



# Research on High-quality Development Strategy of New Quality Productivity in Digital Era

Sihan Yang\*, Wenwen Liu

<sup>1</sup>Shenghua Zizhu Academy, Shanghai, 200241 China

\*Corresponding author: ivyouang@163.com

**Abstract.** Productivity is the objective material force for human beings to conquer and transform nature, and the current digital era, with data elements, digital technology, digital infrastructure and digital governance as the basic framework, has come in full force, so how to fully integrate the digital economy with the new quality of productivity has become the top priority for the development of productivity. The digital economy integrates information technology, artificial intelligence and big data, which is a new engine for economic growth and an important hand in the development of new quality productivity (NQP). This paper analyzes the essential characteristics and core elements of the NQP, and provides an in-depth discussion on the implementation strategy of high-quality development in the era of digital economy, which reflects the trend of the development of the digital economy and meets the requirements of high-quality economic development. Under the current wave of technological revolution and digitization, in the process of China's economic shift to high-quality development, it is necessary to turn more attention to the changes in productivity brought about by digital technology, to promote the high-quality development of the economy with the digital NQP, and then to promote the process of Chinese-style modernization. In addition to the above, science and technology Innovation of world and China is analyzed, which prove that all the country pay much more attention to these facets. Therefore, the paper has great theoretical and practical significance to deeply explore the research on the high-quality development of NQP in the digital era.

**Keywords:** Digital economy; New quality productivity (NQP); Essential characteristics; Development strategy; High-quality development

## 1 Introduction

Productivity is an important driving force for the development of human society and an objective material force for human beings to conquer and transform nature. The increase in productivity is the foundation of social development, and its level of development directly affects the speed and quality of economic growth and social progress. The increase in productivity implies a continuous revolution in production efficiency, production capacity and production relations, thus promoting the rapid development of

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K. Zhang et al. (eds.), *Proceedings of the 4th International Conference on Internet Finance and Digital Economy (ICIFDE 2024)*, Advances in Economics, Business and Management Research 301,

[https://doi.org/10.2991/978-94-6463-534-8\\_5](https://doi.org/10.2991/978-94-6463-534-8_5)

social production. Productivity growth is not only an economic development, but also an important indicator of the overall progress of society.

Human beings have continuously created and accumulated rich productivity resources in their long-term production practice, and through the organic combination of factors such as labor, capital and technology, they have continuously improved their productivity, expanded their production capacity and realized the innovation of production relations<sup>[1-2]</sup>. The development of productive forces has promoted the continuous evolution of the mode of production in human society, and the progress of productive forces has always been the main driving force of social development, from the initial primitive tribal society to the modern industrial society to the information society of the digital age.

With the full advent of the digital age, the development of productivity has entered a new stage. The rapid development and wide application of digital technologies have made the production process more efficient and intelligent, the construction of digital infrastructure has provided more convenient conditions for production, and the implementation of digital governance has provided more possibilities for production innovation. Productivity development in the digital era has more significant features and advantages, providing more opportunities and challenges for realizing high-quality development<sup>[3-4]</sup>.

In the digital era, the high-quality development of NQP requires full recognition of the essential characteristics of productivity, a grasp of its core elements, a response to the challenges it faces, and the realization of a sustained increase in productivity through the logic of change and implementation strategies. The comprehensive integration of the digital economy and NQP will promote the high-quality development of the economy and realize sustainable economic growth. In order to achieve high-quality development in the era of the digital economy, we also need to continue to explore and innovate, to take advantage of digital technology, to enhance productivity levels and to promote the overall progress of the social economy.

## **2 Calculation of NQP and Basic Elements**

### **2.1 Calculation of NQP**

Productive forces are the ultimate determining force in the development of human society and the main criterion for measuring the degree of development of a society, and the history of social development is a history of dynamic development in which backward productive forces are constantly replaced by advanced ones. Emancipating and developing the productive forces and modernizing them are the key elements for the formation and expansion of Chinese-style modernization. Judging from the history of world economic development, scientific and technological innovation is the inexhaustible source of human wealth growth and the great driving force of productivity development.

