

Visualization Analysis of Research Hotspots on New Quality Productivity in China Based on CiteSpace

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Abstract: Since the proposal of New Quality Productivity on September 2023, related research has developed rapidly. Especially in the first half of 2024, a large amount of research papers began to emerge, but the research hotspots and progress still need to be followed up and revealed. This article selected relevant literature before November 2024 as the research object, aimed to use bibliometrics method to reveal the research hotspots of New Quality Productivity. CiteSpace 6.4.R1 software was used to analyze the publication volume, keywords co-occurrence, and keywords clustering of the study on New Quality Productivity in this article. Knowledge graphs were generated by using CiteSpace to perform visual analyses. It is found that research hotspots on New Quality Productivity mainly focus on five aspects: promoting technological innovation, building a strong agricultural country, regional coordinated development, talent education and training, and developing digital industries. This research is expected to provide valuable references for future research on new quality productivity.

Keywords: New Quality Productivity; Technological Innovation; Bibliometrics; Knowledge Graph; Research Hotspots

1. Introduction

1.1 Related Concepts

The concept of New Quality Productivity was first proposed in September 2023. At the symposium on promoting the comprehensive revitalization of Northeast China in the new era, it was described that “Actively cultivate strategic emerging industries such as new energy, new materials, advanced manufacturing, and electronic information, actively cultivate future industries, accelerate the formation of new quality productive forces, and enhance new development momentum^[1].”

1.2 Literature Review

Although it has been just over a year since the concept of New Quality Productivity was proposed in 2023, academic research in this domain has progressed remarkably. As documented in the China National Knowledge Infrastructure(CNKI) database, over 2,000 relevant articles indexed in Peking University Core Journals(hereinafter referred to as PKU Core) and Chinese Social Sciences Citation Index Journals(hereinafter referred to as CSSCI) have been published. Previously, scholars have conducted bibliometric analysis on research related to New Quality Productivity. The existing studies have provided insightful analysis of research hot spots from multiple perspectives. However, the statistics on the publication volume of research papers on New Quality Productivity and the division of research stages in existing studies are still not precise enough. Among bibliometric analyses of New Quality Productivity, only one study conducted month-by-month publication statistics, but there was no further integration and analysis of the same or similar research topics. Furthermore, with the growth of publications, the research contents change a lot over the past year. Therefore, this study employs bibliometric methods aligned with literature growth law to analyze scholarly publications from September 2023 to November 2024. The research phase will be divided by monthly publication statistics, same or similar clustering themes will be integrated in this article, in order to reveal the research progress of New Quality Productivity, and provide valuable references for subsequent research.

2. Research Design

2.1 Research Methodology

Bibliometric methods are employed to analyze research hotspots of New Quality Productivity in this article. CiteSpace, a Java-based visual tool rooted in citation analysis theory, is widely utilized in bibliometric research for its capacity to map knowledge domains^[2]. Using CiteSpace 6.4.R1, we conducted visual analysis of publication volumes by authors, keywords co-occurrence, keywords clustering, and timeline mapping of New Quality Productivity studies, in order to identify emerging research hot spots.

2.2 Data Sources

The data was extracted from CNKI Database. Advanced search parameters were configured as follows: Using “New Quality Productivity” as the subject term, using “PKU Core” or “CSSCI” as the source categories, and using “research articles” as the document type. Initial queries yielded 2,332 results. After data refinement—excluding review articles, prefaces, and topic outlines with low relevance—2,242 valid records were remained. These articles were exported in Refworks format and archived as raw data for subsequent analysis.

3. Research Findings and Implications

3.1 Analysis of Publication Volume

The change in publication volume directly reflects scholars' attention, research engagement to New Quality Productivity. This study retrieved research articles published in PKU Core or CSSCI from the CNKI database between September 2023 and November 2024. Monthly publication statistics were compiled, and a line chart depicting publication trends was constructed (Figure 1). In the figure, the solid line represents the monthly publication trend, while the dashed line illustrates the linear fitting trend. Based on statistical results, the publication trend can be categorized into three phases.

