ontology. GenAI empowers new-quality productive forces by adhering to the worldview and dialectical characteristics of Marxist ecology in the era. Secondly,

adhering to the methodology of green scientific and technological innovation to form green production methods and lifestyles. GenAI empowers new-quality productive forces and will inevitably bring about innovations in production methods and lifestyles. Green development represents the direction of current technological and industrial transformation. Thirdly, the value of harmonious coexistence between humans and nature. Protecting and improving the ecological environment is essentially protecting and developing productive forces. Respecting nature, conforming to nature, and protecting nature are the materialist foundation of GenAI empowering new-quality productive forces, "clear waters and lush mountains are invaluable assets" is the epistemological mechanism of GenAI empowering new-quality productive forces, and harmonious coexistence between humans and nature is the value pursuit of GenAI empowering new-quality productive forces.

2.3 Theme: High-quality Development

The empowerment of new-quality productive forces by GenAI consistently permeates the theme of high-quality development. Marx emphasized the decisive role of productive forces in social development when discussing the dialectical relationship between productive forces and production relations (Complete Works of Marx and Engels, 1976). The ultimate driving force behind social progress and economic development is productive forces. Gu Hailiang (2024) pointed out: "New-quality productive forces form a new orientation and characteristic of systematicness, integrity, and synergy in the system integration of the Chinese path to modernization". The economic requirement of the Chinese path to modernization is to achieve high-quality development, aiming to further promote the development of social productive forces through high-quality development. New-quality productive forces are the anchor that drives the Chinese path to modernization, while GenAI serves as the technological driving force behind new-quality productive forces, exhibiting a strong propelling and supporting effect. Tang Zhengdong (2024) proposed the "principle of the contradictory movement of things and the method of analyzing social fundamental contradictions", acknowledging, recognizing, and adhering to the law of contradiction. The effectiveness of high-quality development is crucial to the overall construction of the Chinese path to modernization, and it is imperative to follow the law of contradiction, dialectically understand the contradictions of high-quality development, comprehensively grasp the laws of contradiction, act according to the laws of contradiction, the particularity of contradiction, and analyze specific issues specifically. The empowerment of new-quality productive forces by GenAI represents a significant theoretical innovation based on the law of contradiction, correctly grasping the laws of contradiction, the particularity of contradiction, and analyzing specific issues specifically. Firstly, from the perspective of the law of contradiction. The empowerment of new-quality productive forces by GenAI promotes high-quality development, deeply following the law of contradiction and innovating in philosophical logic and methodology for acting according to the laws of contradiction. Secondly, from the perspective of the particularity of contradiction. "Developing new-quality productive forces according to local conditions" is precisely a methodology for grasping the particularity of contradiction from a contradictory perspective. Jiang Yongmu and Feng Yijia (2024) pointed out: "High-quality development is the distinctive theme of

China's economic development in the new era". It manifests as a strong focal point in expanding external development forces, that is, the empowerment of new-quality productive forces by GenAI provides impetus and support for high-quality development, which is an important focal point.

2.4 Core: Technological Innovation

Technological innovation serves as the core element of new-quality productive forces, and it is also the key to GenAI empowering new-quality productive forces. Hu Lei (2025) pointed out: "New-quality productive forces are those in which data and technological innovation elements participate in the distribution". From a general perspective, both GenAI and new-quality productive forces exhibit high-tech characteristics, with technological innovation being the core focus where they converge. From a specific perspective, with the enhancement of technological innovation, on the one hand, GenAI itself becomes an advanced productive element. The constructed algorithm models and computing power systems have become the "golden conditions" for the development of new-quality productive forces. For instance, the invention and iteration of core algorithms such as Generative Adversarial Networks (GANs) and Diffusion Models, along with the emergence of high-performance computing chips (such as GPUs/TPUs), not only enhance the performance of GenAI but also elevate new-quality productive forces to another level. On the other hand, they enrich and expand the elements of productive forces. From the perspective of productive force elements, they enhance the skills of workers, innovate labor tools or means of labor, and expand the objects of labor, essentially enhancing the breadth and depth of new-quality productive forces. Technological innovation serves as the bridge and core element between GenAI and new-quality productive forces, promoting their dialectical and benign interaction and greatly enhancing the efficiency of GenAI in empowering new-quality productive forces.