New-quality productivity is the advanced productive forces that play a leading role in innovation, get rid of the traditional mode of economic growth and path of productive

forces development, and have high-tech, high-efficiency and high-quality characteristics, in line with the new development concept; it is spawned by the revolutionary breakthroughs in technology, innovative allocation of factors of production, and in-depth transformation and upgrading of industries, and has the basic connotation of the leap in the combination of laborers, means of labor, and objects of labor and their optimization, and the significant increase in factor productivity as the core symbol. factor productivity as the core symbol, characterized by innovation, the key is in quality, and the essence is advanced productivity. Its calculation formula is as follows:

$$N = (T^{i1} + P^{i2} + C^{i3}) \times (L_F + L_T + L_O)^{i4} \quad (1)$$

In the above formula,  $T$  is science and technology (S&T);  $P$  is production factors;  $C$  is industry;  $L_F$  is labor force;  $L_T$  is labor tools;  $L_O$  is labor object;  $i1$  is the revolutionary breakthrough index;  $i2$  is the innovative configuration index;  $i3$  is the deep transformation and upgrading index; and  $i4$  is the optimized combination index.

## 2.2 Basic Elements of NQP under Digital Era

The full arrival of the digital era marks the entry of human society into a completely new stage of development. In the digital era, data has become an important factor of production, and the wide application of digital technology has provided a new path for productivity enhancement. At the same time, the construction of digital infrastructure and the promotion of digital governance have also created a favorable environment for the development of NQP.

(1) Data elements play a crucial role in the digital age. Emerging technologies such as big data, artificial intelligence and cloud computing are generating data at an unprecedented scale and speed, and these data have become an important support for productivity. Through data analysis and mining, companies can better understand market demand and customer behavior, thereby improving productivity and product quality<sup>[5]</sup>.

(2) The widespread application of digital technologies also promotes the development of NQP<sup>[6]</sup>. Both traditional manufacturing and emerging service industries can realize intelligent production and service provision through digital technology. For example, the application of industrial Internet and Internet of Things (IOT) technologies can realize remote monitoring and fault diagnosis of equipment, and improve production efficiency and product quality<sup>[5]</sup>.

(3) The construction of digital infrastructure is also an important support for development in the digital era. The improvement of digital infrastructure, such as high-speed broadband networks, 5G communication technology and cloud computing platforms, has provided enterprises with more space for development and promoted the integration of information technology and the real economy.

(4) The promotion of digital governance also provides data sharing and security regulation for the development of NQP<sup>[6]</sup>. In terms of data sharing, the specific requirements for data sharing will need to be clarified, and departments and enterprises will be encouraged to realize data interconnection and interoperability under the premise of legal compliance, so as to improve the efficiency of data use. At the same time, the law

will give strict definitions and punitive measures for problems such as privacy leakage and security breaches that may occur in the process of data sharing. This not only guarantees the legal compliance of data sharing, but also provides a strong legal guarantee for data security. As the security regulation, the security regulatory system needs to be strengthened and the responsibilities and obligations of all parties clarified. Enterprises and organizations will be required to establish a sound security management system and report regularly on their security status to the regulatory authorities. In addition, in response to security incidents such as cyberattacks and data leaks, the regulations propose emergency response measures and accountability mechanisms to ensure that security risks are effectively controlled.

### **3 Core and Characteristics of the New Quality of Productivity**

#### **3.1 Core Elements**

The core elements of NQP are the key factors that promote high-quality development in the digital economy. First, new productivity elements include digital technologies and talents. Digital technologies such as artificial intelligence, big data and cloud computing play a crucial role in productivity enhancement, while high-quality talent is the core driver of NQP in the digital era.

Secondly, the core elements of NQP also include digital infrastructure and digital governance<sup>[7]</sup>. Digital infrastructure includes networks, the Internet, cloud computing and so on, and the improvement of these infrastructures will create a good environment for the development of NQP. Digital governance, on the other hand, refers to how governments and enterprises can effectively manage and utilize digital resources in the era of the digital economy in order to promote the development of NQP.

Furthermore, the core elements of NQP include digital finance and digital markets. Digital finance includes digital payments, blockchain and other financial technologies, which make the flow of funds more convenient and provide sufficient financial support for new productivity. Digital markets, on the other hand, refer to online markets created through digital technology, which make the transaction of products and services more convenient and transparent, and are conducive to the research, development and promotion of NQP.