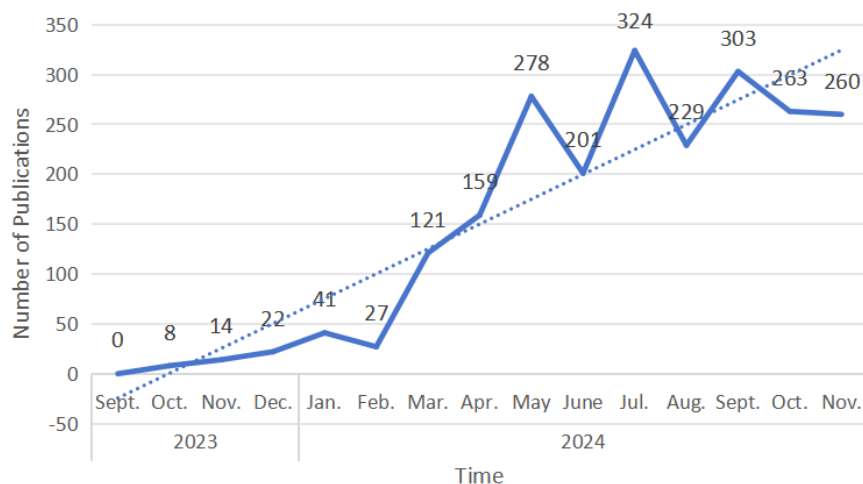


Figure 1 Publication trend of research papers on New Quality Productivity

Phase 1 (September 2023 to January 2024) is the initial phase of research on New Quality Productivity, characterized by slow and steady growth in publication volume. During this period, there was no in-depth and systematic research on this topic yet, so the breadth and depth of research have not yet formed a scale due to the short time since the proposal of New Quality Productivity.

Phase 2 (February 2024 to May 2024) represents a rapid growth stage, with publication volume peaking in May (a month-on-month increase of 74.84%). Research expanded into interdisciplinary domains, particularly in economics domain. A large amount of research on economic systems, agricultural economy, industrial economy, information economy and other fields emerged in phase 2.

Phase 3 (June 2024 to November 2024) shows stabilized publication volumes (fluctuating between 200 and 350), peaking at 324 articles in July 2024. Research prioritized applications in agricultural

modernization, vocational education, and industrial digital transformation.

Overall, the publication volume of New Quality Productivity has shown an upward trend from September 2023 to the present, especially from the end of the first quarter of 2024 when there was a significant increase and maintained at a high level of publication volume, indicating that this concept has gained widespread recognition and high attention.

Price's Law pointed out that considering various factors, the growth of literature tends to be closer to the S-shaped growth curve of organisms^[3]. The change in the publication volume of research on New Quality Productivity from September 2023 to present also conforms well to this law. However, there is reason to believe that future research on New Quality Productivity will expand its research breadth and depth, and show broader development prospects.

3.2 Co-occurrence and Clustering of Keywords

A knowledge graph of keywords co-occurrence is generated by using CiteSpace software, as shown in Figure 2. In the graph, the greater the intermediary centrality of the keyword, the more important the node of the keyword in the knowledge graph becomes. Nodes with intermediary centrality greater than 0.1 are generally referred to as key nodes. According to the ranking of word frequency, as shown in Table 1. The keywords represented by the key nodes are “Scientific and Technological Innovation”, “Digital Economy”, “Data Elements”, “Artificial Intelligence”, and “Vocational Education”, which reveal the hot topics in the research on New Quality Productivity.

