

Technological Innovation Spurring New Quality Productive Forces and Its Global Effect

Haoguang Liang, Wei Huang*

The proposal of developing new quality productive forces is based on the reality of the domestic economy and the complex international environment in the new era, to develop advanced productive forces needed for Chinese modernization. This paper systematically analyzes three characteristics of new quality productive forces: green, digital and high-tech, and demonstrates the key driving role of technological innovation in accelerating the formation of new quality productive forces. The results show that technological innovation strongly supports the formation of the modern industrial system through basic, critical and disruptive technological breakthroughs and their application to the industrial system, through the transformation of traditional industries, the promotion of emerging industries, and the derivation of future industries. The study shows that the new quality productive forces can help to enhance the value of the industrial chain in developing countries, contribute to the global economic recovery, and form a new economic growth pole. The authors believe that to accelerate technological innovation needed for the development of new quality productive forces, it is necessary to enhance the ability of independent research and development, accelerate breakthroughs in core technologies, seize the commanding heights of technology, and actively build an open technological innovation system.

Keywords: technological innovation, new quality productive forces, global effect, industrial chain

1. Introduction

The report of the 20th National Congress of the Communist Party of China emphasizes that science and technology are the primary productive forces, and innovation is the primary driving force. At present, a new round of technological and industrial revolutions is in full swing, accelerating the restructuring of global industrial chains. The international and domestic economic landscapes are complex and ever-changing. Whether it is to promote steady economic growth or to enhance the strategic position of the country, the key lies in technological innovation, and fundamentally,

* Haoguang Liang, Director and Research Fellow at the China Modernization Research Center, Chinese Academy of Sciences. Wei Huang, Ph.D. Candidate, School of Economics and Management, University of Chinese Academy of Sciences.

in the formation of new quality productive forces. The proposition of new quality productive forces is based on President Xi Jinping's understanding of China's national conditions, development stage, and the international competitive landscape, representing a strategic, overarching, and fundamental judgment. It provides a roadmap for achieving high-quality development and realizing Chinese path to modernization, deepening the application of Marxist political economy in China.

The concept of new quality productive forces does not simply entail a deepening of traditional productive forces but a transformation from quantitative to qualitative change in productive forces. The introduction of new quality productive forces has garnered significant attention and research from scholars. Current literature primarily focuses on two directions. On the one hand, it explores the background, connotation, and pathways to achieving new quality productive forces, such as the logic behind its proposition and its significance for the era (Gao, 2023), as well as the essential elements and focal points. On the other hand, it examines the factors influencing the formation of new quality productive forces and its relationship with other important strategic objectives, such as quantitative evaluation indicators for new quality productive forces (Han *et al.*, 2024), its role in promoting regional development (Jia *et al.*, 2024), their contribution to realizing Chinese path to modernization (Pu and Xiang, 2024), in driving high-quality economic development (Du *et al.*, 2023), and in building a modern industrial system (Wang *et al.*, 2024). These studies provide comprehensive and detailed research on the subject. However, there is currently a lack of systematic argument on how technological innovation drives new quality productive forces. This paper, drawing on previous literature, clarifies the connotation and characteristics of new quality productive forces and demonstrates the mechanism and specific manifestations through which technological innovation promotes new quality productive forces. Moreover, against the backdrop of sluggish global economic recovery, the promotion of a green, digital, and technology-driven development model for new quality productive forces will not only deepen the high-quality development of China's economy but also bring benefits to other countries around the world. From the global perspective, this paper examines how new quality productive forces can enhance the position of developing countries in the global industrial chain and promote global economic recovery, making marginal contribution to deepening the understanding of new quality productive forces and their significant role.

2. Theoretical Basis of New Quality Productive Forces

The proposition of new quality productive forces is a significant theoretical application of Marxist political economy in contemporary China, further deepening and innovation of Marxist theories on productive forces (Meng and Han, 2024). Driven by innovation and centered on technological innovation as the core dynamic,

new quality productive forces encompass a rich connotation and a set of distinct characteristics. To comprehensively understand and implement new quality productive forces, it is essential to consider the overall domestic and international economic and political development contexts, and to stand at the height of new development concepts, the realization of Chinese modernization, and the unprecedented changes of the world economy over the past century.

2.1. Scientific Connotation of New Quality Productive Forces

Marx believed that productive forces have the capacity to transform nature. This capacity reflects humanity's ability to create wealth and serves as the intrinsic driving force for social progress. The development of productive forces is the key factor for countries worldwide to achieve industrialization and modernization, and is particularly crucial for realizing Chinese path to modernization (Ren, 2024). During the symposium on promoting the comprehensive revitalization of Northeast China in the new era, President Xi Jinping stated that: "We must actively cultivate strategic emerging industries such as new energy, new materials, advanced manufacturing, and electronic information, as well as future industries, to accelerate the formation of new quality productive forces and enhance new drivers of development."¹ New quality productive forces are advanced productive forces in the contemporary era, driven by revolutionary technological breakthroughs, innovative allocation of production factors, and deep transformation and upgrading of industries. They are fundamentally defined by qualitative changes in laborers, means of labor, objects of labor, and their optimal combinations, with the core indicator being the improvement of total factor productivity.²

The key to accurately understanding new quality productive forces lies in the terms "new" and "quality". The "new" in new quality productive forces is reflected in their distinction from traditional productive forces, relying on digital and green technologies to provide differentiated and personalized products and services. This is achieved through the transformation of traditional industries, the construction of emerging industries, and the extension of new industrial chains via scientific and technological innovation. The "quality" aspect manifests as new standards and new trends. By integrating digital elements with traditional production factors, new quality productive forces differ from the previous production models characterized by "high energy consumption", "high pollution", and "high emissions". Instead, they exhibit

¹ "Xi Jinping emphasized during his inspection in Heilongjiang the importance of firmly grasping the strategic positioning within the national development framework and striving to create new phase of high-quality development in Heilongjiang". People's Daily, September 9, 2023.

