The Value of New Quality Productive Forces and its Epochal Connotation under the Perspective of Scientific and Technological Revolution

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Abstract: *New quality productivity is not only reflected in the new machines and new equipment and other tools and equipment, but also reflected in the scientific and technological revolution and innovation. The scientific and technological revolution has promoted the development of new quality productive forces and changed people's productive and living mode, improving production efficiency, innovating living patterns and bringing new vitality into economic and social progress. The development of new quality productive forces not only lies in innovating material production and improving economic efficiency, but also in promoting industrial upgrading, efficient utilization of resources, high-quality economic development, the modernization of national governance, the reconstruction of production relations and the harmony and beauty between human beings and nature.*

Keywords: *scientific and technological revolution; new quality productivity; value; epochal conn otation*

Introduction

New quality productivity is characterized by innovation, especially technological innovation. The scientific and technological revolution not only motivates new quality productivity, but also determines its form. It is of great practical significance to trace back to the history of the scientific and technological revolution and its impact on productivity, and explore the role of digital technology in the advancement of contemporary productivity and its implications for the times.

1. Review of the existing relevant studies

The term of new quality productivity is new, however, as an important force to promote hi gh-quality development, there is abundant research on it, mainly focusing on following aspects.

1.1 Research on new quality productivity from the perspective of productivity and productive relations

As for the new quality productive forces, Ren Baoping (2024) believes that it answers the questions of the modernization and transformation of productive forces in a scientific way as the latest manifestation proposed by the world, the era and China.[1] Liu Liang (2024) pointed out that the new quality productivity uses advanced technologies to create new industries, new model and new driving forces, forming new productive forces, and the other is the high-quality development by high-tech, high efficiency, high-quality. As for the new production relations, Liu Wenxiang (2024) believes that it is the self-improvement of the socialist productive relations with Chinese characteristics, aiming at reforming the system restricting the development of new quality productive forces and promoting the development of new quality productive forces.[2] Ye Fangqing (2024) believes that the development of new quality productive forces must be combined with advanced productive relations. Zhao Zhenhua (2024) proposed to shape the new quality productive relations adapting to the new quality productivity. These studies have promoted the combination of Marxist theory of production with Chinese reality.

1.2 Research on new quality productivity in the perspective of industrial system

Liu Zhibiao et al. (2024) believe that the modern industrial system is an industrial system with intensive knowledge and technology, strong innovative ability and high added value rate, which contains the requirements for the coordination of different industrial forms. Developing new quality productive forces should not only expand emerging industries and cultivate future industries, but also pay attention to the transformation and upgrading of traditional industries.[3] Zhang Yifan et al. (2024) believe that digital technology both improves the efficiency and quality of existing production methods and promotes the optimization and upgrading of the industrial structure.[4] New quality productive forces help industrial transformation and upgrading, while asking for the upgrading of industrial and supply chains, and promoting the high-end, intelligent and green development of traditional industries.

1.3 Research on new quality productivity in the perspective of production factors

Qiao Qian et al. (2024) believe that science and technology penetrate into labor materials, labor objects, workers and other factors of production, promoting the production division and cooperation, and the improvement of organization and management, leading to the intelligent and diversified combination between people and people, people and things and things, forming new quality productive forces.[5] Liu Liang (2024) believes that the new quality productivity needs to optimize the combination of production factors to achieve a leap in productivity level. Zhan Yubo (2024) believes that new quality productivity provides new opportunities and new market environment for factors of production, promoting the improvement of factor productivity and sharing high-quality development. Xu Fei and Qi Chengshuang (2024) proposed that the development of new quality productive forces demands to deepen the market-oriented reform of factors, stimulate the vitality of advanced production factors such as data, technology, management and resources, and make data playing a part in multiplier effect of the values brought about by traditional production factors as land, labor and capital. New quality productive forces are innovation-led productive forces, which are not only manifested as the technological revolutionary breakthroughs, but also as the innovative allocation of production factors. The qualitative improvement of the three major production factors is the key to the new quality productivity.

