

Formation Mechanism of New Quality Productivity and Policy Synergy under the Guidance of Scientific and Technological Innovation

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Abstract: This article focuses on the formation of New Quality Productivity (NQP) and policy coordination under the guidance of scientific and technological innovation. Under the background of fierce global scientific and technological competition and scientific and technological innovation becoming the core driving force of the economy, NQP, as a new form of productivity, is of great significance to the high-quality development of the economy. Through theoretical analysis and comprehensive application of scientific and technological innovation, productivity and policy synergy, the formation mechanism of NQP and policy synergy effect are deeply explored. It is found that scientific and technological innovation drives the formation of NQP by changing the combination and utilization efficiency of production factors, and its formation depends on the mechanism of factor agglomeration and industrial ecology. Furthermore, policy coordination plays a significant role in stimulating scientific and technological innovation, guiding factor agglomeration and promoting industrial ecological construction. To sum up, it is of great significance to clarify the formation mechanism of NQP and strengthen policy coordination to optimize the innovation policy system, promote high-quality economic development and realize self-reliance and self-reliance in science and technology.

1. Introduction

With the deep adjustment of global economic structure and increasingly fierce competition in science and technology, scientific and technological innovation has become the core driving force to promote economic development [1]. From the perspective of historical development, every major scientific and technological innovation has spawned a new mode of production and productivity, which has effectively promoted the progress of human society [2]. As a new type of productivity based on scientific and technological innovation, NQP is gradually becoming a key force to reshape the economic structure and enhance national competitiveness [3].

An in-depth study of the formation mechanism of new quality productive forces will help to reveal the inherent law of the transformation from scientific and technological innovation to real productive forces, and provide a theoretical basis for better playing the supporting role of scientific and technological innovation in economic growth [4]. Furthermore, policies play an indispensable role in guiding the allocation of scientific and technological innovation resources and promoting the cooperation of innovation subjects [5]. The study of policy synergy aims to clarify how different policies cooperate with each other and form a joint force, so as to promote the development of NQP more effectively [6]. This is not only of great theoretical value for optimizing the national innovation policy system, but also of urgent practical significance for promoting high-quality economic development and realizing scientific and technological self-reliance.

This article mainly adopts theoretical analysis method, comprehensively applies the theory of scientific and technological innovation, productivity theory and policy synergy theory, and conducts in-depth research on the formation mechanism and policy synergy effect of NQP. The innovation of this study is to comprehensively analyze the formation mechanism and policy synergy of NQP from the perspective of multi-dimensional theory, and try to build a more comprehensive analysis framework.

2. Related theoretical basis

The theory of scientific and technological innovation is an important cornerstone to understand the formation of new productive forces. Schumpeter put forward the theory of creative destruction in his works, emphasizing that innovation is not a simple technological invention, but a new combination of production factors by entrepreneurs. This innovative activity breaks the old economic structure, creates a new economic structure and drives economic development. With the development of the times, the connotation of scientific and technological innovation is constantly enriched, covering many aspects such as knowledge innovation, technological innovation and management innovation [7]. The theory of open innovation points out that enterprises should not only rely on internal research and development, but also cooperate with external subjects such as universities and scientific research institutions to integrate internal and external innovation resources and improve innovation efficiency.

The theory of productive forces expounds the essence and law of production activities in human society. Classical political economy thinks that productivity is the result of the joint action of labor, land and capital. Marxist theory of productive forces further points out that productive forces are composed of laborers, labor materials and labor objects, and science and technology are an important part of productive forces, "including science in productive forces", emphasizing the great impetus of scientific and technological progress to the development of productive forces. With the development of society, the connotation of productive forces is constantly expanding, and the position of emerging elements such as knowledge and information in productive forces is increasingly prominent.

Policy synergy theory focuses on the mutual cooperation and coordination between different policies. According to this theory, the policy system does not exist in isolation, and all policies influence each other in the objectives, means and implementation process. Effective policy coordination can avoid policy conflicts and improve the overall effectiveness of policies [8]. In the field of scientific and technological innovation and the development of new quality productive forces, policy coordination is particularly critical. Fiscal policy, tax policy and science and technology policy need to work together to create a good innovation environment, promote the rational allocation of innovation resources and promote the formation and development of NQP.