² The Central Financial and Economic Affairs Commission Explain the Spirit of the Central Economic Work Conference in Detail". China Government Network, December 18, 2023.

features of “high quality”, “high efficiency”, and “high technology”. Therefore, new quality productive forces differ from previous models that relied on factor accumulation to drive economic growth. They represent growth paradigm that does not depend on material inputs or environmental degradation. By the penetration of information technology and fostering the formation of emerging industrial chains, they create new economic growth engine. This sustainable and green production paradigm is the key driver for accelerating the construction of modern industrial system. It is also a new development model that helps China gain strategic advantages in the global governance system .

2.2. Salient Features of New Quality Productive Forces

New quality productive forces are formed through the integration of key disruptive technological breakthroughs with industrial systems, giving rise to new technologies, new economies, and new business models. They embody the concept of green and sustainable development, combine the development of the real economy with the virtual economy, and are supported by high-tech industrial systems. Specifically, new quality productive forces exhibit the following notable characteristics:

First, new quality productive forces embody new development philosophy. The concept of green development is inherent to new quality productive forces. Economic development cannot follow the path of extensive growth but must instead pursue intensive development. Previous theories of productive forces overemphasized humanity’s ability to transform nature, leading to conflict between humans and nature and neglecting the harmonious coexistence between the two. New quality productive forces are based on the principle that protecting natural resources is equivalent to developing productive forces. They adhere to development grounded in green sustainability and uphold the philosophy that “lucid waters and lush mountains are invaluable assets”. Green, low-carbon, and sustainable practices are integrated throughout the construction of modern industrial system. One of the core aspects of high-quality economic development is green and sustainable growth. Achieving synergy between economic growth and environmental protection requires leveraging advanced productive forces to address key aspects of green development. Through the development of green technologies, new quality productive forces drive the transition to a low-carbon, green society by adjusting energy structures and fostering emerging green industries. This represents transcendence of traditional productive forces and reflects new development philosophy distinct from that of traditional productive forces.

Second, new quality productive forces encompass new development content. The digital economy is increasingly becoming a crucial lever for seizing the new wave of technological and industrial revolutions. Traditional theories of productive forces emphasize the role of factors such as capital, labor, and land. However, as the size of

the labor force stabilizes and the advantage of low labor costs diminishes, the economic growth model driven by traditional factors makes it difficult for China to overcome the “middle-income trap” and address the current lack of economic growth momentum. New quality productive forces represent the cutting-edge of societal productive forces, relying on next-generation information technologies, the Internet of Things, big data, and artificial intelligence to enhance labor productivity, reduce unit production time, lower production costs, and improve product quality. By leveraging industrial systems, they drive China’s economy toward high-quality development. The vast quantity of data elements integrates the digitization of information and knowledge with traditional production factors, effectively addressing the law of diminishing marginal returns on input factors. This promotes the optimization and upgrading of production factor structures, enhances the efficiency of traditional industries, empowers all aspects of social production, and increases total societal welfare, demonstrating new development content.

Third, new quality productive forces adopt a new development approach. New quality productive forces are underpinned by technological innovation, reflecting the leadership of high technology in driving economic development. Since the new century, China’s economic growth has primarily been driven by investment and foreign trade, supported by real estate and infrastructure development. This conflicts with the new development philosophy, as traditional productive forces struggle to address current developmental challenges. A new wave of technological and industrial revolutions, led by artificial intelligence, bioenergy, deep-sea exploration, and space technology, is emerging, bringing uncertainties in technological development trajectories and global industrial competition. New quality productive forces emphasize addressing major economic and social issues through original and disruptive technological breakthroughs. They integrate information technology, digital intelligence, and advanced algorithms with traditional industries, creating high-tech industries that serve as new economic growth poles. This is manifested in significant improvement in total factor productivity. New quality productive forces are not merely about unidirectional technological innovation or individual industry transformation. Fundamentally, they represent the rise of new products, new business models, and new drivers of growth. They embody a new form of productive forces that lead high-quality development through technological innovation, showcasing a technology-driven development approach (He, 2024).

3. Scientific and Technological Innovation is the Key to New Quality Productive Forces

During the 11th collective study session of the Political Bureau of the CPC Central Committee, President Xi Jinping emphasized that technological innovation

can give rise to new industries, new models, and new drivers of growth, serving as the core element in developing new quality productive forces. Since the 18th National Congress of the Communist Party of China, the Party Central Committee has consistently prioritized technological innovation, adhering to the principle that science and technology are the primary productive forces. Technological innovation has been elevated to a new height in driving economic development and social progress, with coordinated efforts to advance various scientific and technological initiatives. Therefore, China has a solid foundation for developing new quality productive forces supported by technological innovation.

