

Empowering High-Quality Development of Agriculture with Digital Economy: Mechanisms, Challenges, and Pathway Choices

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Abstract: With China's ongoing economic and social development, the high-quality advancement of rural industries has become integral to national strategy. The 2023 Central Document outlines guidelines focusing on expanding agricultural processing, enhancing rural services, nurturing new industries, and bolstering county economies. Embracing the digital economy is pivotal, as highlighted in the 20th National Congress report, aiming to integrate it with the real economy to enhance industrial efficiency through modern digital clusters. However, challenges hinder this transition. Insufficient extension of rural industrial chains limits the application of digital technologies, while weak infrastructure and a lack of digital talents further constrain rural digital empowerment. To address these issues, pathways are proposed: enhancing digital service supply, establishing a robust digital talent cultivation system, strengthening legal frameworks, improving information statistics, and optimizing the ecological system for digital empowerment. These pathways aim to support the digital transformation of agriculture, promoting its high-quality development amidst contemporary challenges. Achieving this requires concerted efforts from government, enterprises, and rural residents alike to harness the full potential of the digital economy in fostering sustainable rural growth.

Keywords: Digital economy, agriculture, High-quality development, Theoretical logic, Empirical verification.

1. Introduction

With the continuous development of China's economy and society, the high-quality development of rural industries has become an important part of the national strategy. The 2023 Central Document outlined guidelines to promote high-quality development of rural industries, emphasizing four key areas: expanding and strengthening agricultural product processing and circulation industries, accelerating the development of modern rural services, nurturing new rural industries and business models, and fostering robust industries that enrich county economies. The 20th National Congress report clearly emphasizes aligning with social development trends, fully recognizing the significant value of the digital economy, and integrating it with the real economy to form modern digital industrial clusters that enhance industrial efficiency. Against this backdrop, the rapid development of the digital economy not only injects new momentum into rural economies but also plays a crucial role in promoting high-quality development of rural industries.

The high-quality development of agriculture aims to ensure national food security, improve agricultural production efficiency, optimize agricultural structure, enhance the quality and added value of agricultural products, and promote the modernization, greening, intelligence, and sustainable development of agriculture. As a new economic form driven by the information technology revolution, the digital economy relies on information technology and network communications, centers around data as a core resource, encourages innovation, and possesses global and cross-border characteristics, thereby providing rich opportunities and challenges for the high-quality development of agriculture. Inclusive growth theory emphasizes pursuing coordinated social and economic development, advocating equal

opportunities for growth, and core principles of fair and equitable sharing of economic growth benefits. The digital economy brings more innovation opportunities and growth space to agriculture, enhances agricultural production efficiency through digital technologies, and promotes the intelligent and refined development of agricultural production. However, it also presents challenges such as fair sharing, green development, and upgrading of industrial chains.

2. Challenges and Bottlenecks Facing the Empowerment of High-Quality Agricultural Development by the Digital Economy

Insufficient Extension of Rural Industrial Chains Currently, the main forms of rural industries in China primarily revolve around agriculture and initial processing of agricultural products, with insufficient extension of the primary industry to the back end, inadequate expansion of the secondary industry to both ends, and lagging development of the tertiary industry towards high-end segments. Compared to developed countries, the extension level of China's rural industrial chains is notably inadequate. This situation restricts the diversity and development potential of rural economies, hindering the development of rural industries.

In the era of the digital economy, the insufficient extension of rural industrial chains implies that under the trends of informatization and intelligent development, the modernization level of rural industrial chains lags behind. The application of digital technologies in modern agricultural production, such as agricultural big data analysis and intelligent agricultural machinery, requires a complete industrial chain to support them. However, due to the insufficient extension of rural industrial chains, these

advanced technologies cannot fully unleash their effectiveness. For instance, the low level of initial processing in rural areas results in low added value of agricultural products, which hampers the application of digital technologies and the extension of rural industrial chains. Simultaneously, inadequate extension of the primary industry to the back end results in a lack of modern agricultural service systems in rural areas, failing to meet the demand for efficient production driven by digital economy development, thus causing a disconnect between the digital economy and rural economy.