3. Risk Challenges: Challenges Posed by Generative Artificial Intelligence Empowering New Productive Forces

The development of new-quality productive forces empowered by General AI (GenAI) faces various risk challenges. As one of the typical achievements of new-quality productive forces, GenAI can serve as an engine for empowering the development of new-quality productive forces, but it also faces risk challenges from various aspects such as technological monopoly hindering scientific and technological innovation, algorithm recommendation eroding subjective creativity, data leakage posing ethical risks, and protectionism impeding international cooperation.

3.1 Technological Monopoly Hinders Scientific and Technological Innovation

The technological monopoly walls built by large technology giants are hindering technological innovation. Technological innovation, as the core element of new productive forces, is essentially challenged by technological monopoly, which impedes its development. Technology giants possess absolute advantages in computing power, data, and technology, constructing high technological barriers, strictly controlling algorithm sharing, distorting the direction of technological innovation, and even monopolizing the market through technological hegemony. For example, technology giants such as

OpenAI, Microsoft, and Meta hold extremely exclusive monopolies, gradually eroding the positive force of technological innovation. The trend of technological monopoly hindering technological innovation is intensifying. Specifically, firstly, the key core technology wall - the monopoly of large language models hinders the architectural power of technological innovation progress. The key technology of GenAI is the architecture of large models, which is dominated by technology giants like a technological wall, "freezing" the technological innovation momentum of other innovation entities and tightly blocking them outside the technological wall, thus weakening the enthusiasm of other innovation entities for technological innovation. Secondly, the monopoly of data and computing power - hinders the core key force of technological innovation. Technology giants, like technological Leviathans, control the data elements of GenAI and the GPU computing power accumulated through massive capital. The hegemony over data and computing power completely deprives other practitioners of the core key force of technological innovation, and technological Leviathans may also bring alienation to the enthusiasm of the giants themselves for innovation. Thirdly, the application ecosystem - API monopoly hinders the vitality of the technological innovation market. With the support of computing power hegemony and data hegemony, emerging technological innovation entities cannot afford the cost of a large number of high-end GPUs, let alone independently developing new training models. They are forced to use APIs monopolized by giants, resulting in emerging innovation entities being completely overwhelmed by the technological hegemony of technology giants and completely losing their innovation ability. The multiple threats posed by technological hegemony to technological innovation ultimately pose severe challenges to the empowerment of new productive forces by GenAI.

3.2 Algorithmic Recommendation Mitigates Subject Creation

GenAI algorithm recommendations are eroding human subjective initiative and creativity. GenAI empowers new-quality productivity, which fundamentally relies on the core element of productivity—the subjective initiative and creativity of workers. This is the core guarantee for the development of GenAI and new-quality productivity. GenAI is relying on algorithm recommendations to continuously train models, update iterations, and occupy the international market. Algorithm recommendations are eroding human subjective initiative and creativity through algorithm bias, technological black boxes, and algorithmic domination. Firstly, algorithm bias. Large-scale algorithm models are technological products constructed based on a certain capital foundation, inherently possessing a capitalist stance, such as ChatGPT. The content delivered by these models often carries algorithmic biased values, posing a risk that subjects may gradually become prey to them, ultimately losing self-awareness and innovative consciousness. Secondly, algorithmic domination. It gives people a false sense of satisfaction. In reality, algorithms continuously push similar content, depriving people of choice and self-judgment, making them objects of algorithmic domination. Under the domination of algorithms, subjects become alienated objects of algorithms. Thirdly, technological black boxes. Algorithm recommendations are like a "technological black box." Ordinary people have no idea what might emerge from this box, which could be either opportunities or risks, depriving them of the right to know and pre-judge things. Under the

shadow of technological black boxes, people may develop a denial of their own creativity, experience self-anxiety, and lose their subjective initiative as humans. Marx emphasized the role of self-awareness in his doctoral dissertation. Algorithm recommendations erode human subjective initiative and self-awareness, leading to the weakening or disappearance of creative abilities, which poses a risk challenge to the development of new-quality productivity.

