Digitization of Rural Industries: Current Situation, Progress and Prospects

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ABSTRACT

The digitization of rural industries is the core of the construction of digital villages. It is a new driving force for realizing rural revitalization, promoting the transformation and upgrading of industrial structure. Based on the analysis of the status and progress of the digital development of rural industries, this paper uses the SWOT analysis framework to study the development prospects of the deep integration of market-led and government-led digital technology and rural industries. This paper believes that the current digitization of rural industries in China generally presents the characteristics of a new type of agricultural business entity; promoting the digitization of rural industries requires the cultivation, encouragement, and development of new rural economic formats, such as smart agriculture and precision agriculture. The flow and configuration of digital elements such as rural e-commerce platforms improves the rural logistics system and build agricultural credit information databases, so as to promote high-quality and efficient agriculture and rural modernization.

Keywords: Digital technology; Rural industry; Digitization of rural industry; Rural revitalization

1.INTRODUCTION

The epidemic has caused a significant impact on China's agricultural and rural development. The digital industry is an important application of the digital economy, and the digital agricultural industry is an important manifestation of the digitization of the industry [1]. The current global digital wave is ushering in a stage of deep integration with the real economy, and various digital technologies are exploring the development path of technological industry integration. The Food and Agriculture Organization of the United Nations predicts that agriculture will usher in a "digital revolution."

Although China's agriculture has made certain achievements in infrastructure construction, logistics improvement, and rural e-commerce development, the digitization of rural industries in China is still in its infancy.The deep integration of digital technology and the agricultural industry is still insufficient. In the late 1970s, China's rural industries introduced technologies. The "Golden Agriculture Project" in 1994 was an important sign of the official start of the digitization of rural industries [2]. Due to the poor information acquisition ability of traditional, small farmers and the high level of risk aversion, traditional small farmers in China have certain difficulties in accepting and applying

digital agricultural technology. There is a certain "digital divide" problem in the promotion of digital technology in rural areas [4]. China's new agricultural business entities are also facing the imbalance between the supply and demand of data technology, and the benefits of digital services in rural industries are low [5]. Due to the large gap in the integration of digitization of rural industries, it is necessary to accelerate the transformation of traditional agriculture. "Internet + rural industry" is a new model of the integration of intelligent and modern rural industry under the new generation of digital technology revolution [6]. With the continuous construction of digital infrastructure in China's rural industries, China's rural 4G network coverage has exceeded 98% by 2020, the number of rural citizens has reached 309 million, and the network penetration rate is 55.9%.

Since China implemented the "Internet +" strategy in 2015, rural areas have accelerated the construction of digital infrastructure. From the central to the local level, big data service agencies and websites have been gradually established at the city, county, township, and village levels. In 2021, the No. 1 document of the Central Committee clearly stated that implementation of digital rural construction and development projects, and the promotion of rural revitalization through digital technology has become a development consensus.

Through digital technology innovation, information connection and transformation solve the effective interaction of the grain production process, improving the situation of high loss, high risk and high cost of grain production [3].

Although agriculture is a pioneer in the use of digitization in many aspects, the current level of integration of agriculture and artificial intelligence and other digital technologies is relatively low, and the in-depth integration is not enough. This is reflected in the lack of willingness and the ability of farmers to apply artificial intelligence and investment in intelligent rural industries. The large amount of money has a slow recovery cycle, and the difference between the operation method and the traditional rural agriculture is widened. General Secretary Xi Jinping emphasized during an inspection tour in Zhejiang that we must seize the new opportunities given by industrial digitization and digital industrialization. The report of the 19th National Congress of the Communist Party of China proposed that digital technology should be integrated into production, distribution, and service industries to form a new requirement for a modern rural economic system. On May 13, 2020, the National Development and Reform Commission launched the "Digital Transformation Partnership Action" with 145 units including multiple departments.

Through literature review, this paper believes that although the current academic research on the integration of digital technology and rural industries has achieved some results, there are still some shortcomings. The existing literatures use local data to carry out case analysis on the digital construction of rural industries, and there are few literatures on the overall and systematic research on digital technology and rural industries. This paper intends to analyze the digital development process of rural industries and try to incorporate government guidance and market leadership into the analysis system to promote the reallocation of resources for smart agriculture and rural e-commerce platforms. Industrial construction promotes the realization path of rural revitalization.

2.ANALYSIS OF THE DEVELOPMENT STAGE OF DIGITAL TECHNOLOGY'S ACCELERATING INTEGRATION OF RURAL INDUSTRIES

Digital technology refers to the technology of processing and controlling digital technology through Internet equipment. The digital economy refers to economic activities that take digital technologies as an endowment element and deeply integrate it into the industrial chain to optimize the economic structure. Digital dividends mean that in the process of digitization, poor people in developing countries receive convenient digital information services due to the adoption of new digital technologies, thereby gaining dividends to improve competitiveness, narrowing the digital divide with wealthy people [7].