3. The formation mechanism of NQP

Scientific and technological innovation is the core driving force for the formation of NQP, which leads to a qualitative leap in productivity by changing the combination mode and utilization efficiency of production factors. Scientific and technological innovation gives birth to new technologies and new processes, enabling workers to act on labor objects with more advanced production tools, greatly improving production efficiency and product quality [9]. Taking information technology as an example, the development of big data, artificial intelligence and other technologies has realized the intelligent control of the production process, changed the traditional production mode, and promoted the transformation of manufacturing to intelligent manufacturing, thus forming NQP.

The formation of NQP depends on the effective gathering of key elements such as talents, capital and technology. All kinds of factors converge in a specific region or industrial field, interact and develop synergistically, creating conditions for the birth of new quality productive forces. High-quality innovative talents are the key to the formation of new productive forces. Scientific researchers carry out cutting-edge technology research and development, and skilled workers turn scientific research results into actual productivity [10]. For example, in the semiconductor industry, professionals such as chip design engineers and process technicians gather to promote the continuous breakthrough of chip technology and the rapid development of NQP in this field. Adequate financial support is the guarantee for innovation activities. The government's financial investment guides the inflow of social capital and provides funds for scientific research projects and enterprise innovation and development. Financial instruments such as venture capital and private

equity investment help innovative enterprises grow and accelerate the formation of NQP. The cross-integration of technologies in different fields is an important feature of the formation of NQP. For example, the fusion of biotechnology and information technology produces bioinformatics, which gives birth to new gene sequencing technology and precision medical industry, and promotes the development of NQP in the health field. The agglomeration effect of factors forming NQP of high-tech industries is shown in Table 1 below:

Table 1: Agglomeration Effects of Formative Factors for NQP in High-Tech Industries

Factor Category	Agglomeration Effect Manifestation	Impact on Formation of NQP
Talent	Attracting high-end scientific research, management, and technology application talents to form talent teams	Accelerating the development and application of new technologies, enhancing industrial innovation capabilities, and driving transformation in production methods
Capital	Government funding guidance, investment from financial institutions, and social capital	Ensuring the implementation of innovative projects, supporting enterprise growth, and providing an economic foundation for the development of NQP
Technology	Convergence of cross-disciplinary technologies, sharing and transformation of technological achievements	Spawning new technologies and business models, expanding industrial boundaries, enhancing overall industrial competitiveness, and promoting the formation of NQP

The formation of NQP depends on a perfect industrial ecosystem. Within the industrial ecology, upstream and downstream enterprises in the industrial chain cooperate closely to realize resource sharing and complementary advantages. Taking the new energy automobile industry as an example, upstream battery raw material suppliers, midstream battery manufacturers, vehicle manufacturers, downstream charging pile operators and other enterprises have cooperated to promote the progress of the new energy automobile industry.

Industry-University-Research's deep integration is also an important part of industrial ecological mechanism. Universities and scientific research institutions carry out basic research and applied research to provide technology sources for the industry; As the main body of innovation, enterprises turn scientific research achievements into products and push them to the market; Users feedback the use requirements and guide the direction of innovation. This interactive circulation mechanism accelerates the industrialization of scientific and technological achievements and promotes the growth of NQP in industrial ecology.

4. Analysis on the effect of policy synergy in promoting the development of new quality productive forces

4.1. Incentive effect of policy coordination on scientific and technological innovation

Table 2: Incentive Effects of Regional Policy Coordination on Investment in Scientific and Technological Innovation

Year	Financial Subsidies for Scientific Research Projects (Billion Yuan)	Number of Enterprises Benefiting from Additional R&D Expense Deductions	Growth Rate of Enterprise R&D Investment (%)
2018	5	300	10
2019	6	350	12
2020	7	420	15

Policy coordination stimulates scientific and technological innovation and promotes the development of new quality productive forces in various ways. With the coordination of fiscal policy and science and technology policy, the government has increased investment in scientific research projects, set up special research funds, and guided enterprises to increase investment in research and development. Direct financial subsidies can be given to R&D projects of high-tech enterprises to encourage enterprises to carry out cutting-edge technology research. With the cooperation of tax policies, the R&D expenses of enterprises will be added and deducted to reduce the innovation cost of enterprises and improve their innovation enthusiasm. Table 2 takes a certain

region as an example to discuss the incentive effect of policy coordination on technology innovation investment.