3.3 Data Leakage Challenges Ethical Risks

The development of new productive forces enabled by General AI (GenAI) faces challenges such as data leakage risks, social privacy ethics, and other risks. Some scholars have pointed out: "examines specific privacy risks, data leakage risks, and personal data risks posed by generative AI" (Xiongbiao Ye, Yuhong Yan, Jia Li, & Bo Jiang, 2024). This emphasizes the objective existence of specific privacy risks, data leakage risks, and personal data risks brought by ChatGPT-like generative AI. Large generative AI models rely on a vast amount of data for training, and the situation of data leakage is complex and pervasive, posing challenges to citizens' privacy security. The ethics of technology and society are facing multiple challenges from AI. Firstly, large generative AI models are built on the feeding of data. Based on model training, they crawl a large amount of existing human data worldwide, train to imitate, and generate new data, including text, sound, video, etc. The large-scale data crawling and generation inevitably lead to security issues and data leakage in some links. At the same time, huge interests attract speculators, which may lead to illegal data trading. The application security of generative AI is questionable. Secondly, as generative AI is based on the development of networks, data, and technology, the authenticity of the content generated by it and data falsification and leakage may lead to data abuse and privacy leakage. Thirdly, algorithm-based generative AI is highly likely to have "black box" algorithm biases, which may pose ethical risks to social ethics and technological ethics, causing social ethical issues such as unfair resource allocation and service distribution. Data leakage, social privacy security, and ethical risks pose severe challenges to the healthy development of new productive forces.

3.4 Protectionism Hinders International Cooperation

A smooth and equitable international market, coupled with healthy international exchanges and cooperation, is a crucial condition for the development of new productive forces empowered by GenAI. However, protectionism in reality severely hinders international cooperation and exchanges, posing obstacles to the development of both GenAI itself and new productive forces. Under hegemonic protectionism, decoupling and sanctions are increasingly evident, leading to difficulties in international cooperation, closed-source AI algorithms impeding technological exchanges, and narrowed paths for talent exchange and learning, all of which hinder technological innovation. Specifically, firstly, under hegemonic protectionism, small courtyards with high walls, decoupling, and sanctions are significant factors impeding the development of new productive forces empowered by GenAI. Currently, as the global economic recovery remains sluggish, some economies possess early development advantages. However, protectionism is on the rise in fields such as chips, high-tech, and AI, often leading to decoupling and sanctions. This is detrimental to the healthy development of the international market

required for the global development of GenAI and new productive forces. Ultimately, this leads to a loss of mutual trust, increased difficulties in cooperation, disruptions in international cooperation, and dual hindrances to the development of global generative AI and new productive forces. Secondly, under protectionism, the closed-source algorithms of large generative AI models hinder technological exchanges and innovation. Technology giants have leading algorithms in GenAI, and their closed-source model may maintain a certain development advantage in the short term. However, in the long run, it loses the "catfish effect" of participating in international competition and makes technological competition and exchanges more fragile, which is actually detrimental to international technological innovation and cooperation. Thirdly, protectionism narrows the paths for talent exchange and learning. The development of new productive forces empowered by GenAI requires a more abundant talent pool, as people are the fundamental element for the development of GenAI and new productive forces. Under protectionism, international education and talent exchanges are hindered, with little effect, making the talent team building for GenAI-empowered new productive forces face extreme vulnerability. Protectionism is the biggest obstacle to the development of new productive forces empowered by GenAI.

4. Paths to Exploration: Paths for Generative AI to Empower New Productivity

Generative artificial intelligence brings numerous opportunities for the development of new-quality productive forces and has become an important driving force for empowering their development. We should overcome the risk challenges brought by generative artificial intelligence from multiple dimensions and explore development paths. Based on technological self-reliance and self-improvement, we should promote scientific and technological innovation, establish an algorithm open-source sharing mechanism, implement supervision to build data authority, and promote talent exchange through international cooperation. We should promote the empowerment of generative artificial intelligence for the development of new-quality productive forces from multiple dimensions.