Weak Infrastructure Constraining the Empowerment of High-Quality Agricultural Development by the Digital Economy Weak infrastructure constrains the application of digital technologies in rural economic development. In the process of rural digital development, sound infrastructure is a prerequisite for implementing digital economy applications, and the construction of such infrastructure requires sufficient financial support. Despite significant progress in digital infrastructure construction in China, rural digitalization still faces many problems and obstacles, with weak infrastructure being a major reason restricting the development of rural digital economy. Financial support is crucial for promoting infrastructure construction. However, due to the dispersed population and complex terrain in rural areas, coupled with their overall relative backwardness, investments in rural digital infrastructure construction remain inadequate. According to a report from the Market and Information Technology Department of the Ministry of Agriculture and Rural Affairs, in 2020, the fiscal investment in agricultural and rural informatization construction accounted for only 1.4% of the national fiscal expenditure on agriculture, forestry, and water affairs. Only a few counties (cities, districts) received sufficient financial support, while the majority faced funding shortages in rural informatization construction. This inadequate financial support directly affects the progress and quality of rural infrastructure construction, thereby constraining the effective empowerment of rural economy by digital technologies.

Lack of High-Quality Digital Talents and Low Digital Literacy Among Rural Residents Under the current background of socioeconomic transformation and development, specialized talents are the foundation and key to promoting digital development in rural economies. However, in recent years, due to significant disparities in income, living standards, and public services between urban and rural areas, an increasing number of labor forces and capital tend to flow to urban areas, resulting in talent drain and declining digital literacy levels in rural areas.

The problem of serious talent drain in rural areas is manifested in several aspects: Firstly, a large number of young and middle-aged labor forces migrate to cities, leading to a generally older population left in rural areas and resulting in hollowing out and aging phenomenon. According to data from the "Comprehensive Survey and Research Report on China's Rural Revitalization 2021," the proportion of population aged 60 and above and 65 and above in rural areas has reached 20.04% and 13.82% respectively, exceeding the standard for an aging society with more than 10% of the elderly population. Secondly, rural areas lack "high-end" leading talents in specialized fields, leading to a lack of technological support and innovation driving force for rural economic development. Furthermore, the majority of the population remaining in rural areas generally have lower

educational qualifications and relatively backward concepts, lacking the ability to accept new technologies, which further limits the application and promotion of digital technologies in rural areas. The overall low level of digital literacy among rural residents is also a significant factor constraining the construction of rural digital economy. According to the report, 97.05% of the group of rural residents aged 50 and above do not use smartphones, indicating that the majority of rural residents have limited understanding of digital technologies, thus unable to fully utilize digital technologies to promote high-quality development of agriculture.

3. Pathway Choices for Digitized Transformation Empowering New Productivity

3.1. Strengthening Digital Service Supply to Enhance Empowerment Service Levels

In the process of the digital economy empowering high-quality development of agriculture, constructing services and management platforms that facilitate digital transformation is particularly crucial.

Firstly, collaborative efforts and establishing a system of collaborative innovation are key. Ensuring the modernization, digitalization, and intelligent development of agricultural economies requires technical cooperation between research institutions and enterprises to swiftly translate agricultural technology achievements. Rational utilization of digital information technology aids in stabilizing the foundation for high-quality rural development. Under such collaborative mechanisms involving multiple stakeholders, promoting the construction of rural big data platforms and advancing intelligent agricultural development becomes imperative. Secondly, continuously innovating the application spaces and scenarios of digital platforms is equally vital. Appropriately employing digital information technology can eliminate spatial and temporal constraints, shaping a vibrant digital cultural landscape in rural areas to support high-quality rural development. Simultaneously, it is essential to preserve various rural material and intangible cultural heritages, scientifically utilize these cultural resources, and imbue them with more economic functions and values. Finally, fully utilizing rural libraries, grand theaters, cultural landmarks, etc., for digital upgrades and transformations enhances the dissemination power of cultural carriers, enriches residents' nostalgic sentiments, and lays the groundwork for engaging in rural economic development activities. These measures will help strengthen digital service supply, elevate service levels of digital empowerment for new productivity, and propel high-quality rural development to new heights.

3.2. Establishing a Digital Talent Cultivation System to Consolidate the Foundation of Empowerment Talent

During the process of the digital economy empowering high-quality development of agriculture, nurturing highly skilled digital talents is crucial, thus constructing a digital talent cultivation system becomes an inevitable choice.