Overall, the core elements of NQP cover a wide range of aspects, including technology, talent, infrastructure, governance, finance and markets, and the effective integration and synergy of these elements will lay a solid foundation for the high-quality development of NQP in the digital era.

#### **3.2 Essential Characteristic**

Innovation-driven: NQP is productivity with science and technology innovation as the core driving force, and it is more prominent in the digital age. Through the continuous introduction of new technologies, new ideas and new models, productivity is constantly promoted and developed<sup>[8]</sup>.

**Knowledge-intensive:** The NQP is strongly knowledge-intensive, which relies on highly qualified personnel and advanced technological equipment, and continuously improves production efficiency and quality through knowledge and technological innovation.

**Networking:** The new quality of productivity relies more heavily on networked production methods in the digital age. Through the Internet, the Internet of Things and other technological means, the efficient interconnection and synergy of factors of production are realized, and the overall production efficiency is enhanced.

**Flexibility and adaptability:** NQP has strong flexibility and adaptability, and is able to flexibly adjust production methods and product structures in response to market demand and technological changes to maintain competitiveness.

**Sustainability:** The NQP focuses on sustainable development, not only pursuing economic benefits, but also considering environmental protection and social responsibility, and promoting the development of the production model in the direction of high efficiency, low carbon and environmental protection.

**Creative Economy:** NQP regards the creative economy as its core, emphasizing innovation-driven and value-creation, and realizing a win-win situation in terms of economic growth and social progress through the continuous improvement of product quality, service level and consumer experience.

## 4 NQP Development Strategy and Implementation Program

### 4.1 Strategic Layout Design and Focus

To establish an innovation-driven and sustainable economic system, improve national competitiveness and people's quality of life, aiming at improving the ability of scientific and technological innovation, promoting the optimization and upgrading of industrial structure, enhancing international competitiveness and realizing green and sustainable development, the development strategy is shown in Figure 1.

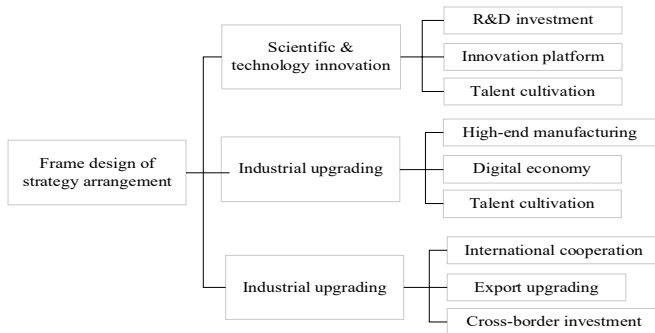


Fig. 1. The development strategy focus design

## 4.2 Development Strategies

In order to analyze these challenges and problems, it is necessary to formulate corresponding policy measures to strengthen data security management, increase talent training and promote the construction of an innovation system, so as to ensure the sustainable development of NQP. As a NQP in the digital era, its development strategy is crucial.

Firstly, the logic of change for the new quality of productivity lies in making full use of digital technology and digital infrastructure to realize the intelligence and networking of the production process<sup>[9]</sup>. Through the collection, analysis and application of data, enterprises can better understand market demand and production efficiency, and achieve precision and customized production, thereby improving production efficiency and quality.

Secondly, the implementation strategy for NQP needs to give full play to the role of digital governance and build a digital economic ecosystem. This includes strengthening data security and privacy protection, building a digital workforce and promoting digital industrial upgrading. In particular, it is important to emphasize data sharing and innovation, promote cooperation and win-win cooperation among industries, and promote the application of new technologies and the development of new business models.

At the same time, the logic of change of the NQP is also reflected in the change of enterprise management and organizational structure. Traditional production methods and management models can no longer adapt to the needs of the digital age, and enterprises need to transform into open and flexible organizational structures, promote information sharing and cross-sector collaboration, and improve decision-making efficiency and execution.

In addition, NQP needs to be supported and guided in terms of government policies and market environment. The Government should increase its investment in the digital economy and in the research and development of new technologies, encourage enterprises to strengthen innovation and transformation and upgrading, and create a market environment for fair competition and sustainable development.