1.4 Research on new quality productivity in the perspective of ecological civilization

Zhan Yubo, Zhou Fengqi (2024) and others believe that the development of new productive forces means an important direction of innovation and green development, and new productive forces itself is green productivity. Qi Jifan (2024) believes that new quality productivity is the productive force of green and low-carbon development which focuses on scientific and technological innovation, promotes the efficient utilization of resources and the development of environment-friendly industries.[6] Zhou Yong (2024) believes that the new quality productivity itself is green productivity. It is of great significance to build a new pattern of green development, promote the overall social green development on the basis of ecology, help to build a "beautiful China", and promote the green transformation of production technology and achieve the "double carbon" goal.[7]

In addition, there are researches done from the perspective of high-quality talents. The new quality productive forces requires the workers turn to higher-qualified strategic talents and applied talents. Xu Fei, Qi Chengshuang (2024) believe that it is necessary to improve the mechanism of talent training, introduction, utilizaiton, evaluation and rational flow, deepen the two-way empowerment between human intelligence and artificial intelligence, and build harmonious labor relations. New quality productivity is new in innovation, and talent is the most active and positive innovation factors, therefore, it needs knowledge-based, skilled, innovative and high-qualified technical personnel team.

2. The "quality" of productivity determined by Science and technology

Among the factors influencing productivity, scientific and technological revolution, innovative allocation of production factors and industrial transformation and upgrading are all crucial. However, science and technology is the primary productive force, for the high-end, intelligent and green industry and the high efficiency, modernization and ecological production all rely on new technologies. Contemporary scientific and technological revolution and the new achievements of digitalization and intelligent production determine the quality of new productive forces.

2.1 The scientific and technological revolution is the fundamental driving force for the development of the productive forces

The first scientific and technological revolution, which began in the middle of the 18th century, was marked by the invention and use of the steam engine, and the mechanical power replaced the labor force, creating more material wealth than that in thousands of years in the human society. The second scientific and technological revolution began in the 1870s, was marked by the wide application of electric power and internal combustion engine. The human society entered the era of electrification, promoting the development of social productive forces. The third scientific and technological revolution, which began in the 1940s, was marked by the application of nuclear energy, computers and space technology. Science and technology liberated human brain power and greatly promoted the development of productive forces.

2.2 The revolutionary role of digital technology, artificial intelligence and other scientific and technological innovations on the new quality of productive forces

When there is breakthrough and qualitative change in the key science and technology, it will inevitably cause the change of the core elements of productive forces to form new quality productive forces.[8] Marx pointed out in Das Kapital that the large-scale mechanized industry made the creation of wealth mainly depend on "the general level of science and technological progress, or on the application of science in production".[9] The "quality" of productivity depends on scientific and technological innovation.

2.2.1 Scientific and technological innovation promotes the innovative allocation of factors of production

Different developing levels of productive forces correspond to different production technological requirements and corresponding production organization forms, forming different combination and allocation of production factors. The data in the new quality productivity is different from the traditional factors of production such as land and capital. The use of it is non-rivalry which means used by someone does not reduce the use of others. At the same time, general factors can only promote the improvement of production factors when combined and interwoven with other factors in a cheap way, but data analysis such as big data and artificial intelligence can bring about multiplier effect to promote economic growth. In addition, the integration of data with production factors such as land and labor force has a geometric impact on the economy.

2.2.2 Scientific and technological innovation shapes new production relations adapted to new quality productive forces

It is necessary to deepen reform and form a new type of production relations to match the development of new quality productive forces. New quality productive forces is a qualitative leap of productive forces, and the relationship between people, people and things has changed. In particular, "new technology" poses challenges to the existing production relations, affecting production, circulation, and consumption, and requiring the reconstruction of production relations to adapt to the new productive forces. Throughout the history, each scientific and technological revolution brings about the reform and evolution logic of "science and technology- -productive forces- -production relations". Scientific and technological innovation requires change the production relations positively to adapt to the development of new quality productive forces.

