

# An Analysis on the Development Path of Digital Agriculture under the Background of Rural Revitalization

Haijun Li, Xiaopeng Cao

Basic Education Department, Shandong Huayu University of Technology, Changhe Street, Dezhou, China

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**Abstract:** According to the Chinese Academy of Social Sciences' report on the measurement of the scale of China's digital economy and the "14th five-year plan" outlook, the size of China's digital economy is expected to reach 3.27 trillion yuan by 2025. In recent years, the digital economy of China develops rapidly, the digital agriculture has big development space. In the context of deepening the implementation of the rural revitalization strategy, the development of digital agriculture will be taken as an important poverty alleviation to consolidate the achievements of rural development, stimulate the endogenous driving force of rural development, and achieve sustainable social and economic development in rural areas. The development of digital agriculture is not only an important process to promote the development of agriculture and rural modernization, but also a key factor to increase farmers' income, improve the quality of life, and achieve the goal of rural revitalization. On the basis of exploring the necessity of digital agriculture development and its development practice, this paper puts forward the practical dilemma existing in digital agriculture development, digital talent and social support, and puts forward the path of digital agriculture development from the perspective of digital rural construction as well as the resultant force of professional farmer cultivation and development.

## 1. The Necessity for Digital Agriculture Development

According to the National Bureau of Statistics, in 2021, the per capita disposable income of urban residents was 47,412 yuan and 18,931 yuan. The per capita disposable income of urban residents was about 2.5 times that of rural residents. The gap between urban and rural areas is still large, and there is still plenty of room for rural revitalization. For a long time, China's urban-rural dual structure has led to the gap between urban and rural areas in various aspects. The rural revitalization strategy focuses on the city, industry and agriculture, and is committed to promoting the integrated development of urban and rural areas. The revitalization of the countryside needs the comprehensive development of agriculture, forestry, animal husbandry and fish industry. According to the National Bureau of Statistics, the total output value of agriculture, forestry, animal husbandry and fish in China in 2020 is 13,778.217 billion yuan, of which the total output value of agriculture is 71,748.23 yuan, accounting for 52.07%, which shows that the development and revitalization of agriculture play a huge role in the whole process of rural revitalization. Digital agriculture relies on various agricultural technologies and information technologies acting in the whole process of agricultural production, management, sales and service, and is committed to building an agricultural technical production, fine management, precision sales and intelligent services [1]. Digital agriculture has opened up a new path for the comprehensive revitalization of agriculture.

### 1.1. Developing Digital Agriculture is an Inevitable Choice for Rural Revitalization

The rural revitalization strategy is committed to narrowing the gap between urban and rural areas, promoting agricultural development, rural prosperity, and the happiness of farmers. The key to rural revitalization is that the increase of farmers' income is mainly in the development of agriculture. The development of digital agriculture can effectively improve the efficiency of agricultural production, improve the production quality of agricultural products, improve the working life of farmers, and increase the income level of farmers, which is the key impetus to achieve rural

revitalization. In today's era, new technologies emerge in endlessly, directly affects people's production and life, technology as one of the important factors of production, effectively combined with agricultural production, can greatly promote the improvement of productivity level, productivity also affects the production relations, effectively promote rural education, medical, pension and other fields. On the one hand, we should revitalize rural areas, gradually narrow the gap between urban and rural areas, and promote the digital transformation of agriculture. On the other hand, we should also revitalize industries and promote the integrated development of primary, secondary and tertiary industries. Digital agriculture can better connect the secondary and tertiary industries, and boost industrial integration and urban and rural integration.

## **1.2. Development of Digital Agriculture is an Inevitable Trend of Agricultural Development**

The development of agriculture should conform to the requirements of the times, and constantly pursue the organic combination with production practice. According to the data of the National Bureau of Statistics, China's GDP in 2020 was 114,366.97 billion yuan, of which the added value of the primary industry is 8,308.55 billion yuan, far behind the added value of the secondary industry 45,090.45 billion yuan and the added value of the tertiary industry 60,967.97 billion yuan. There is still a lot of room for the development of the primary industry. As an important component of the primary industry, the high-quality development of agriculture is of great significance to improving the output value of the primary industry. The development of agriculture must rely on advanced production technology and information technology, accurately connect with the demand end of agricultural products, and realize the effective matching between supply and demand. The organic integration of various advanced technologies and agriculture can realize the digital management and operation of the whole process before, during and after agriculture, which can effectively improve agricultural production capacity and improve the quality of agricultural products. At the same time, the development of digital agriculture can realize the combination of agriculture and industry, the combination of agriculture and service industry, and comprehensively expand agricultural production, service and management functions, which is an inevitable choice for agriculture to adapt to the new era and new business forms.