Table 1 Division of Digitization Stages of Rural Industries

Stage division	Division basis	Focus of Digital Technology Application
Initial construction stage (Late twentieth century)	In 1994, "Gin Nong" project logo; 2003 863 plan technology intelligent application project	Digital industry, agricultural expert digital database construction, agricultural website construction, etc.
Pilot phase (early 21st century)	In 2005, the No. 1 document of the central government was put forward, and the construction of the national rural e-commerce website in 2010	The development of digitization of the rural industry is gradually clarified, involving e-commerce, digital technology promotion and services, etc.
Accelerate the integration phase (Since 2011)	In 2011, the five-year plan for the digital development of the country's rural industries, the country's first batch of Internet of Things projects started	Internet of Things, E-commerce, Smart Agriculture

At present, China has entered a new period of comprehensive integration of digital technology and rural industries. Throughout its development process, it can be roughly divided into three stages:

At the end of the twentieth century, the digitization of rural industries entered the initial stage. The development and application of agricultural-related digital technology at the national level has begun. Jinnong Engineering has established a national rural industry database and focused on demonstrating digital production methods represented by precision rural industries. The 1994 Jinnong Project marked the beginning and rapid development of China's digital rural industry.

At the beginning of the 21st century, the digitization of rural industries entered the pilot stage. The rural digital infrastructure is constantly being improved, and the role of digital technology in the rural industry is becoming more and more obvious. The digital construction of the rural industry is highly valued. With the increase of investment in the development and construction of digital technology from the state to the local level, the penetration of digital technology in all links of the rural industrial chain is increasing.

Since 2011, the industrialization of digital villages has entered a stage of accelerated integration. The new round of digital technology is fully integrated into the rural industry, and the degree of digitization of production, operation and consumption has clearly

emerged. In 2011, China entered the era of rural industry 4.0 [8], and "Internet +" facility agriculture was promoted successively. In 2015, the application of the big data developed rapidly. With the government's guidance of digital agriculture, China has initially formed the development framework of digital rural industrialization and the operation mechanism of digital rural industry, and the embryonic form of the development of digital rural industry has emerged.

3. SWOT ANALYSIS OF ACCELERATING INTEGRATION OF DIGITAL TECHNOLOGY IN RURAL INDUSTRIES

Since the 19th National Congress of the Communist Party of China, the state has made major deployment arrangements, which have been carefully implemented from the central to the local level, and vigorously promoted the accelerated integration of digital technology in rural industries. The construction of digital technology infrastructure in China is constantly deepening, and the penetration of smart digital into rural industries is speeding up to achieve the goal of reducing production costs and improving the quality of crop products.

Table 2 SWOT analysis of accelerating integration of digital technology in rural industries

Advantage	Disadvantage
The rural big data platform has begun to take shape; E-commerce reduces market transaction costs; Promote the layout and upgrading of rural industrial structure; The main body of production and operation and consumers have become passive to interaction;	Low popularity of digital technology application in rural industries; Lack of professional talents for digital technology application and promotion; E-commerce Taobao Village demonstration drive is not strong; Insufficient financial support;
Opportunity	Challenge
Digital technology reconstructs a new era of rural industry; During the epidemic, the public's online consumption habits have been cultivated; New momentum is needed to achieve high-quality economic development;	The digital technology infrastructure needs to be upgraded; The degree of data sharing is low, and the research and development of key technologies is insufficient; The digital divide is highlighted by the gap between the rich and the poor; The lack of digital technology talents restricts the development of rural industries;

3.1. Advantage analysis

In all links of the rural industry chain, digital information is more open and transparent, and the sharing of digital information resources in the rural industry has been realized. The integration of digital technology and

rural industries can enable rural industry operators to accurately respond to market demands and enhance their competitiveness. With the popularization of the Internet in rural areas, e-commerce has been radiated in rural areas. In the future, the delivery of full coverage of various industrial links in rural areas will not be restricted

by time and space. The promotion of 5G technology and the application of e-commerce have changed the behaviors and habits of producers and consumers, making digital technology more efficient and in-depth integration with rural industries. The operation of digital technology in rural industries promotes the upgrading of rural industrial structure. Digital technology can also improve rural production efficiency and reduce production costs. Most rural producers and consumers are relatively passive in the application of digital technology.

3.2. Disadvantage analysis

The national and local governments attach great importance to the application of digital technology in the industry in terms of decision-making, deployment and capital investment. However, insufficient attention is paid to the application of digital technology in the industry. This has led to the lack of publicity by the local government. The popularity of rural industries is not enough, and operators lack an understanding of the concept of digital technology. Farmers have a low level of education and lack of ability to accept big data intelligence. They are prone to doubt the security of big data intelligence. The development of rural e-commerce in China started late and showed regional imbalance. The vast number of farmers in poor areas are still producing and selling in traditional ways. Although government departments increase policy support for the application of digital technology to rural industries every year, there are fewer e-commerce companies that can meet the conditions for policy support.