2.2.3 Scientific and technological innovation improves total factor productivity

The improvement of total factor productivity caused by scientific and technological innovation is mainly reflected in the basic research and applied research. As far as basic research is concerned, it improves total factor productivity through labor quality improvement and knowledge penetration. Scientific and technological innovation in basic research requires the labor force with the consciousness and ability of innovation, and uses big data and artificial intelligence to improve the quality of labor force and total factor productivity. The new knowledge and new theories formed by the basic research can guide the technological innovation of enterprises and industrial innovation promoting the improvement of total factor productivity. In terms of applied research, it elevates the theoretical knowledge to materialized knowledge, promoting the transformation of scientific and technological achievements, and improves the total factor productivity with independent innovation and imitating innovation.

3. The contemporary value of the development of new productive forces

The development of new quality productivity profoundly answers questions about the path of modernization with Chinese characteristics, such as why and how to develop productive forces in the new ear, which is helpful to promote the Sinicization of Marxism, guide high-quality economic development, promote the transformation and upgrading of traditional industries, and promote the efficient use of resources and green development.

3.1 Promoting the sinicization and modernization of Marxist production theory

The new quality productivity is the sinicization and modernization of Marxist production theory. First, new workers. According to Marxism, workers generally engage only in simple and repetitive work, while workers in the new productive forces with rich knowledge reserves and strong learning ability are sophisticated compound talents able to make full use of modern science and technology to rapidly adapt to complex environments. The rapid development of the Internet and artificial intelligence has created new workers who surpass the traditional labor force. Second, new means of production. Profound changes have taken place in the means of labor material with the new technologies. The use of new quality technologies such as information technology, biotechnology, new energy and new materials is an important part in the development of new quality productivity. Science and technology and new quality production tools such as derived big data and artificial intelligence have a great impact on the production process and production mode, and have become the key in the transformation and upgrading of traditional industries and the development of new industries. The third is the new labor object. With the development of digital technology, the object of labor has changed greatly. Digital and intelligent tools not only improve the ability of workers, but also expand the scope of labor objects which expand from tangible to intangible information, data and technology and so on, as well as expand the social efficiency greatly.

3.2 Guiding high-quality economic and social development

New quality productivity is changing the traditional mode of production and becoming the key to lead and promote high-quality economic and social development. New productivity promotes the integration of digital economy and real economy. Digitalization, networking and intelligence promote industrial digitalization, making the digital technology play a part of amplification and multiplication effect in economic development. Digital technology penetrates into the real economy, bringing about the integration and intergrowth between the real economy and digital technology. The traditional mode of economic and social development has led to unbalanced regional development, while with the deepening of the digital revolution, information sharing and rational use of resources, new normal of shared and collaborative development, new productive forces promote the coordinated development of regional economy and society.

3.3 Promoting efficient use of resources and green development

Digitalization and green development is the core feature of new quality productivity. Digitalization emphasizes the role of data technology, while green development focuses on ecological protection and sustainable development. New technologies, new materials and new processes will upgrade and transform traditional industries, improve resource utilization efficiency and reduce energy consumption and waste emissions, achieving low-carbon and green production. The essence of new quality productivity is green productivity, which is of great significance to energy conservation, emission reduction and green development.

3.4 Boosting the modernization of national governance

The new productivity changes the social operation mode and provides a new path for breaking through the traditional governance dilemma and improving the national governance efficiency. First of all, it creates a collaborative governance mode. The new quality productivity is based on digital algorithms, which provides the powerful links enabling the government, enterprises and society to connect with each other, breaking through the limitations of the geographical location of governance subjects and their respective power division. Digital governance also provides a convenient way for the participation of civil society. Secondly, it makes the target of governance precise. Digital technology uses big data to accurately analyze individual information and characteristics to better serve the people,

such as precise identification and precise policy implementation. Finally, it improves governance efficiency. The digital platform makes the government, society, enterprises and individuals intertwine into a unified governance network, and governance and services are everywhere.

4. The epochal connotation of developing new productive forces

New quality productivity is characterized with informatization, digitalization, scientification and intellectualization, which fully conforms to the new development concept of "innovation, coordination, green, openness and sharing". It is the only way to deeply grasp the epochal connotation of new quality productivity to implement the new development concept and promote the building of a great modern socialist country.