4.1 Objective Path: Strengthening Ourselves through Science and Technology and Deepening Scientific and Technological Innovation

Adhering to technological self-reliance and self-improvement and embarking on the path of independent technological innovation is the fundamental path for GenAI to empower the development of new productive forces. The core key to the operational mechanism of GenAI empowering new productive forces lies in technological innovation. Technological monopoly and hegemony challenge technological innovation, which is the key "breaking point" for connecting generative artificial intelligence with the development of new productive forces. It is imperative to firmly grasp this point. To implement effective technological innovation and further promote the development of new productive forces empowered by generative artificial intelligence, we must advance the modernization that coordinates material and spiritual civilization, especially by strengthening cultural confidence, emphasizing technological self-reliance and self-improvement, and promoting technological innovation in a solid and effective manner. We should advance from multiple dimensions, including cultural confidence, the nationwide system, and

basic research. Firstly, cultural confidence. Technology needs to be self-reliant and self-improved, and culture needs to be confident. Cultural confidence is the spiritual weapon for technological self-reliance and self-improvement, the spiritual code for a culturally strong nation, and the "sharp sword" to break the technological monopoly blockade. Dai Shengpeng (2025) pointed out: "In terms of the spiritual power for building a culturally strong nation, cultural confidence plays an irreplaceable role". Cultural confidence is the inherent spiritual power for technological self-reliance and self-improvement. Technological self-reliance and self-improvement open up new development "horizons" for technological innovation and are the original driving force for achieving breakthroughs from 0 to 1. Secondly, the nationwide system. We should fully leverage China's institutional advantages, innovate the nationwide system, optimize resource allocation, unleash market vitality, and mobilize all enthusiasm. We should provide institutional guarantees for technological self-reliance and self-improvement, and focus on breaking through technological monopoly. Thirdly, emphasis on basic research. Technological innovation cannot be separated from talent, and the cultivation of talent relies on education. GenAI empowering the development of new productive forces requires particular emphasis on the cultivation of talents in basic disciplines, such as mathematics, physics, and even philosophy and logic. The cultivation of basic disciplines is a reliable guarantee for truly unleashing the talent dividend. Making efforts in multiple directions and stimulating the sense of independent innovation in science and technology is also the manifestation of the dynamic role of self-awareness in scientific and technological innovation as described by Marx, breaking the era of capital monopoly.

4.2 Subjective Approach: Leveraging Subjective Initiative through Open-source Algorithms

Build open-source algorithm models to unleash human subjective initiative and creativity, catalyzing the development of new productive forces empowered by GenAI. Under the coercion of algorithm recommendations, human subjective initiative is easily eroded, becoming the object of algorithm domination. Developing digital technology, building open-source algorithm models, and enhancing subjective initiative are one of the paths to better leverage GenAI to empower the development of new productive forces. Firstly, developing digital technology lays the foundation for algorithm optimization. With the support of digital technology, big data, generative artificial intelligence, blockchain, digital twins, the Internet, and other technologies integrate with the digital economy, and the amplification, superposition, and multiplication effects of digital technology on new productive forces become increasingly significant. Digital technology provides a reliable guarantee for optimizing the algorithm foundation. Building a scientific, controllable, and reasonable development logic of digital technology + data + algorithm is the basic premise for GenAI to empower new productive forces. Secondly, building open-source algorithm models for the future. GenAI is the latest achievement of human technological development, and new productive forces are the choice of the times for world economic development. Open-source algorithm models are the best choice to harness global wisdom to continuously fission and upgrade GenAI. Open-source algorithm models can integrate more innovations and also eliminate algorithm bias, implementing a technical logic for better governance. Thirdly, enhance human subjective

initiative. GenAI supported by algorithms and computing power serves humanity, and it cannot become a threat to erode human initiative and creativity. Instead, it requires humans to exert their subjective initiative and creative ability to better utilize GenAI for the benefit of human society. Humans should transition from being "algorithm consumers" to "algorithm innovators", breaking free from the coercion of algorithms to master them. Improve human digital literacy, enhance awareness of anti-algorithmic coercion, and make algorithms truly empowering tools, rather than making humans lose self-awareness and become their appendages. Choose open-source algorithms from a subjective perspective, fully unleash human subjective initiative and creativity, and let GenAI better empower the development of new productive forces.