3.1. Scientific and Technological Innovation is the Mechanism that Leads to New Quality Productive Forces

Productive forces refer to the capacity to produce goods through various production factors such as laborers, means of labor, and objects of labor. This process is manifested as laborers utilizing means of labor to act upon objects of labor, with the metrics being the extent to which human needs are satisfied. President Xi Jinping emphasized: “New quality productive forces are dominated by innovation” and “represent an advanced form of productive forces characterized by the leap of laborers, means of labor, objects of labor, and their optimal combinations.”¹ This discourse not only adheres to the general principles of Marxist theories on productive forces but also aligns with the new requirements of China’s current economic development situation. It represents the integration of Marxist theories on productive forces with contemporary Chinese economic growth practices. The magnitude of productive forces depends on the quantity, quality, and combinations of production factors. Achieving new quality productive forces requires new types of laborers, new types of labor tools, new types of labor objects, and an efficient factor combination structure. Technological innovation supports the formation of new quality productive forces by promoting the extension and optimization of factor combinations, which in turn act on these three elements. Specifically, it manifests as:

First, scientific and technological innovation promotes the all-round development of new types of laborers. The primary factor in forming new quality productive forces is high-quality laborers, as technological innovation enhances their ability to understand and transform nature. In traditional production, laborers primarily engage in repetitive and simple labor, reflecting a production model driven by the quantity of labor. In contrast, new quality productive forces require that laborers possess the ability to create and utilize new types of labor tools and apply them to new types of labor objects. These laborers are applied talents with innovative thinking, representing transformation in labor quality. On the one hand, green technologies within technological innovation, aimed at achieving harmonious coexistence between humans

and nature, reshape laborers' understanding of the natural world, economic processes, and the relationship between humans and nature. They realize the need to rationally utilize natural resources and integrate sustainable development concepts such as green operations, green production, and green management throughout the entire production and operation process to reduce environmental impact and achieve goals of economic, environmental, and social benefits. On the other hand, digital technologies enabled by the technological innovation enhance the practical capabilities of new types of laborers and improve labor productivity. Digitization fosters closer collaboration among new types of laborers with the scale of collaboration continuously expanding, showing trends of cross-disciplinary, cross-industry, and cross-enterprise cooperation (Cui, 2023).

Second, scientific and technological innovation gives rise to innovation in the means of labor. The means of labor are an important indicator of the level of development of social productive forces (Liu, 2024). The means of labor in different eras reflect the production level of that era, such as iron tools in the agricultural age and semi-automated machinery in the information age. The innovation of means of labor directly reflects the rapid rise in the level of productive forces. Therefore, new quality productive forces are directly manifested in new types of means of labor. The creation and innovation of new means of labor are both the driving force of new quality productive forces and significant marker of their formation. Technological innovation provides strong technical support for the research and development of new types of means of labor. In an era of accelerating technological reform, technological innovation has brought cutting-edge technologies such as artificial intelligence and the Internet of Things, leading to the continuous emergence of new types of means of labor like embedded sensors, computing power, and cloud servers. At the level of digital means of labor, the combination of massive data information and powerful computing capabilities enables the in-depth research and application of new processes and technologies through machine learning and deep learning. This has successfully led to the development of a series of intelligent, automated, and high-tech means of labor, such as intelligent robots and intelligent production lines. The emergence of digital means of labor has significantly improved production efficiency, reduced production costs, and continuously enhanced production quality, promoting social progress (Zhao *et al.*, 2021). Green and low-carbon technologies have driven the formation of new types of means of labor, such as new energy sources, new materials, and green intelligent equipment.

Third, scientific and technological innovation expands the object of labor. The object of labor refers to the target on which laborers apply their tools during the production process. The object of labor can be either physical objects or non-physical objects. In traditional production, the object of labor is typically concrete, tangible physical objects, often consisting of natural materials or roughly processed

materials. Technological innovation, driven by digitization, scientific advancement, and intelligentization, significantly expands the boundaries of the object of labor in production. On the one hand, technological innovation greatly enhances humanity's ability to understand natural laws and adapt to the natural environment, enabling the exploration of emerging fields such as oceans, polar regions, deserts, and space, and transforming them into objects of labor. On the other hand, massive amounts of data and rich knowledge are being processed and utilized with remarkable efficiency, giving rise to data as a new form of labor. Technological innovations in artificial intelligence, big data, information technology, and new energy lays the technical foundation for knowledge, computing power, and data to become new types of objects of labor. This greatly expands the forms of the object of labor, enabling the application of new objects of labor to achieve intelligent and personalized services. This significantly enhances the efficiency of resource allocation, contributes to the improvement of people's living standards, and supports the governance of the economy and society, thereby accelerating the formation of new quality productive forces.