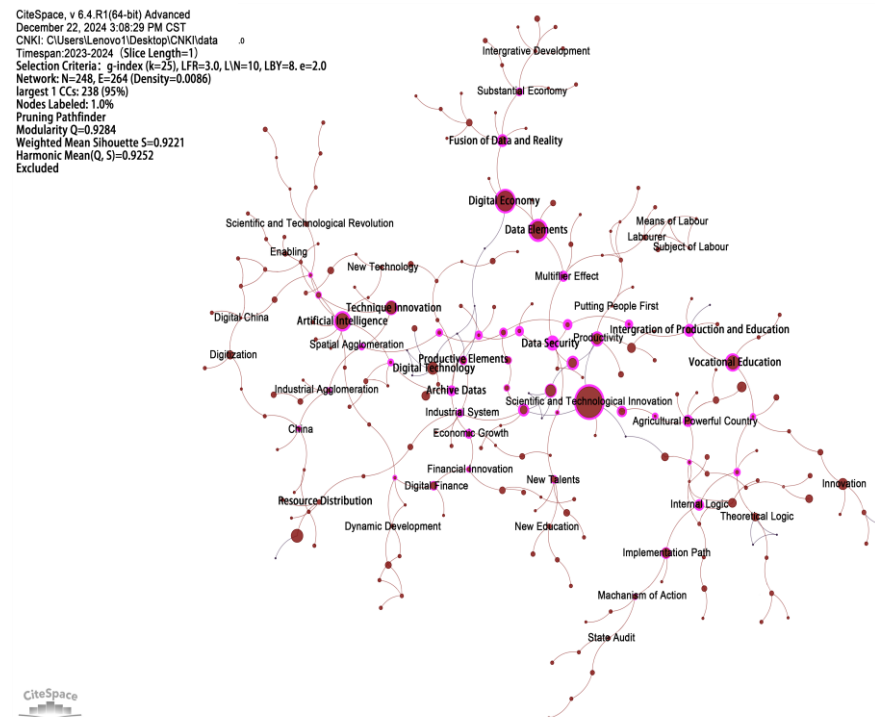


Figure 2. Knowledge graph of keyword co-occurrence

Table 1. Statistics of the top 10 high-frequency keywords in terms of word frequency ranking

Rank	Keyword	Frequency	Year	Betweenness Centrality
1	Scientific and Technological Innovation	233	2023	0.57
2	Digital Economy	101	2023	0.28
3	Data Elements	78	2024	0.26
4	Artificial Intelligence	58	2024	0.20
5	Vocational Education	48	2024	0.10
6	Common Prosperity	47	2023	0.08
7	Digital Technique	40	2023	0.09
8	Technological Innovation	39	2024	0.15
9	Future Industries	36	2023	0.06
10	Innovation	31	2024	0.06

CiteSpace software was employed to cluster relevant keywords and generate a knowledge graph of keyword clustering, as shown in Figure 3. The graph shows that keywords can be aggregated into the following 16 categories: Scientific and Technological Innovation, Artificial Intelligence, Agricultural Powerful Country, Regional Differences, Fusion of Data and Reality, Innovation, New Quality Talents, Technological Revolution, Technological Innovation, Data Elements, Vocational Education, Digital Economy, Coupling Coordination, Implementation Path, Common Prosperity, and Putting People First.

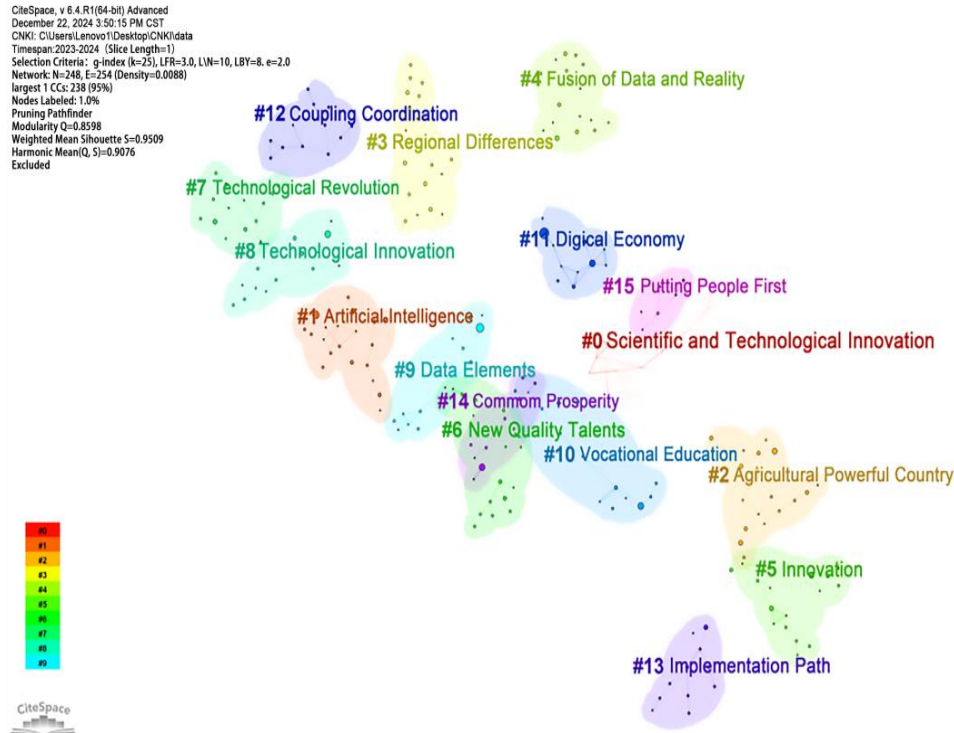


Figure 3. Knowledge Graph of Keyword Clustering

Based on this, the research hotspots of New Quality Productivity in China are analyzed and described, mainly divided into the following five aspects:

The first one is to promote scientific and technological innovation. The development of New Quality Productivity requires technological progress and innovation as the foundation. There is an urgent need to break through the frontier of science and technology, master the core key technologies, and promote industrial upgrading and transformation. Under this cluster, Tian(2024) summarized the major opportunities and challenges facing the research in the field of technology finance in China, and identified the key issues and research directions that need continuous attention in this field^[4]. Yin(2024) believe that enterprises are an important driving force for New Quality Productivity, and have put forward policy recommendations for promoting technological and industrial innovation^[5]. In addition, scholars from various fields have conducted relevant research based on the actual situation in their respective fields. Starting from the four basic functions of scientific journals and combining with the characteristics of New Quality Productivity, Jin(2024) analyzed the functional positioning and approach of scientific journals in serving the development of New Quality Productivity^[6]. Zhang(2024) believe that at present, the agricultural field needs to focus on five directions: seed industry innovation, synthetic biology, biomass engineering, intelligent agricultural machinery, and smart agriculture, injecting new momentum into the development of new agricultural productivity^[7]. Various studies have shown that the development of various fields cannot be separated from the empowering role of New Quality Productivity.

The second one is to build a strong agricultural country. It was pointed out at the Central Rural Work Conference that “a strong country must first strengthen agriculture, and only with strong agriculture can it become strong”. In China, agriculture plays a crucial role and is a powerful support for the national economy. Members of the drafting group of the No. 1 central document said that: To speed up the construction of a strong agricultural country, it is necessary to clarify the main direction and strategic priorities, constantly strengthen policy and factor supply, and focus on promoting scientific and technological and institutional innovation^[8]. Luo(2024) analyzed the spatiotemporal

characteristics and regional differences of New Quality Productivity in China, and discovered the configuration path for achieving agricultural green transformation^{[9][10]}. Chen(2024) explored the connotation, characteristics, element mechanisms, and practical paths of empowering rural comprehensive revitalization with New Quality Productivity. He believed that New Quality Productivity provides new types of laborers, labor materials, and labor objects for rural comprehensive revitalization, and promotes a qualitative change in the combination of the three elements^{[11][12]}. And by analyzing the difficulties of empowering agricultural modernization with New Quality Productivity, he came up with corresponding solutions^[13]. Developing New Quality Productivity can effectively promote the transformation of agricultural technology and the optimization and upgrading of the agricultural industry, promote collaborative research and development of agricultural science and technology, promote the widespread application of the latest scientific and technological achievements, improve agricultural productivity and production efficiency, ensure agricultural supply capacity, and promote the transformation of agriculture from large to strong.

The third one is to promote coordinated development. In the new journey of comprehensively developing a socialist modernized country, China still faces the challenge of uneven and uncoordinated regional development. It is manifested as the persistent gap between the East and the West, and the increasingly significant difference between the North and the South. This unbalanced state not only does not meet the needs of coordinated regional development in the new era, but also poses obstacles to achieving the goal of common prosperity^[14]. Therefore, the development of New Quality Productivity requires innovative productive factors to promote the transformation of traditional industries, enhance the spirit of innovation to improve the quality of scientific and technological achievements, achieve common development in all directions, and jointly promote modernization construction. Related researches mainly focused on the mechanism and path of promoting regional and urban-rural coordinated development through New Quality Productivity. As Wu(2024) pointed out, the new requirements for regional coordinated development essentially have inherent unity with New Quality Productivity. Chinese technological revolutionary breakthroughs and deep industrial adjustments should develop New Quality Productivity according to local conditions, bridge the development gap between different regions, promote high-quality regional development through the development of New Quality Productivity, and advance the goal of common prosperity^{[15][16]}. Shi(2024) studied the gradient distribution of regional development in China based on the concept of New Quality Productivity, and analyzed regional differences and system synergy^[17]. Liu(2024) conducted research on the logical mechanism of transforming traditional industries to develop New Quality Productivity, and proposed the constraints and basic path of this development model^[18].