4.3 Internal Path: Implementing Regulation and Building Data Authority

Implementing effective supervision over the algorithm recommendations of GenAI, establishing an authoritative official data algorithm, and enhancing social governance efficiency are the internal pathways for the healthy development of new productive forces empowered by GenAI. The effective path to addressing data leakage, privacy risks, and social ethical challenges under GenAI lies in high-quality supervision, building data authority, and promoting the modernization of governance systems and capabilities. Firstly, implement high-quality supervision. The purpose of GenAI empowering new productive forces is to promote high-quality development. High-quality development cannot be achieved without a stable environment and a healthy and orderly market order. It is extremely necessary to conduct necessary technical, legal, ethical, and regulatory supervision over GenAI's algorithm recommendations, data extraction, model feeding, and training. This can not only create a healthy and orderly space for the sustainable development of generative artificial intelligence but also effectively prevent the spillover of risks such as data leakage, privacy leakage, and technological ethics under GenAI. It serves as the market guarantee for the development of new productive forces empowered by GenAI. Secondly, build data authority. Generative artificial intelligence is inseparable from the extraction, analysis, processing, training, and generation of a large amount of data elements. Data elements are the most basic elements. In order to ensure the healthy and orderly development of new productive forces empowered by GenAI, the government, based on the overall market and the scientific nature of generative artificial intelligence empowering new productive forces, establishes an authoritative official data chain to standardize, demonstrate, and allocate data. This provides data support for generative artificial intelligence enterprises' training and authoritative data for the market, enhancing market and public confidence in GenAI. The reasonable allocation of authoritative data among the market, enterprises, and individuals will undoubtedly stimulate the enthusiasm of all parties, creating a more stable mainstay guarantee for the development of new productive forces empowered by GenAI under the authoritative institutional guarantee. Thirdly, modernize governance systems and capabilities. On the one hand, the development of new productive forces empowered by GenAI is a systematic project that requires comprehensive promotion across politics, economy, culture, society, and ecology. This "five-in-one" overall layout serves as the "four beams and eight pillars" for the development of new productive forces empowered by

GenAI, providing modern governance system guarantees and also serving as the fundamental pillar for effectively preventing risks of generative artificial intelligence. On the other hand, achieving efficient, legal, and intelligent national governance can better meet people's aspirations for a better life. From the perspective of governance, we should effectively enhance the governance guarantee for the modernization of social governance systems and capabilities of new productive forces empowered by GenAI.