Overall, the logic of change and the implementation strategy for NQP in the digital age include the use of digital technology to enhance productivity, the construction of a digital economic ecosystem, the restructuring of enterprise management and organization, and the support of government policies and the market environment. Only by comprehensively promoting reform and innovation in these areas can we realize the high-quality development of NQP and promote sustained economic and social prosperity and sustainable development.

## 4.3 Full Integration of NQP in Digital Economy

The comprehensive integration of digital economy and NQP is an important way to realize high-quality development in the digital era. The digital economy, as the core of the digital era, has not only changed the production mode of traditional industries, but also provided new opportunities and challenges for the cultivation and development of NQP.

Firstly, the convergence of the digital economy and NQP is manifested in the release of the value of data. In the digital era, data is considered a new factor of production, and through data collection, analysis and application, enterprises can better understand market demand, optimize product design and improve productivity. Data-driven production not only improves productivity, but also provides a solid foundation for the innovation of new products and services.

Secondly, the wide application of digital technology is also an important manifestation of the integration of the digital economy with NQP<sup>[10-11]</sup>. The continuous development and application of new technologies such as artificial intelligence, big data and the Internet of Things have made it possible for the production process to be intelligent and automated. Through the application of digital technology, enterprises can realize the refined management of the production process, improve production efficiency and product quality, thus promoting the enhancement of NQP.

In addition, the construction of digital infrastructure is also an important support for the integration of the digital economy and NQP. Digital infrastructure includes the construction of networks, cloud computing, Internet of Things platforms and other infrastructures, which provide technical support for enterprises to realize digital production. The improvement of digital infrastructure not only improves the production efficiency, but also facilitates the innovation and development of enterprises.

Finally, digital governance plays an important role in the integration of the digital economy and NQP. Digital governance includes the regulation and management of data security, privacy protection, intellectual property protection and other aspects, providing institutional safeguards for the healthy development of the digital economy and NQP. Only by establishing a sound digital governance system can we ensure that the integration and development of the digital economy and NQP can proceed smoothly.

To sum up, the integration of the digital economy and NQP is a necessary way to realize high-quality development in the digital era. Only by giving full play to the advantages of the digital economy and promoting the cultivation and development of NQP can we realize sustained economic growth and comprehensive social progress.

#### **4.4 Implementation of the Program**

How to realize high-quality development in the era of digital economy is an important topic in current economic development.

First of all, to achieve high-quality development, it is necessary to continuously improve the level of digitization and give full play to the role of digital technology in production, management and services. Digital technology can improve production efficiency, optimize industrial structure, improve product quality and promote economic growth.

Secondly, it is necessary to strengthen the construction of digital infrastructure and build a sound digital infrastructure, including broadband networks, cloud computing and big data platforms, in order to support the development of the digital economy. Only with a sound infrastructure can enterprises and individuals make full use of digital technology to realize efficient production and innovation.

Once again, digital governance is also crucial. The establishment of a sound digital governance system, including data security and privacy protection, digital copyright protection, digital economy regulation and other aspects, can ensure the stable and orderly development of the digital economy. At the same time, strengthening digital governance can also improve the transparency and credibility of the digital economy and attract more people to participate in digital economic activities.

Ultimately, in the process of realizing high-quality development, it is also necessary to fully take into account the essential characteristics and core elements of NQP. The essence of the NQP is the production factors centered on digital technology, and the core elements of the NQP include data, talent and innovation, with data being the foundation of the digital economy, talent being the core driving force of the digital economy, and innovation being the soul of the digital economy. Only by giving full play to the role of these core elements can the high-quality development of NQP be realized.

## **5 Science, Technology and Innovation Index and Analysis**

### **5.1 Analysis of the Role of Science and Technology Innovation**

Strengthen original and disruptive scientific and technological innovation. The new quality productivity represents the direction of the new round of scientific and technological revolution and industrial change. With the national strategic scientific and technological power as the important basis, we should actively promote original and disruptive scientific and technological innovation in terms of the layout of tasks, resource allocation, organizational methods, cultivation of scientific and technological enterprises, and cultivation and introduction of high-end talents to comprehensively enhance the capability of independent innovation. It is necessary to expand patient capital and risk capital investment, promote long-term goal-driven basic research, and promote the emergence of original and disruptive technological achievements.