Fourth, scientific and technological innovation gives birth to new organizational forms and improves the efficiency of factor combination. On the basis of given factor supplies, new quality productive forces enhance product quality and increase quantity to meet the growing high-level demands of people in the new era. Science and technology are both independent production factors and elements that can form production relations aligned with the current level of productive forces and promote the effective combination of various production factors. At this stage, China is in the middle and later phases of industrialization and urbanization, with production organization methods across various sectors characterized by standardization, integration, and scale, reflecting economic principles such as economies of scale, cluster economies, and diminishing marginal returns. The continuous emergence of disruptive information technologies such as artificial intelligence, big data, and cloud computing drives the transformation of traditional production organization models toward automation, digitization, and intelligentization, giving rise to new forms of production organization. This achieves deep integration of the real economy with the digital economy, significantly improving resource utilization efficiency. Digital technologies and platforms centered on “data + algorithms + computing power” utilize their big data elements and powerful computing capabilities to achieve targeted matching between demand-side participants and laborers, activating the cross-side network effects of platform models. Platform economy becomes the new business model that transforms enterprise production and supply-demand connecting methods (Xu *et al.*, 2024).

3.2. Technological Innovation Promotes an Industrial Structure that Supports New Quality Productive Forces

The material carrier of new quality productive forces is industry. Currently, the fourth industrial revolution is on the rise, and the importance of technology in production activities is becoming increasingly prominent. Only by achieving breakthroughs in foundational, disruptive, and cutting-edge scientific and technological innovations and implementing them in industrial production can productive forces undergo transformation from quantitative to qualitative change—transitioning from traditional productive forces to new quality productive forces (Ren and Dou, 2024). Technological innovation is the core driving force of new quality productive forces. By continuously breaking through the constraints of traditional technologies, it promotes the development of emerging industries, fosters future industries, and constructs modern industrial systems, leading the new trends of economic and social development. This results in an industrial structure characterized by greening, intelligentization, and scientific advancement.

First, the industrialization of scientific and technological achievements will promote the greening and intellectualization of traditional industries. New quality productive forces can effectively address prominent issues in traditional manufacturing, such as insufficient innovation capacity, excess capacity in backward production, and massive energy consumption. Traditional industries like coal, steel, and chemicals, due to their high energy consumption, severe pollution, and outdated production methods, face significant excess of low-end capacity during the high-quality development phase. There is an urgent need to integrate and upgrade these industries with the achievements of technological innovation. President Xi Jinping pointed out: “Developing new quality productive forces does not mean neglecting or abandoning traditional industries. It is necessary to prevent rush to action and bubbles, and to avoid adopting single model.”¹ The modern industrial system is built on the foundation of traditional industries. By integrating with advanced technologies, traditional industries can be upgraded and transformed into emerging industries, such as new energy vehicles and new materials. In the digital economy, data elements require real industries as carriers to fulfill their role as production factors. The combination of digitization and traditional industries gives rise to industrial digitization and digital industrialization, demonstrating strong competitiveness.

The penetration and application of technological innovation achievements can bring about technological revolutions in traditional industries, empowering them with

¹ “Xi Jinping emphasized during the deliberation with the Jiangsu delegation: Develop new quality productive forces according to local conditions”. China Government Network, March 5, 2024.

new competitive advantages. The digital revolution drives the transformation and upgrading of traditional industries, promoting the optimal combination of laborers, means of labor, and objects of labor, thereby endowing traditional industries with intelligent and green characteristics. Technologies such as artificial intelligence and big data are applied to production lines and logistics, driving traditional industries to adopt new production methods and supporting the improvement of total factor productivity. Taking agricultural production as an example, the application of high-tech elements such as intelligentization, scientific advancement, and digitization in agriculture—through the introduction of new technologies and equipment—optimizes the combination of production factors like labor, land, and capital. This drives qualitative leap in agricultural productivity and empowers high-quality agricultural development (Ma and Yang, 2024). The innovation and application of green and low-carbon technologies give rise to a large number of green production tools, promoting the optimization of traditional industrial processes, reducing the waste of production materials, and lowering dependence on natural resources. This endows industries with green and efficient characteristics.

Second, breakthroughs in core technologies create emerging industries and nurture future industries. Technological innovation will drive industrial transformation, giving rise to a series of emerging industries and nurturing future industries. The industrial structure will exhibit characteristics centered on high and new technologies. The emergence of original and disruptive technologies will change the methods and approaches of socio-economic production, as well as enhance product added value, business models, and promote the birth of new products, triggering new demands. This will fundamentally generate high-quality new demands and supplies, forming a virtuous cycle of high-level supply matching demand. Breakthroughs in key digital information technologies such as artificial intelligence, quantum information, the Internet of Things, the metaverse, and humanoid robots, along with the rise of related industries, will accelerate the emergence of new industries, new drivers of growth, and new business models in economic activities. This will propel China into a new stage of high-quality development with great strides.