4.4 External Path: Promoting Talent Exchange through International Cooperation

The empowerment of new-quality productive forces by GenAI cannot be achieved without sustained and healthy international cooperation and talent exchange. The development of new-quality productive forces empowered by GenAI not only promotes high-quality economic development in the country but also serves as an important "engine" for global economic recovery. Removing obstacles in international cooperation, building mutual trust, abandoning trade protectionism, deepening win-win cooperation, and promoting normal exchange and learning among global talents are external requirements for the empowerment of new-quality productive forces by GenAI. Firstly, establishing multi-party communication to deepen mutual trust. The empowerment of new-quality productive forces by GenAI to facilitate global economic recovery relies on the joint efforts and cooperation of the world, especially the win-win cooperation among major economies, which is crucial. The premise of cooperation is to enhance mutual trust, which is the "key" to cooperation. Based on mutual trust, promoting international cooperation will surely gather global wisdom, push generative artificial intelligence to a new level, and benefit the global economy through the development of new-quality productive forces. Secondly, abandoning trade protectionism. In the era of generative artificial intelligence, with rapid technological development and deepening economic globalization, the world has become inseparably interconnected. Trade protectionism is a "dead end" that can only lead to economic stagnation and is not conducive to the sustainable development of the domestic or even global economy. Implementing trade protectionism is also a wrong choice that violates the laws of development and leads to darkness without a future. Stepping out of the "barriers" of trade protectionism will surely create reliable arteries and development opportunities for the development of new-quality productive forces empowered by generative artificial intelligence and promote world economic recovery and prosperity. Thirdly, promoting global talent exchange. The empowerment of new-quality productive forces by GenAI relies on the global wisdom of global thinkers, and talent is the fundamental source of global wisdom. Talent is also the most revolutionary production factor in new-quality productive forces and the core driving force for the development of GenAI. Opening up paths for talent exchange and cooperation globally, removing bottlenecks and obstacles in global talent exchange, and making talent exchange smoother and freer are the necessary paths for the global development of new-quality productive forces empowered by GenAI. For example, giving the green light to overseas students and talent exchange. Deepening mutual trust, strengthening international cooperation, and promoting talent exchange have opened up broad external paths for the empowerment of new-quality productive forces by GenAI.

5. Conclusion

Based on the Marxist view of science and technology, an examination of GenAI empowering new productive forces reveals that it is both an innovative move to promote high-quality economic development in the country and a powerful lever to drive global economic recovery. Under the guidance of the Marxist view of science and technology, it is even more necessary for people to balance the dialectical relationship between the development of GenAI and new productive forces, paying particular attention to preventing potential social ethical issues such as technological Leviathans under technological hegemony, algorithmic recommendation risk challenges, data privacy breaches, and obstacles posed by trade protectionism that may arise from the development of GenAI. Under the guidance of the Marxist view of science and technology, promoting scientific and technological innovation, exerting subjective initiative, implementing supervision, and advancing international cooperation become practical and feasible answers.

References

- Complete Works of Marx and Engels (2nd ed., Vol. 4, p. X). Beijing: People's Publishing House, 1976.
- Dai Shengpeng. (2025). On the Important Role of Cultural Self-Confidence in Building a Strong Cultural Country. *Academic World*, 2025(06), 45-51.
- Fang Shinan. (2025). On the Ecological Civilization Thoughts Contained in the Concept of New Productive Forces. *Ideological and Theoretical Education*, 2025(02), 36-42.
- Gu Hailiang. (2024). New Characteristics and Requirements of New Productive Forces in the System Integration of Chinese Path to Modernization. *Contemporary World and Socialism*, 2024(05), 25-34.
- Hu Lei. (2025). Improving Production Relations More Compatible with New Productive Forces: Connotation, Requirements, and Methods. *Studies on Marxism*, 2025(09), 81-92.
- Huang Nansen et al. (1996). *History of Marxist Philosophy, Volume 1* (p. 110). Beijing: Beijing Press,.
- Jiang Yongmu, & Feng Yijia. (2024). Theoretical Logic, Practical Manifestation, and Path Selection for Developing New Productive Forces Based on Local Conditions. *Journal of Chongqing University* (Social Science Edition), 30(05), 1-12.
- Tang Zhengdong. (2024). "Six Musts" and the New Realm of the Sinicization of Marxist Worldview and Methodology. *Jiangnan Forum*, 2024(10), 5-12.
- Xiongbiao Ye, Yuhong Yan, Jia Li, & Bo Jiang. (2024). Privacy and personal data risk governance for generative artificial intelligence: A Chinese perspective. *Telecommunications Policy*, 48(10), 102851-102851.
- Xun Qingzhi. (2023). An Analysis of the Ecological Perspective of the Chinese Path to Modernization. *People's Forum: Academic Frontiers*, 2023(08), 59-71.
- Zhou Wen, & Zhang Yihan. (2024). New Productive Forces and High-quality Development: Internal Correlation and Key Breakthroughs. *Academic Research*, 2024(06), 73-82.