Deeply promote the innovative development of digital economy. Actively promote digital industrialization and industrial digitization, make full use of digital technology to transform and upgrade thousands of industries, and promote the deep integration of the digital economy and the real economy. We will build digital infrastructure at an appropriately advanced stage, accelerate the formation of a national integrated arithmetic system, and promote openness and sharing. Improve the data foundation system, vigorously promote the development, opening and circulation of data, and give better play to the digital empowerment of data as a new factor of production.

### **5.2 Example Analysis of S&T Innovation of world**

In formula (1), revolutionary breakthrough index, innovative configuration index, deep transformation and upgrading index and optimization of the combination of indexes are closely related to science and technology innovation, if you want to comprehensively realize the high-quality development of the new quality of productive forces, we must pay full attention to the role of science and technology innovation. According to public information, from 2013 to 2023, China's Global Innovation Index (hereinafter referred



to as GII)<sup>[12]</sup> ranking from 35th to 12th, has successfully entered the ranks of innovative countries. However, at the same time, it should be noted that the problem of unbalanced innovation development still exists, which restricts the further improvement of China's innovation capacity.

China's total global innovation index ranked 35th in the world in 2013, ranked among the world's top 25 for the first time in 2016 (25th), up 18 places from the lowest ranking in history in 2010 (43rd), ranked among the world's top 20 for the first time in 2018 (17th), ranked the highest in history in 2022 (11th), up 32 places from 2010, and ranked 2023 China's total innovation index ranks 12th in the world, the second highest level in history.

Through the analysis of relevant data, the main conclusions are: short-term fluctuations in innovation inputs, but stable growth in the long term, most factors in the field of the index is growing rapidly and to a greater extent than in the innovation powerhouses. Innovation output is a global leader in the field, with a significant quantitative advantage in intellectual property output. The top 100 S&T clusters are shining, with significant growth in cluster output, and S&T clusters are defined based on a place's patenting activity and published scientific papers, defining places with a high concentration of inventors and scientific scholars as S&T clusters.

### 5.3 Analysis of China's S&T Innovation Result

China has made great progress in the in-depth implementation of the innovation-driven development strategy and accelerating the major decision-making and deployment of building a strong science and technology country. According to publicly available information in Table 1, with 2015 as the base period, China's innovation index in 2022 will be 155.7, and the innovation environment index, innovation input index, innovation output index, and innovation effectiveness index will be 160.4, 146.7, 187.5, and 128.2, respectively. compared with 2015, China's innovation index has grown by an average annual rate of 6.5%, which is 0.8 percentage points faster than the same period's gross domestic product (GDP) growth rate of 0.8 percentage points faster than that of GDP in the same period; the average annual growth rate of the four sub-field indices is 7.0%, 5.6%, 9.4% and 3.6% respectively. Compared with 2021, China's innovation index grows by 5.9%, and the 4 sub-field indices grow by 5.7%, 7.0%, 9.2% and 0.7% respectively. As can be seen from the table, China's innovation capacity has been improved at a relatively fast pace, and the new kinetic energy of innovation and development has been accelerated and gathered, providing a strong impetus for promoting high-quality development.

**Table 1.** Statistical table of China's innovation index data (2015-2022)

Index	2015	2016	2017	2018	2019	2020	2021	2022
Total	100.0	105.3	112.3	123.8	131.3	138.9	147.0	155.7
Environment	100.0	103.9	109.9	123.1	132.4	138.9	151.8	160.4
Inputting	100.0	103.8	111.1	119.6	124.3	131.9	137.1	146.7
Outputting	100.0	108.4	117.5	137.0	150.3	161.2	171.6	187.5
Effecting	100.0	105.2	110.7	115.5	118.0	123.6	127.2	128.2

## 6 Conclusions

This paper provides an in-depth discussion on how to realize high-quality development in the era of digital economy from the essential characteristics, core elements, challenges and implementation strategies of NQP, which reflects the trend of the development of the digital economy and is also in line with the requirements of high-quality economic development. How to realize high-quality development in the era of digital economy requires giving full play to digital technology, strengthening digital infrastructure construction, and improving the digital governance system, while at the same time paying attention to the essential characteristics and core elements of the NQP, addressing the challenges faced by the NQP, and formulating the corresponding policies and measures, in order to realize the high-quality development of the digital economy.

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