## **2. Practical Exploration of Digital Agriculture Development**

Digital transformation is the inevitable choice of agricultural development, it can greatly improve the efficiency of agricultural production, precision fertilization, agricultural spraying technology can improve the quality of agricultural products, the big data, block chain technology applied to agricultural products sales can achieve sales traceability, providing convenience for agricultural products supervision. At present, the development of digital agriculture at home and abroad has formed many typical cases, providing reference experience for the further development of digital agriculture.

### **2.1. Practice to Alleviate Labor Shortage**

With the increasing aging, the rural labor force is also in short supply. According to international practice, when the population of over 65 reaches 7%, it means that the country has entered an aging society. According to the data from the National Bureau of Statistics, by the end of 2020, China had a total population of 1412.12 million, of which 190.64 million, accounting for 13.5% or above, so China has entered an aging society, and the problem of labor shortage will become more and more serious [2]. Especially in rural areas, a large number of young and middle-aged labor force enters the cities, resulting in a shortage of labor force directly engaged in agricultural production. How to alleviate this situation is a major dilemma facing the development of digital agriculture. Agricultural robots are put into the agricultural production process, and helping agricultural production is an important breakthrough to deal with this problem. French Naio Technologies team research and development class an agricultural robot, the robot can work 24 hours in agricultural production, greatly improve the efficiency of agricultural production, and the robot on pesticide spraying and field weeding operations can do the safe use of pesticides and accurate operation, both liberated the

agricultural labor and promote the quality of agricultural products, contribute to the improvement of agricultural production environment [3]. Digital agriculture uses various intelligent technologies to realize the intelligent and intelligent production of agriculture, and can also realize the precise and precision management of crops, and the production efficiency has also been greatly improved.

## **2.2. Practice of Promoting the Integration of Production and Marketing**

Promoting digital transformation in the field of agricultural production can better guarantee production efficiency and product quality, and digital transformation is also needed in the sales link of agricultural products [4]. In the traditional mode of agricultural production, farmers should constantly look for products, and middlemen earn high profits by purchasing price and selling price. The development of digital agriculture can promote the integration of production and marketing, directly avoid the price difference of middlemen, and effectively protect the rights and interests of producers and consumers. Box horse fresh is using all kinds of advanced technology, realize the docking of production and sales, vegetable sales, for example, box horse fresh direct docking with vegetable production base, vegetable picking, after packaging and cold chain transportation link, directly into the supermarket sales, save the middlemen link and supermarket entry cost, etc., can feed consumers at a low price, realize two-way mutual benefit and win-win [5]. The digital development of sales saves the cost of farmers to find sales channels, reduces the sales price of products, promotes the innovative development of new retail models, and forms a whole-chain tracking system, which is conducive to the supervision of agricultural products.

## **2.3. Promoting the Practice of Supply-Side Structural Reform**

The high-quality development of digital agriculture should not only make full use of various technical means and information channels, but also strive to improve the quality and upgrading of the agricultural industry in the process of digital transformation, and promote the supply-side structural reform [6]. Netease Weiyang pig model reflects the new upgrading and digital transformation of the breeding industry, and provides experience for the development of the breeding industry in rural areas. Netease WeiYang pig modern breeding mode fully relying on all kinds of advanced technology, intelligent camera can monitor the pig activity and rest condition, the application of sensing technology can comprehensive monitoring of pig excretion and feeding, do accurate feeding, health maintenance, automated liquid feeding system also improve the scientific, ensure the healthy pigs. In the digital pig raising scene, only six managers can complete the operation of the whole pig farm, which greatly improves the efficiency of breeding, creates the digital speed, and promotes the supply-side structural reform of the pig raising industry.

## **2.4. Promoting the Practice of Digital Agricultural Brands**

For a long time, we have been exposed to various brands, brand awareness is more and more prominent in various industries, the value of brands has also been more and more attention. The brand construction of agricultural products should run through the whole process of agricultural production, and the brand digital construction is also an inevitable choice to adapt to the digital transformation of agriculture, but also closely related to the consumption upgrading of the whole society [7]. Agricultural brand digital needs to rely on Internet technology, not only requires the corresponding brand quality of agricultural products pass, also requires the production process follow the low carbon, environmental protection, sustainable development concept, and the brand is a culture, cultural factors behind agricultural products to digital mining and connected with the brand. The digitalization of agricultural products brands should rely on Internet communication means and use new media publicity means to boost the digital communication of brands. Taste Xinjiang is a typical representative of being committed to building brand digitalization. On the APP, we can see the high-quality agricultural products brands in various regions of Xinjiang, and the APP also provides various life service functions.

