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Research on the Prospect and Significance of China's Scientific and Technological Innovation from the Perspective of New-quality Productivity

Peng Deng*

Xinjiang Academy of Science and Technology Development Strategy, Urumqi 830011, Xinjiang, China

**Author to whom correspondence should be addressed.*

Abstract: This paper deeply explores the prospects and significance of China's scientific and technological innovation from the perspective of new-quality productivity. By analyzing the connotation, characteristics, and formation factors of new-quality productivity, this paper expounds its close connection with scientific and technological innovation. Combined with the current situation of China's scientific and technological innovation, the study analyzes the opportunities and challenges faced by China under the development trend of new-quality productivity and looks forward to the future prospects. At the same time, it elaborates on the important significance of scientific and technological innovation for China in terms of economic development, industrial upgrading, and enhancement of international competitiveness, aiming to provide theoretical support and decision-making references for better promoting scientific and technological innovation in the era of new-quality productivity.

Keywords: New-quality productivity; Scientific and technological innovation; Industrial upgrading; Economic development

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1. Introduction

The president of the CCP pointed out that new-quality productivity is an advanced form of productivity led by innovation, breaking away from traditional economic growth modes and productivity development paths, featuring high technology, high efficiency, and high quality, and conforming to the new development philosophy. With the continuous development of science and technology and the deep integration of the global economy, new-quality productivity has become a crucial force for transformation and upgrading across all sectors of society [1]. For new-quality productivity, technological empowerment is its core driving factor. Therefore, it is imperative and timely to deeply study the prospects and significance of China's scientific and technological innovation from the perspective of new-quality productivity [2].

2. Connotation and characteristics of new-quality productivity

2.1. Connotation of new-quality productivity

New-quality productivity is an advanced form of productivity with innovation at its core, where innovation is its unique symbol, and quality excellence is its core philosophy. Different from past modes of productivity development and economic growth, it is characterized by high efficiency, high technology, and high quality, in line with the new development philosophy. Its proposal represents the Chinese practice and innovation of Marxist productivity theory, reflecting the fundamental achievements of scientific and technological innovation and interdisciplinary integration. The basic connotation of new-quality productivity lies in the leapfrog development of labor tools, personnel, objects, and their optimized combination, pursuing the full improvement of total factor productivity, and embodying modern high-level productivity [3].

2.2. Characteristics of new-quality productivity

New-quality productivity is characterized by high technology, high efficiency, and high quality. High technology serves as the foundation, manifested in the application of modern science and technology to the production process—such as breakthroughs in artificial intelligence, quantum information, biotechnology, and new energy technologies—that provide new products and services to society. High efficiency means improving production efficiency, such as using new technologies and equipment to transform or replace outdated ones, substituting low-efficiency technologies or equipment with high-efficiency ones to produce the same or more products or services of higher quality. High quality refers to improving the quality of products and services. Driven by new-quality productivity, the ultimate pursuit of enterprises is to provide high-quality products or services to various end customers, especially consumers. It is this customer-demand-oriented new-quality productivity that brings market value-added and competitive advantages to enterprises' products and services [4].

3. Factors forming new-quality productivity

3.1. Leading role of scientific and technological innovation

Scientific and technological innovation plays a leading role in the formation of new-quality productivity. Innovation has taken different forms and characteristics in different eras, with unprecedented features in the current era. From institutional, ideological, and management innovation to technological and cultural innovation, these interwoven forces jointly drive the development of new-quality productivity [5]. For example, the innovative application of 5G communication technology in the information technology field has not only changed the speed and mode of information transmission but also spawned numerous new industries and business models, such as smart IoT, telemedicine, and industrial internet, greatly promoting the development of new-quality productivity.

3.2. Synergistic effect of multi-field innovation

Since the 21st century, global scientific and technological innovation has entered an unprecedentedly intensive and active period, with remarkable activity in innovation across fields such as next-generation information technology, life sciences, advanced manufacturing technology, energy technology, and space and marine technology. The innovative achievements in these fields integrate and reinforce each other, forming a powerful synergistic effect that drives the formation and development of new-quality productivity [6]. For instance, the combination of gene editing technology in life sciences with advanced manufacturing technology has brought new development opportunities to the biopharmaceutical industry. Through precise gene editing and efficient manufacturing

processes, more effective drugs can be developed to improve medical standards.