Compared to traditional industries, emerging industries represent the new force in the growth phase, with their key characteristic being vitality. They exhibit features such as rapid development speed and significant market potential. Emerging industries typically have high technological content and added value, capable of generating substantial economic spillover effects. This helps drive the transformation and upgrading of China's industrial structure, achieving high-quality and sustainable economic development. Currently, China has made significant breakthroughs in areas such as artificial intelligence algorithms, chip technology, autonomous driving, new energy, and new materials. With the maturity of artificial intelligence and new energy technologies, industries like big data and new energy vehicles have emerged,

driving China's economic growth. In the global context of green and low-carbon development, the new energy industry becomes new growth pole for China's economy. In 2023, China's foreign trade "new trio"—new energy vehicles, lithium batteries, and photovoltaic products—collectively exceeded the trillion-yuan mark in exports. Among them, the production and sales of new energy vehicles both surpassed 9 million units, maintaining China's position as the global leader for nine consecutive years (Jin, 2024). Emerging industries dominated by digital technology and information communication technology will empower various production processes through the multiplier diffusion effect of digital information—from foundational infrastructure to application scenarios. This will activate product distribution, transportation, and consumption processes, enabling their leading role over other industries and enhancing the value of industrial chains. Strategic emerging industries and future industries driven by technological innovation, centered on information technology, semiconductor materials, and green low-carbon technologies, mark the direction of the new generation of technological and industrial revolutions. They are key areas for China to develop new quality productive forces and build modern industrial system. The strategic emerging industries and future industries is becoming a new growth pole, injecting momentum into high-quality development and significantly improving the modernization level of the industrial system.

4. Global Effect of New Quality Productive Forces

The formation and development of new quality productive forces require open and shared production relations to refine and complement them. To achieve the implementation of new quality productive forces at the industrial level and fully unleash their potential, production relations must align with the development level of productive forces (Huang and Sheng, 2024). In the context of economic globalization today, continuously expanding openness provides core elements such as talent, technology, and knowledge for the formation of new quality productive forces, accelerating the exchange of advanced technologies. Sharing is the inherent pursuit of new quality productive forces. They aim to grow and fairly distribute the pie, ensuring that people worldwide can benefit. Through sustained open policies, new quality productive forces help latecomer countries achieve transformative leaps in traditional productive forces, enhance their position in the global value chain, and drive economic recovery with high and new technologies as core elements. This represents China's noble contribution to the world, particularly to developing countries, demonstrating its responsibility as a big economy and its global vision in aligning its advanced productive forces concepts with world economic development.

4.1. New Quality Productive Forces Enhance the Status of Industrial Chains in Developing Countries

For a long time, in the global industrial chain, developed countries have undertaken high-value-added segments such as product research and development and the production of core components, while developing countries have been responsible for low-value-added segments such as raw material supply, simple reprocessing, and product assembly (Liang and Li, 2024). Developed countries solidify the low-end position of developing countries in the global value chain through methods like technology lock-in and multinational corporation embedding. Currently, the global industrial and supply chains are shifting from focusing on production efficiency and profit pursuit to emphasizing self-reliance, industrial resilience, and political factors. The global trade network is exhibiting characteristics of regionalization, diversification, localization, and fragmentation (Wang *et al.*, 2024). The reshoring of multinational corporations from developed countries causes significant shocks to the domestic supply chains of developing countries—often resulting in the loss of core nodes in production networks and leading to disruptions in production chains (Lun *et al.*, 2023). Multinational corporations possess strong purchasing power and often occupy core positions in the industrial chains of developing countries. The reshoring of these corporations directly affects upstream suppliers and extends to secondary suppliers, triggering chain reactions. Additionally, the dissemination of knowledge and technology relies on enterprises as carriers. Multinational corporations typically possess cutting-edge technologies and advanced knowledge, and their reshoring blocks the pathways for knowledge dissemination. This significantly increases the cost for other enterprises in the industrial chain to acquire knowledge (Jiang and Li, 2023). Exploring feasible paths for developing countries to avoid low-end value chain lock-in, move toward the mid-to-high end of the global value chain, achieve value chain climbing, and enhance international competitiveness becomes an urgent issue in global governance.

Open and shared production relations, while emphasizing independent innovation, also adhere to high-level openness, enhance the scale of trade cooperation and investment, and create a favorable international trade environment. By actively engaging in high-level scientific research collaboration, encouraging large enterprises to establish branches overseas, particularly in developing countries, and implementing strategic cooperation with key smaller nations, cutting-edge technologies can flow to developing countries, narrowing the technological gap between them and developed countries. This enables developing countries to deeply embed themselves in the global industrial chain, integrate into the global innovation network, and achieve low-end industrial chain transformation. Promoting domestic enterprises to “go global” utilizes their industrial chain and production capacity advantages to repair the fragmentation

of production networks caused by multinational corporations' reshoring, accelerate knowledge dissemination, and assist developing countries in building their own industrial systems and upgrading their industrial chains. At the level of international trade, the formation of China's new quality productive forces not only enhances domestic product quality but also brings technology spillover effects to trading partners. In the process of restructuring global industrial chains and establishing open, equal, and shared international trade rules led by China, technology-intensive industries centered on new quality productive forces will generate demonstration effects on developing countries through trade activities. This will accelerate the diffusion and application of high and new technologies, enabling developing countries' industries to exhibit intelligent and digital characteristics, achieve industrial structure transformation and upgrading, and improve infrastructure. Additionally, the process of China forming new quality productive forces will inspire developing countries to prioritize the virtuous cycle of key resources such as technology, education, and talent, cultivate high-tech industries, break the inherent comparative advantages of developed countries, and continuously expand openness while adhering to independent innovation. By protecting the rights and interests of foreign investment in accordance with the law and learning from and drawing on best practices, developing countries can promote economic growth and enhance the resilience of their industrial chains (Zhao, 2024).