As can be seen from Table 2, with the increase of financial subsidies and the increase of enterprises enjoying tax incentives, the R&D investment of enterprises has increased significantly, indicating that the incentive effect of policy coordination on scientific and technological innovation investment is obvious.

4.2. The guiding effect of policy synergy on factor agglomeration

Policy coordination plays a key role in guiding talents, capital, technology and other factors to gather in the field of NQP. In terms of talent policy, a talent introduction plan was introduced to attract high-end talents by providing favorable treatment and supporting conditions for scientific research. In terms of capital policy, the government guides funds to cooperate with financial institutions to provide financing support for emerging industries. Technology policy encourages enterprises to cooperate with universities and scientific research institutions to promote technology transfer and transformation. Taking the emerging artificial intelligence industry as an example, the guiding effect of policy coordination of artificial intelligence industry on factor agglomeration is shown in Table 3:

Table 3: Guidance Effects of Policy Coordination on Factor Agglomeration in the Artificial Intelligence Industry

Factor Category	Policy Measures	Factor Agglomeration Effect
Talent	Establishing an "Artificial Intelligence High-End Talent Introduction Plan" with provisions for housing settlement fees and research startup funds	Attracting over 200 doctoral-level talents in related fields over the past three years
Capital	The government establishing a 1 billion yuan AI industry guidance fund, driving 3 billion yuan in loans from financial institutions	Providing cumulative financial support to over 50 AI enterprises
Technology	Introducing policies to encourage technological cooperation, facilitating 30 cooperation projects between enterprises and university research institutions	Promoting the application and transformation of multiple key technologies in the industry

Table 3 shows that through the coordinated guidance of policies, the artificial intelligence industry has realized the effective gathering of talents, capital and technology, laying the foundation for the development of NQP.

4.3. Promoting effect of policy coordination on industrial ecological construction

Policy coordination promotes the construction of industrial ecology from the aspects of industrial chain and Industry-University-Research utilization, and helps the development of NQP. In terms of industrial chain, industrial policies guide the coordinated development of upstream and downstream enterprises and build a complete industrial chain. Enterprises in key links of industrial chain should get policy support to promote the sustainable development of industrial clusters. Industry-University-Research encourages universities, scientific research institutions and enterprises to cooperate in depth with policies, and establishes cooperation platforms such as innovation alliances and industrial research institutes. Policy synergy has promoted the close cooperation of all subjects in the industrial ecology, created a good environment for innovation and development, accelerated the growth of NQP in the industrial ecology, and injected new impetus into the high-quality economic development.

5. Conclusions

This article makes an in-depth study on the formation mechanism of NQP and the synergistic effect of policies under the guidance of scientific and technological innovation, and draws the following important conclusions.

First of all, scientific and technological innovation is the core driving force for the formation of NQP, which promotes a qualitative leap in productivity by changing the combination of production

factors and utilization efficiency. Information technology promotes the transformation of manufacturing industry to intelligent manufacturing, which fully demonstrates the key role of scientific and technological innovation in the formation of NQP. The formation of NQP depends on the mechanism of factor agglomeration and industrial ecology. The effective gathering of key elements such as talents, capital and technology creates conditions for the birth of new quality productive forces. Taking high-tech industry and artificial intelligence industry as examples, the agglomeration of different factors has effectively promoted industrial innovation and development. A perfect industrial ecosystem, including the cooperation between upstream and downstream enterprises in the industrial chain and the deep integration of Industry-University-Research, has accelerated the industrialization of scientific and technological achievements and promoted the growth of NQP. Policy coordination is of great significance in the development of new quality productive forces. For scientific and technological innovation, the synergy of finance, taxation and scientific and technological policies has effectively stimulated innovation investment. For factor agglomeration, policies such as talents, capital and technology coordinate to guide all kinds of factors to gather in the field of NQP. In the construction of industrial ecology, industrial policy and Industry-University-Research's policy cooperate to promote the development of industrial clusters and cooperate closely with all subjects.

To sum up, a deep understanding of the formation mechanism of NQP and strengthening policy coordination will help to optimize the national innovation policy system and provide strong support for China's high-quality economic development and self-reliance in science and technology. Future research can consider more complex factors, deepen the understanding of the formation mechanism of NQP and the synergistic effect of policies, and further enhance the scientificity and effectiveness of policy formulation.

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