Firstly, adopting a university-enterprise cooperation model is necessary. The government should guide universities and renowned enterprises to collaborate with rural areas, jointly cultivating digital talents. Universities can leverage their teaching advantages to nurture professional talents, while

enterprises can lead talent innovation and the application of digital technologies, collectively cultivating professional talents with high theoretical knowledge and digital skills for rural areas. The government should also enhance training in employment skills for digital talents, ensuring their deployment to more rural areas. Secondly, implementing job rotation training systems can introduce high-end digital technology talents to rural areas for experiential learning and training, providing demonstrations and guidance to quickly establish a digital talent pool that meets local development needs. Meanwhile, efforts should intensify to support high-quality rural development, dispatching professional talents to paired assistance units, employing experts and part-time talents to introduce more digital talents, and enhancing the development level of rural digital economy. Finally, continuous enhancement of digital talent quality is crucial. Efforts should be made to vigorously enhance residents' digital economic literacy through methods such as e-commerce promotion and intelligent government affairs handling, encouraging rural residents to participate in digital economic development activities, learn new knowledge and ideas, and dispel traditional notions inhibiting digital economic development. Simultaneously, through successful case studies, publicity, and methods like returning university graduates to rural areas for employment and entrepreneurship, traditional constraints on rural residents' thinking should be eliminated, improving digital economic literacy, enhancing the spillover effects of digital technologies, and promoting comprehensive rural revitalization.

3.3. Strengthening Legal and Regulatory Construction and Information Statistics Work to Enhance Risk Prevention Capability

During the process of the digital economy empowering high-quality development of agriculture, establishing a sound legal and regulatory system and information statistics work is crucial. Local rural governments should actively promote the vital role of the digital economy in rural development, timely enact and implement relevant laws and regulations to safeguard the secure development of rural digital economies. On one hand, it is necessary to implement measures for digital information space security and regularly invite experts and entrepreneurs to conduct special lectures, strengthen research on safety controls for digital economy and high-quality rural development, and provide guidance. On the other hand, establishing a sound rural digital financial market access mechanism, improving digital information security management systems, enhancing digital financial supervision efforts, and ensuring the secure development of rural economies are essential. Additionally, effective implementation of information statistics work related to rural digital economic development, formulation of modern big data information collection laws and regulations, establishment of specialized management and service standards, clarification of intellectual property rights related to rural digital economic development, and promotion of high-quality rural economic development.

3.4. Strengthening Supply of Various Elements and Improving Empowerment Ecological System

In the pathway choices for the digital economy

empowering high-quality development of agriculture, strengthening the supply of various elements and improving the empowerment ecological system are crucial. Therefore, the government should firstly formulate specific laws and regulations, strengthen supervision of rural digital economic activities, especially digital financial supervision, to prevent security issues. Secondly, establish specialized rules for rural digital economic data statistics to ensure data uniformity, accuracy, and standardization, laying a foundation for the integration of digital economy and high-quality rural development. Finally, establish good rules for data flow, promote free flow of rural digital economic data, address rights attribution and profit allocation issues in data transactions, establish a complete data flow system, and ensure the successful establishment of rural digital economic data element markets.

4. Summary

In exploring the empowerment of high-quality development of agriculture by the digital economy, this article elucidates its practical mechanisms and summarizes a series of typical practices. However, it also clearly recognizes the challenges and bottlenecks facing the digital economy's empowerment of high-quality development of agriculture, such as insufficient extension of rural industrial chains, weak infrastructure, and lack of high-quality digital talents. In response to these issues, a series of pathway choices are proposed, including strengthening digital service supply, constructing a digital talent cultivation system, enhancing legal and regulatory construction and information statistics work, strengthening supply of various elements, and improving the empowerment ecological system. These pathway choices aim to provide effective support for empowering new productivity with digitized transformation, pushing high-quality development of agriculture to new heights.

Nevertheless, achieving the empowerment of high-quality development of agriculture by the digital economy is not an easy task and requires joint efforts from the government, enterprises, farmers, and other stakeholders. The government should increase policy support, provide necessary policy and regulatory safeguards; enterprises should enhance technological innovation and talent cultivation, actively explore new pathways for digital transformation; and farmers should improve digital literacy, actively participate in digital economic development, and achieve a win-win situation.

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