In China's continuous efforts to open up, the "Belt and Road" platform has played an increasingly significant role in promoting industrial upgrading in developing countries through the flow of science and technology. Green technologies and digital technologies are essential components of new quality productive forces. In terms of green technologies, as of 2023, China has signed environmental protection cooperation agreements with over 30 countries and international organizations, jointly initiated the "Belt and Road" Green Development Partnership Initiative with 31 countries, established the "Belt and Road" Green Development International Alliance with more than 150 partners from over 40 countries, and formed the "Belt and Road" Energy Partnership with 32 countries to accelerate the sharing of cutting-edge green technologies. These efforts aim to collaborate with various developing countries to achieve industrial greening.¹ In terms of digital technologies, as of 2022, China has signed Memorandums of Understanding (MoUs) on the "Digital Silk Road" with 17 countries and MoUs on e-commerce cooperation with 30 countries. These efforts have promoted the regional dissemination of digital technologies, enabling them to impact the social reproduction processes within and among developing countries and

¹ The State Council Information Office: "Co-building the 'Belt and Road': A Major Practice in Building a Community with Shared Future for Mankind". China Government Network, October 10, 2023.

accelerating the digital transformation of industries. The dissemination of green and digital technologies helps developing countries expedite the formation of value chains centered on high-value-added emerging industries, enhances the resilience of their value chains, accelerates the process of industrial upgrading, and strengthens their position in the international division of labor.

4.2. New Quality Productive Forces Contribute to Modest Recovery of the Global Economy

The new economic growth driven by new quality productive forces is characterized by an intensive and connotative growth pattern. New quality productive forces empower production factors such as laborers, means of labor, and objects of labor, achieving optimal allocation of resources through intelligent, green, intensive, and efficient emerging technologies. This significantly enhances total factor productivity, not only serving as an intrinsic requirement and important driver for promoting high-quality economic development in China, but also injecting new momentum into global economic growth. The core support for economic globalization and the progress of human society lies in the continuous iteration and renewal of productive forces. As a new round of industrial and technological revolutions emerges, breakthroughs and applications in science and information technology further emphasize the importance of developing productive forces. China's accelerated formation of new quality productive forces can both create future industries through high-end technologies and transform traditional industries through intelligent and green methods, promoting coordinated and sustainable economic development. This is both responsibility that China, as a big economy, should shoulder and an inevitable choice for building a community with a shared future for mankind.

The essence of new quality productive forces lies in achieving disruptive and original technological breakthroughs and applying them to industrial production processes, as well as fostering future high-value-added industries, emphasizing shift in economic development paradigms. Unwaveringly implementing open policies, building high-level open economic system, and engaging in global governance with the concept of a community with a shared future for mankind will enhance the resilience of global economic development, accelerate global innovation, and facilitate the rapid diffusion of new quality productive forces. On the supply side, by promoting the "Belt and Road" international cooperation platform and maintaining continuous high-level openness, production factors can flow freely, resources can be allocated effectively, and sharing mechanisms for information resources, scientific talent, data elements, and innovation platforms can be established. This will enable disruptive, original, and foundational industries to play a leading role in the global economy, accelerating the rapid development of new industrial clusters and future industrial clusters among

countries. On the demand side, new quality productive forces driven by knowledge, technology, and computing power will reshape people's demand baskets. High-quality, high-standard products will become major component of the demand of China's middle class, and the potential consumer demand generated by the large population will encourage global enterprises to transform, exhibiting characteristics of innovation, green development, and intelligence. This will create new job opportunities and promote the common development of China and the world economy.

International cooperation in sharing the latest research achievements and promoting the transfer of high and new technologies is conducive to the sustained improvement of the global economy. The globalization driven by digital technologies and the digital economy is flourishing, becoming an important driving force for global economic growth and the promotion of international economic and trade cooperation (Liang and Jiao, 2022). China's innovative development and application of achievements in artificial intelligence, new energy, and quantum information inject momentum into the vigorous development of related industries worldwide. In 2022, the scale of China's digital economy reached 50.2 trillion yuan, accounting for 41.5% of GDP, and the number of international patent applications in the information field reached 32,000.¹ New quality productive forces, through high-level open strategies, contribute to the expansion of markets, enhance the international competitiveness of enterprises in various countries, support the continuous innovation and development of foreign trade, and provide high-quality growth poles for the world economy. Peace, stability, and common prosperity are the common aspirations of the international community, the shared wishes of people around the world, and the essential essence of a community with a shared future for mankind.

5. Conclusions and Policy Recommendations

The concept of new quality productive forces proposed by President Xi Jinping is an important pathway for China to promote high-quality economic development and achieve the Chinese path to modernization. Technological innovation fosters the formation of new quality productive forces through the discovery of fundamental theories, the achievement of disruptive technological breakthroughs, and the penetration of scientific and technological achievements. This generates new types of laborers, new labor tools, and new labor objects, which are organically combined and applied through industrial systems to transform traditional industries, drive emerging industries, and nurture future industries. As a result, the industrial system exhibits characteristics of greening, digitization, scientific advancement, and the application

¹ Refer to the "Digital China Development Report (2022)" released by the Cyberspace Administration of China.

of new quality productive forces. Achieving new quality productive forces requires open and shared production relations, which means that the formation of China's new quality productive forces will accelerate the flow of cutting-edge technologies, promote the transformation and upgrading of industries in developing countries, and enhance their position in the global industrial and value chains. At the same time, China's continuously open policies share its vast domestic market with the world, enabling the global application of scientific and technological achievements, supporting global economic recovery, and making Chinese contributions to global economic growth. In terms of policy, it is essential to strengthen fundamental theoretical research, achieve breakthroughs in original achievements, actively seize the high ground in technological competition and future development, and address difficulties and bottlenecks in the transformation of scientific and technological achievements.