3.3. Extensive application of innovation achievements

Innovation achievements across various industries and fields are continuously and widely applied to all aspects of production and life. Never before have humans fully utilized and enjoyed innovation achievements as they do today. The application of more and more innovative achievements in practical production not only improves production efficiency and quality but also creates new market demands, drives industrial upgrading and development, and further promotes the formation of new-quality productivity [7]. Take new energy vehicles as an example: the application of innovative technologies such as battery technology and autonomous driving has gradually replaced traditional fuel-powered vehicles, becoming a new direction for the automotive industry and driving the development of related industrial chains to form a new productivity paradigm.

4. Current status of China's scientific and technological innovation

4.1. Increasing investment in science and technology

Currently, China attaches great importance to technological development and has gradually increased its investment in this field. Additionally, the introduction of relevant policies has paved the way for enterprises' scientific and technological innovation. Against this backdrop, enterprises' enthusiasm for scientific and technological innovation is continuously increasing. Meanwhile, substantial financial and policy support has provided a solid material foundation for scientific and technological innovation, effectively driving the reform and innovation of scientific equipment and technologies [8].

4.2. Remarkable scientific and technological achievements

China has achieved remarkable results in many scientific and technological fields. In aerospace, the Chang'e lunar exploration missions and the Tianwen-1 Mars mission have made significant breakthroughs, bringing China into the world's advanced ranks in deep-space exploration. In 5G communication, China's 5G technology leads the world, with the largest number of 5G base stations and users globally, driving the rapid development of the digital economy. In high-speed rail technology, China's high-speed rail has become a shining national brand with its speed, safety, and comfort, leading the world in both technical standards and operational mileage. These scientific and technological achievements have not only enhanced China's international influence but also provided strong support for the development of new-quality productivity [9].

4.3. Enhanced vitality of innovation entities

The vitality of innovation entities such as enterprises, universities, and research institutions has continuously increased. As the main body of innovation, enterprises pay more attention to research and development (R&D) investment and actively carry out technological innovation activities, with many making important progress in tackling key core technologies. Universities and research institutions play a crucial role in basic research and cutting-edge technology research, deepening industry-university-research cooperation with enterprises to accelerate the transformation and application of scientific and technological achievements. At the same time, the government has encouraged collaborative innovation among innovation entities through a series of policy measures, creating a favorable innovation ecosystem.

5. Opportunities and challenges for China's scientific and technological innovation from the perspective of new-quality productivity

5.1. Opportunities

First, with the launch of a new round of global scientific and technological revolution, digital and intelligent technologies are developing at a fast pace. Against this backdrop, people should actively participate in international scientific and technological competition and cooperation, introducing corresponding technologies and learning from other countries' experiences while focusing on independent technological innovation, especially breakthroughs in emerging technologies. Based on this, people should cultivate growth points in related technological industries to promote the development of new-quality productivity through dual-driven technological and industrial approaches [10]. For example, leveraging China's vast artificial intelligence (AI) application scenarios and data resources, international cooperation can be pursued to seek new breakthroughs in AI. Second, the development of the domestic market brings enormous opportunities for scientific and technological innovation and new productivity. Currently, people have greater demands for high-quality services and products. Against this backdrop, relevant enterprises can provide more advanced and modern products and services to achieve their own innovative development while offering more products and services for the development of new-quality productivity, thereby accelerating the pace of technological, service, and product innovation. For instance, the furniture industry can actively explore the track of digital intelligence development to develop smart home products, injecting technological innovation vitality into industry revitalization.

5.2. Challenges

First, key technologies need further breakthroughs. Although China has made continuous technological breakthroughs in recent years, it still faces acute "bottleneck" problems in some key technologies, particularly in operating systems and high-end chip manufacturing. These issues have become increasingly prominent, directly affecting the development of China's technology and related industries and posing certain risks to national economic security [11]. Therefore, scientific and technological innovation in the new era must focus on key fields to solve these bottlenecks and boost the development of new-quality productivity. Second, there is a shortage of high-quality talent. As is well known, talent is a key driver of scientific and technological innovation. However, China currently has a large gap in high-end technological talent, especially in emerging technologies. How to better support scientific and technological talent development has become a prominent issue in our current development.