The fourth one is talent education and training. Talents are indispensable and important resource in any field, such as technology, economy, culture, and ecology. To achieve the leap from following to leading in various fields, education and training of talents are the foundation. From the perspective of New Quality Productivity and the urgent need for specialized and diversified talents in China, many scholars have conducted profound thinking on talent education and training. Chen(2024) believes that it is necessary to promote the high integration of education, technology, and talent, deepen the reform of education mechanisms, and strengthen the innovation subject status of enterprises guided by the “talent chain platform chain innovation chain”^[19]. Zhu(2024) proposed that in the era of digital intelligence, education needs to establish a new paradigm for cultivating high-quality talents with the penetration of artificial intelligence, adhere to the guidance of literacy, rely on intelligent platforms, and integrate industry and education development, cultivate talents that are in line with the development of New Quality Productivity, and empower the cultivation of high-quality talents with digital intelligence technology^{[20][21]}. Wei(2024) analyzed the challenges and strategies for vocational education talent cultivation by analyzing the changes in labor subjects, labor materials, and labor objects brought about by New Quality Productivity. Guided by the concept of “three in one” coordinated development^[22]. Gu(2024) discussed the unique roles of education, technology, and talent in promoting the development of new quality productive forces, as well as the basic principles and educational focus points for promoting the development of new quality productive forces^[23].

The last one is to develop the digital industry. The “new” of New Quality Productivity is reflected in its innovation driven transformation of productivity, and the “quality” of New Quality Productivity is reflected in the innovation of production factor allocation and industrial transformation. The digital economy has profoundly reformed the traditional economic model. With the continuous innovation of technologies such as cloud computing, big data, and artificial intelligence, digital economy has achieved optimized resource allocation and significantly improved production efficiency, gradually giving birth to an economic model with a qualitative change in productivity, injecting strong impetus into economic and social development. Under this clustering, scholars are more concerned about the

development of the digital economy and the practical path of the digital industry in the context of the emergence of New Quality Productivity. Zhang(2024) believes that New Quality Productivity has shown particularly prominent strategic importance in the construction of digital industries and new infrastructure. Promoting breakthroughs in core technologies and supporting cutting-edge technology industries is an important way to stimulate the innovation vitality and competitiveness of the digital industry^[24]. Ren(2024) pointed out that the digital wave has formed new quality productive forces represented by new technologies, new industries, and new energy in the field of industrial development, which will have a comprehensive and significant promoting effect on new industrialization^[25]. Ma(2024) sorted out the logical path of digital industrialization and explored the practical path of digital industrialization^[26]. Hu(2024) used the dynamic QCA method and combined it with the practical situation in China to analyze the relationship between the evolution of the integration path of data and reality and the emergence of New Quality Productivity from 2013 to 2022^[27].

4. Conclusion

From the perspective of research, since it was first proposed in September 2023, the concept of New Quality Productivity has been widely concerned and discussed by scholars from all walks of life. At first, related research focused on exploring the connotation, characteristics, and time value of New Quality Productivity. Many scholars tried to analyze the uniqueness of New Quality Productivity from multiple dimensions. In this process, the digital, intelligent, high-end and green characteristics of New Quality Productivity have been excavated, and New Quality Productivity has been endowed with multiple era values such as stimulating economic vitality, promoting industrial upgrading and promoting social progress. In addition, the combination of the characteristics of New Quality Productivity and the three elements of productivity - workers, means of labor, and labor objects has also become an important direction of practice path research. Through a large number of researches and analyses, scholars believe that the cultivation of New Quality Productivity needs to promote the improvement of workers' literacy, the intelligent upgrading of labor materials and the diversification of labor objects. Relevant research not only provides clear guidance for the practice of cultivating New Quality Productivity, but also provides strong support and enlightenment for various industries to actively explore New Quality Productivity. With the deepening of research, the scope of New Quality Productivity research has gradually spread from the field of politics and economics to various industries. Many fields have begun to pay attention to integrating the concept of New Quality Productivity into their own development, forming a boom in the research of New Quality Productivity. This interdisciplinary diffusion and integration promotes the interdisciplinary integration, and also provides a broader space for the further research and practical application of New Quality Productivity.

From the perspective of research distribution, China has a high enthusiasm for the research of New Quality Productivity, involving a wide range of disciplines, and has formed five clusters of researches: promoting technological innovation, building a strong agricultural country, regional coordinated development, talent education and training, and developing digital industries. Scholars can explore the empowering role and quantitative evaluation indicators of New Quality Productivity in various fields by strengthening cooperation in the future, in order to accelerate the cultivation of new quality productivity.

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