4.1 Cultivating high quality talents

The new productivity lies in scientific and technological innovation of which the internal power source is high-quality talents. High quality talents should adapt to digital and intelligent science and technology, and have the comprehensive ability of integrating cross industries. Strategic talents with forward-looking vision, insight into the future and the ability to grasp the development trend of high-tech industry are an important guarantee for the development of new quality productivity. Innovative talents create new production and business modes by organically combining knowledge and skills from different fields, and promote the marketization of new quality productivity by combining scientific and technological product innovation with public demand, which is the backbone of new quality productivity. Applied talents apply the latest technology in actual production to promote enterprise innovation, improve enterprise technology and management mode, transform scientific and technological achievements into productivity, and promote enterprise cooperation and exchange and industrial collaborative development, which are the important forces in promoting the development of new productivity.

4.2 Promoting the industrialization of digital technology

The industrialization of digital technology is an important force to promote the development of new productivity. The development of new productive forces inherently demands the healthy development of digital technology industrialization. Therefore, it is important to strengthen basic scientific research and technological innovation. Firstly, it should increase capital investment to lay a solid economic foundation for digital technology research and digital technology industrialization. Secondly, it should create scientific research innovation platform to promote the cooperation among enterprises, universities and scientific research institutes, and promote the transformation of scientific research achievements. Thirdly, it should cultivate high-tech talents and promote the updating and iteration of digital technology to escort the industrialization of digital technology. Fourthly, it should strengthen the protection of intellectual property rights of digital technology to consolidate the basic guarantee for the industrialization of digital technology. Fifthly, it should cultivate and develop the digital technology market and provide market access environment for enterprises through policy support and market access.

4.3 Optimizing the combination of production factors

Digital technology not only infiltrates into the various elements of productivity to make a qualitative leap, but also changes the combination of elements.

First of all, the combination of productive factors has shifted from the traditional linear mode to modern networking. The use of big data and artificial intelligence has broken the information barrier, promoted information sharing and intercommunication, and strengthened the networking of element combination. At the same time, big data, artificial intelligence and other technologies enable market players to achieve global resource allocation promoting the networking of production factors. In addition, innovation promotes the networking of the combination of production factors. Secondly, the production factors have changed from the traditional static and mechanical combination to the modern dynamic and flexible combination. Scientific and technological progress provides technical support for the dynamic and diverse combination of production factors. The market players use new technology to quickly and actively respond to changes of consumer preferences and accelerate the dynamics and flexibility of the combination of production factors. And the development goal changes from only

economic growth to the sustainable and healthy development of economy, society and ecology, promoting the dynamics and flexibility of the combination of production factors.

4.4 Improving government public services

The significant effect of new quality productivity on the economy and society requires the government to reform government affairs and improve the level of public service.

First of all, the new quality productivity puts forward higher requirements for the government public service capacity. The traditional mode of government service can no longer meet people's needs for government service in the information age. The government should make full use of new technologies such as big data and artificial intelligence to strengthen information sharing and interconnection, improve the administrative efficiency, and improve the intelligent and scientific level of public services. Secondly, it should promote the development of new quality productivity through improving the public service capacity of the government. The governmental high-quality public services can attract enterprises to strengthen scientific and technological innovation, provide enterprises with a more convenient environment for innovation and entrepreneurship, promote enterprises to strengthen scientific and technological research and innovation investment, promoting the development of new quality productivity. In addition, the improvement of the governmental public service capacity can also promote well-being of the people. Modern, intelligent and scientific government public services can better meet the diversified and personalized service needs of the people. The digital management and intelligent services of the government can improve the level of people's well-being.

Conclusions

New quality productivity is a new form of productivity born from new technologies and new institution, which will inevitably promote the optimization of production factors, the upgrading of industrial systems, and the sublimation of human life styles. To meet the requirements of the development of new quality productivity, it is necessary to promote the development of new quality productivity through comprehensive innovation in development concepts, production technology and management systems.

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