6. Prospects for China's scientific and technological innovation from the perspective of new-quality productivity

6.1. Prosperous development of emerging industries

The development of new-quality productivity will further drive the reshaping and optimization of industrial structures, with a group of new industries such as quantum information, new energy, and artificial intelligence entering an unprecedented strategic opportunity period. Take the new energy industry as an example: with the advancement of the times, the global demand for green energy technologies is increasing, and accelerating the development of related technologies in this field is fundamental to reducing resource consumption and achieving sustainable economic development [12]. At the same time, AI-driven emerging industries will bring disruptive impacts to various sectors, triggering an AI innovation wave, and related industries will complete their innovative development under AI leadership.

6.2. Accelerated industrial upgrading

Scientific and technological innovation is a crucial prerequisite and driving force for industrial transformation and upgrading. In the past, industries lacked technological infusion, but with the development and innovation of advanced technologies and products such as digital intelligence, various industries will undergo a process of integration and reshaping, forming new industrial chains and clusters, and achieving better development and upgrading. Moreover, based on high starting points and high-level development, they will move toward more advanced directions. For example, the introduction of AI and big data models in manufacturing can successfully complete the digital and intelligent transformation of manufacturing, thereby improving management, production, and product quality levels.

6.3. New competition patterns under international cooperation

China now holds more and more voice in international scientific and technological cooperation and competition. On the one hand, people actively participate in international scientific and technological innovation and governance and carry out various forms of cooperation and exchanges with other countries, which significantly promotes the development of scientific and technological achievements and the exchange of scientific knowledge. On the other hand, with China's significant progress in scientific and technological innovation in certain key fields, a new international scientific and technological competition pattern is gradually taking shape. This new pattern is more credible and inclusive, demonstrating China's contributions to the global scientific and technological innovation stage and thus playing an important role in global scientific and technological innovation in the new era.

7. Significance of China's scientific and technological innovation from the perspective of new-quality productivity

7.1. Promoting high-quality economic development

Scientific and technological innovation can empower the development of new-quality productivity, improve social production efficiency, and accelerate economic development through rational resource allocation. With the characteristics of high quality, high efficiency, and high technology, new-quality productivity can renew industries, assist in their upgrading and transformation, and improve the quality and value-added of products and services, thus providing sustainable momentum for enterprises. For example, in emerging industries, scientific and technological innovation will ensure the quality of related products and services, helping to achieve high-quality economic development [13].

7.2. Enhancing industrial competitiveness

Scientific and technological innovation continuously drives the upgrading of social industries to high-end levels, producing positive effects on enhancing industrial competitiveness. Under the influence of new-quality productivity with new production methods, technological innovation and management innovation help enterprises reduce operating costs, increase the value of products or services, and gain competitive advantages. Additionally, scientific and technological innovation promotes the development of new business formats and models [14]. For instance, guided by science and technology, the new energy vehicle industry has gradually expanded its development space, and breakthroughs in areas such as autonomous driving and battery capacity have greatly assisted enterprises in this field, significantly enhancing industrial competitiveness.

7.3. Safeguarding national security and strategic interests

With the increasingly complex international situation, scientific and technological innovation remains a core element in safeguarding national security and strategic interests [15]. For example, in critical industries such as semiconductors, only by strengthening independent innovation can people break through bottlenecks; relying on foreign technologies would leave people completely vulnerable to others. The gradual replacement of foreign-related products with a new generation of domestically developed and controllable chips has significantly reduced the dependence on foreign technologies, undoubtedly ensuring national information security and avoiding impacts on the country's strategic interests.

7.4. Meeting people's needs for a better life

The essential purpose of scientific and technological innovation is to meet people's needs and promote better survival and living conditions. In the medical and health field, for example, scientific and technological innovation can help make new breakthroughs in medical technology and careers, thereby solving more difficult medical problems and safeguarding public health. In the education field, technological development has also provided new opportunities for educational reforms at all stages, particularly the application of big data and AI technologies, which have greatly assisted students' learning and growth, promoted educational equity, and satisfied people's needs for education.

8. Conclusion

In summary, under the background of new-quality productivity, China's scientific and technological innovation faces new opportunities and challenges. Overall, the prospects for China's scientific and technological innovation are very broad, especially with the drive of scientific and technological innovation, the gradual formation of new industrial structures, the accelerated trend of industrial upgrading, and the gradual shaping of international cooperation and competition patterns. China should increase investment in science and technology, deeply cultivate key technological fields, and cultivate more high-quality scientific and technological innovation talents, thereby leveraging their important role in promoting the development of new-quality productivity, contributing to the healthy development of the social economy, and gaining strategic initiative in international competition.

Disclosure statement

The author declares no conflict of interest.

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