5.1. Actively Seize the Commanding Heights of Science and Technology and Promote the Formation of New Quality Productive Forces

The core of new quality productive forces lies in achieving key and disruptive technological breakthroughs, which are essential for driving systemic change. The high ground in technology typically refers to the pinnacle in frontier fields, the critical points in innovation chains, and the control points in innovation systems. Accelerating the seizure of the high ground in technology helps drive the systemic formation of new quality productive forces through point breakthroughs. In the current context of dramatic changes in the world landscape, relying solely on learning and imitation can no longer secure cutting-edge core technologies. China's production security faces severe threats, and only by mastering core technologies can the country achieve the climbing of industrial added-value in the new round of industrial revolution, overcome bottleneck challenges, and fundamentally ensure the stable development of the national economy.

On the one hand, it is essential to strengthen the centralized and unified leadership of the Party and utilize the advantages of the national system. Scientific research and development resources should be integrated, improving R&D efficiency, and addressing bottlenecks and pain points in the research and development process. On the other hand, it is crucial to strengthen basic research and achieve breakthroughs in key core technologies. This involves optimizing the layout of basic disciplines, supporting the integration of various disciplinary systems, increasing investment in basic research, and ensuring financial support. Encouraging financial institutions to provide funding for fields with potentially major original achievements is also necessary. Guided by national strategic needs, it is important to persist in focusing on the frontiers of global science and technology, determine scientific research directions based on the urgent needs of the nation and its people, and resolutely break the monopolies of Western countries in certain technological fields.

5.2. Promote the Industrialization of Scientific and Technological Achievements, and Build Scientific and Technological Innovation System with New Quality Productive Forces

Strengthening the close integration of technological innovation achievements with industries is an important lever for achieving the greening and digital transformation of the industrial system. Breakthroughs in technological innovation significantly enhance total factor productivity. By applying scientific and technological achievements to industries, the depth of traditional industrial chains is explored, the length of new industrial chains is extended, and future industrial chains are derived. Currently, there are clear shortcomings and weaknesses in the integration of industry, academia, and research in China: Enterprises are reluctant to join the innovation and R&D process due to insufficient confidence in achieving breakthroughs in key production technologies; Schools and R&D institutions conduct research guided by the evaluation of professional titles, and the R&D results are detached from actual production; and there is a lack of appropriate benefit-sharing mechanisms for innovation achievements. It is essential to strengthen the transformation of scientific and technological achievements, deepen the integration of industry, academia, and research, industrialize advanced productive forces, and accelerate the construction of modern industrial system dominated by emerging and future industries. Enterprises should be persistently regarded as the main body of innovation, and innovation policies should be implemented to encourage enterprises to increase investment in innovation and R&D, promote the implementation of scientific and technological achievements. The government should actively promote collaborative research among enterprises, universities and research institutions, break down information barriers, improve the evaluation system for university faculty, accelerate the construction of scientific and technological achievement trading platforms, and promote the flow of scientific and technological achievements to form synergy among industry, academia, and research. It is also necessary to improve the patent protection system for enterprises, strengthen intellectual property protection, enhance the precision of intellectual property protection laws, and strengthen the protection of intangible assets. A relaxed innovation environment should be created by combining national problem orientation and socio-economic effects, establishing multi-stage dynamic evaluation system and diverse evaluation indicators, and improving the management mechanisms of research institutions. Researchers should be allowed and encouraged to “sit on the cold bench” and “study unpopular disciplines”.

5.3. Actively Build an Open Innovation System and Promote the Globalization of New Quality Productive Forces

Against the backdrop of the rapid development of the knowledge economy and

modern information technology, the economies of various countries are closely interconnected, sharing both the benefits and risks of economic globalization. The concept of new quality productive forces proposed by President Xi Jinping offers Chinese wisdom for global governance and injects new momentum into global economic growth. This concept also relies on close connections and cooperation with countries around the world. It is essential to build an open innovation system, actively foster open and collaborative domestic and international research environment, expand cooperation channels, and create international cooperation platforms to integrate innovative resources from around the world, achieving resource sharing and complementary advantages. While actively learning from and adopting advanced foreign technologies and management experiences, we should utilize our strengths as a big economy to attract global innovation resources and talent, thereby enhancing our position in the global innovation system. We must actively uphold multilateralism, firmly oppose unilateralism, decoupling, and supply chain disruptions, and promote the global flow of scientific and technological innovation elements. By driving innovation levels in countries along the “Belt and Road” and deepening international scientific and technological innovation cooperation through high-quality joint construction of the “Belt and Road”, we can continuously contribute to the realization of a community with a shared future for mankind.