3.3. Opportunity analysis

In the future, the deep integration of China's digital technology and rural industries will usher in a rare opportunity. The state vigorously promotes the integration of digital technology and rural industries, which provides a strong policy guarantee for the development of digital agriculture. At present, the application of digital technology has entered a new historical stage. China's digital technology infrastructure is ushering in the development trend. Due to the popularization and application of digital technology in rural areas, rural industries have succeeded in their attempts to conduct online transactions for control of the epidemic. Digital technology has penetrated into all aspects and links of the rural industrial chain, promoting the transformation of the agricultural economy from relying mainly on human and capital inputs of production factors to driving total factor productivity. Since the 19th National Congress of the Communist Party of China has attached great importance to the digital development of rural industries and promoted the in-depth integration of digital technology in rural industries. During the "14th Five-Year Plan" period, digital technology will be regarded as the main endowment factor of rural industries.

3.4. Challenge analysis

At present, the basic data resources of China's rural industries are scattered, and the ability to obtain data is relatively weak. The industrialization of digital villages is lagging behind, and the development and utilization of data integration is insufficient. The prerequisite for promoting the revitalization of rural industries is the infrastructure of digital technology. The geographical location of rural areas is remote, and infrastructure affects the promotion and application of digital technology. The information dividend of digital technology continues to spread rapidly to rural areas and agriculture. However, due to the gap between the rich and the poor in the country, the acceptance of digital technology is restricted. Therefore, a digital divide appears in the state of traditional rural industries. The unbalanced investment in rural infrastructure has long delayed the advancement of rural digital technology. The occlusion of the countryside has led to a general outflow of high-quality young and middle-aged people in rural areas, exacerbating the shortage of digital technology talents in rural areas. In the next five years, there will be a gap of more than 1.5 million digital technology talents.

4.A TYPICAL CASE ANALYSIS OF DIGITAL TECHNOLOGY IN THE PROCESS OF ACCELERATING THE INTEGRATION OF RURAL INDUSTRY-TAOBAO VILLAGE

Taobao Village is a practitioner of rural revitalization. The foundation of the rural revitalization strategy is to use the e-commerce platform to promote the development of rural industries. The integration of e-commerce in the rural industry has solved the problem that agricultural products are difficult to sell. Local businesses use the rural Taobao platform to directly push agricultural products to the rural people. Rural Taobao optimizes the allocation of local agricultural products that meet market green, health and safety standards to local brand companies and operators, and promotes agricultural products to the country and the world.

In 2009, Taobao village researchers knew that once farmers were given information capabilities by the Internet platform, they would have more room for empowerment. In 2010, Professor Wang Xiangdong studied the e-commerce development model of farmers in Shaji Town, Suining County, and released the Taobao Village Shaji Model. In 2013, the Ali Research Institute proved that Taobao Village is replicate. The World Bank pointed out in the "World Development Report 2019: Changes in the Nature of Work" that digital technology can help China's rural economy grow inclusively, and it can also lower the threshold of required skills to facilitate individual participation in e-commerce and increase income. Farmers have explored the endowment factors that affect e-commerce of farmers, prompting local

governments to guide mass e-commerce entrepreneurs [9], creating a large number of jobs for poverty-stricken areas, and gradually narrowing the income gap in poverty-stricken areas.

5.COUNTERMEASURES FOR THE IN-DEPTH INTEGRATION OF DIGITAL TECHNOLOGY IN THE RURAL INDUSTRY

5.1. Market plays a leading role of the integration of digital technology and rural industries

General Secretary Xi Jinping emphasized at a symposium of experts in the economic and social fields that breakthroughs in digital technology are related to the overall development and the promotion of supply-side structural reforms. The creation of new demand with new supply requires digital technology strength to ensure the supply chain of the rural industry chain. Rural e-commerce companies use big data service stations at the four levels of provinces, counties, towns, and villages to promote the connection of supply and demand, innovation of consumption models, and expand the agricultural product sales market.

5.2. Government should guide and regulate

The deep integration of digital technology and rural industries require government guidance and macro-control. The government provides policies, funds and assistance for the digital development of rural industries. The government should accurately digitize rural industries by building a new online and offline matching platform for the deep integration of digital technology and rural industries.

6.CONCLUSION

This paper summarizes the current situation, progress and prospects of the digital development of rural industries. It is necessary to carry out the in-depth integration of digital technology in the rural industry under the conditions of government guidance and market leadership. And put forward strategies to promote the deep integration of digital technology and rural industries. With the continuous development of digital technology and the deepening of the integration of new technologies in rural industries, future research should focus on low-income groups crossing the "digital divide" and sharing

the "digital dividend. With the development and transformation of new technologies, the realization of full coverage of rural high-speed broadband, production, consumption, circulation to provide farmers with digital services that meet their needs will become the trend of digital research in rural industries.

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