References

- Cui, Y. (2023). An Analysis of Digital Technology Promoting the Development of New Quality Productive Forces. *World Socialism Studies (Shijie Shehuizhuyi Yanjiu)*, 8(12), 97–109.
- Du, C., Shu, S., & Li, Z. (2023). Mechanism Path of New Quality Productive Forces in Promoting High-Quality Economic Development. *Economic Review Journal (Jingji Zongheng)*, (12), 20–28.
- Gao, F. (2023). The Logic, Multidimensional Connotation, and Era Significance of “New Quality Productive Forces”. *China Review of Political Economy (Zhengzhi Jingjixue Pinglun)*, (6), 127–145.
- Han, W., Zhang, R., & Zhao, F. (2024). The Measurement of New Quality Productive Forces Levels and New Driving forces of Chinese Economy. *Journal of Quantitative & Technical Economics (Shuliang Jingji Jishu Jingji Yanjiu)*, (6), 5–25.
- He, J. (2024). The Theoretical Gap in the Study of New Quality Productive Forces and the Economic Analytical Perspective of “Heterogeneity”. *China Finance and Economic Review*, 13(4), 59–75.
- Huang, Q., & Sheng, F. (2024). The New Quality Productive Forces System: Factor

- Characteristics, Structural Bearings, and Functional Orientations. *Reform (Gaige)*, (2), 15–24.
- Jia, R., Wang, J., & Dou, H. (2024). Promoting High-Quality Regional Development with New Quality Productive Forces. *Reform (Gaige)*, (3), 38–47.
- Jiang, N., & Li, X. (2023). Geographical Distribution of Overseas Subsidiaries, Regional Intellectual Property Protection, and Enterprise Innovation. *World Economy Studies (Shijie Jingji Yanjiu)*, (2), 50–65.
- Jin, D. (2024). The Development of China's New Energy Industry is a Global Contribution and Opportunity. *People's Daily (Renmin Ribao)*, June 7, 2024.
- Liang, H., & Jiao, S. (2022). Research on Digital Economy Cooperation and Regional Economic Governance under the RCEP Framework. *Journal of International Economic Cooperation (Guoji Jingji Hezuo)*, (4), 4–13.
- Liang, H., & Li, L. (2024). The Logical Orientation, Development Indicators, and Strategic Path for the Basic Realization of Socialist Modernization by 2035. *Journal of Beijing Administrative Institute (Beijing Xingzheng Xueyuan Xuebao)*, (1), 19–28.
- Liu, Z. (2024). New Production Relations Driven by New Quality Productive Forces: Trends, Challenges and Countermeasures. *China Finance and Economic Review*, 13(4), 45–58.
- Lun, R., Guo, H., & Pu, X. (2023). Shortening of Value Chains of International Production and Its Industry Performance, Actual Impact and China's Response. *Economic Review Journal (Jingji Zongheng)*, (2), 63–72.
- Ma, X., & Yang, X. (2024). Promoting High-Quality Agricultural Development by Accelerating the Formation of New Quality Productive Forces. *Issues in Agricultural Economy (Nongye Jingji Wenti)*, (4), 4–12.
- Meng, J., & Han, W. (2024). The Theory of New Quality Productive Forces: A Historical Materialist Interpretation. *Economic Research Journal (Jingji Yanjiu)*, (3), 29–33.
- Pu, Q., & Xiang, W. (2024). New Quality Productive Forces and Its Utilizations—New Driving Force for Chinese Path to Modernization *Journal of Xinjiang Normal University (Philosophy and Social Sciences) (Xinjiang Shifan Daxue Xuebao)*, (1), 77–85.
- Ren, B. (2024). The Logic of Modernization Transformation of Productivity Forming New Quality Productive Forces. *Economic Research Journal (Jingji Yanjiu)*, (3), 12–19.
- Ren, B., & Dou, Y. (2024). New Quality Productive Forces: Literature Review and Research Outlook. *Review of Economy and Management (Jingji yu Guanli Pinglun)*, (3), 5–16.
- Wang, F., Han, X., & Chen, R. (2024). Empowering the Modern Industrial System with New Quality Productive Forces: Intrinsic Logic and Implementation Pathways.

- Contemporary Economic Management (Dangdai Jingji Guanli)*, (6), 12–19.
- Wang, R., Chai, Z., & Lin, J. (2024). The Three New Characteristics Of China's Foreign Trade under the Spatial Reconstruction of Global Supply Chain: New Pattern, New Momentum and New Quality Productive Forces. *Journal of Chongqing University (Social Science Edition) (Chongqing Daxue Xuebao)*, (3), 18–35.
- Xu, H., Yu, Y., & Zhang, Y. (2024). Birth of the Riders: Digital Platforms, Targeted Matching, and Job Creation. *China Industrial Economics (Zhongguo Gongye Jingji)*, (4), 114–132.
- Zhao, C., Wang, W., & Li, X. (2021). How does Digital Transformation Affect the Total Factor Productivity of Enterprises. *Finance & Trade Economics (Caimao Jingji)*, (7), 114–129.
- Zhao, Z. (2024). The International Economic Significance and Implementation Pathways of New Quality Productive Forces. *Contemporary China and World (Dangdai Zhongguo yu Shijie)*, (2), 4–11.