### **3. The Realistic Dilemma of Digital Agriculture Development**

#### **3.1. Digital Construction in Rural Areas Lags Behind**

In the process of digital construction, the digital gap between urban and rural areas is relatively obvious, the productivity level in urban areas is advanced, and the digital level of various industries is developing rapidly [8]. Relying on the economic level, social security level and education status, the social governance pattern is increasingly digital. However, the level of digitalization in rural areas is far behind. According to the statistical report of China's Internet development in China, by the end of 2021, the scale of rural Internet users in China is 284 million, accounting for only 27.6% of the total Internet users. The Internet penetration rate in rural areas is 57.6%, and the Internet penetration rate in urban areas is 81.3% [9]. The first element of the digital transformation of agriculture is the network. The precise supply of agricultural products, the e-commerce of sales, and the popularization and promotion of information all need to rely on the network channels, but the current network popularization in rural areas cannot meet the needs of digital transformation. The lag of digital construction hinders the digital transformation of agricultural production, and the unimpeded information between urban and rural areas restricts the flow of capital, talent, technology and other production factors between urban and rural areas. Agricultural production cannot accurately meet the market demand, and the effective linkage of various agricultural production factors is also limited. In the digital age, information and technology are equally important. The digital transformation of agriculture and the supply-side structural reform both need the effective communication of information.

#### **3.2. Lack of Digital Talents in Rural Areas**

The development of digital agriculture should not only rely on advanced digital technology, but also rely on talents who can master digital technology. At present, young and middle-aged labor engaged in agricultural production generally flows into cities in rural areas. Most of the farmers left in rural areas for agricultural production are older elderly groups, taking into account the families and production women, which directly leads to the labor resources in the development of digital agriculture cannot meet the real needs. In terms of education level, farmers engaged in agricultural production in rural areas have low education level, and many children choose to work and live in urban areas, unwilling to return to the countryside; graduates from specialized agricultural colleges rarely return to the countryside for agricultural operation. The development of digital agriculture requires both farmers who understand agricultural production and talents who understand digital technology.

#### **3.3. Insufficient Social Support for the Development of Digital Agriculture**

The effective practice of rural revitalization strategy requires not only the self-development and progress of rural areas, but also the support of various social forces. Cities support rural areas, industry and service industry feed agriculture, and the support of rural revitalization by all sectors of society is an important driving force for the national modernization process [10]. As a key point of rural revitalization, digital agriculture requires the participation of various social forces and the help and drive from the help of all sectors of society. However, the current social support for the development of digital agriculture is far from enough. At present, the main areas of social support are focused on network application, e-commerce live broadcast application, but the key technology of digital agricultural production, the application of digital production facilities, digital rural construction and other aspects of insufficient support. At the same time, the development of digital agriculture is not a short-term behavior, but requires long-term investment and support from technology companies, agricultural technology experts and financial support.

### **4. The Development Path of Digital Agriculture**

#### **4.1. Promote the Digital Construction of Rural Areas and Build a Digital Countryside**

The digital level in rural areas directly affects the development level of digital agriculture. By

constantly improving the level of Internet coverage in rural areas, increasing the scale of rural Internet users, and consolidating the information foundation of digital agriculture. At the same time under the premise of the network flow, constantly improve the rural data information sharing platform, through data sharing, realize urban and rural information interactive interconnection, accurately grasp the latest industry development dynamic and product quality, direct consumer demand, timely focus on the latest technology update and application, through internal efficiency, external exchange, information sharing to build urban and rural union, workers and peasants, industrial integration development of digital agriculture development mode. Improve the rural digital level is to promote the effective interpretation and application of digital information, realize the accurate push of information, which needs to improve the digital literacy of farmers, build from infrastructure to the grass-roots farmers, from the upper leadership to the lower level, from the information demand to the information application of information communication and practice path. The construction of digital countryside, we will gradually infiltrate digital technology into the rural production and living practice, consolidate the foundation for the development of digital agriculture, and promote the high-quality development of agriculture.

#### **4.2. Cultivate Farmers' Digital Literacy and Cultivate New Professional Farmers**

Influenced by their own knowledge structure and geographical culture, farmers engaged in agricultural production are more willing to believe their own production practice experience, not willing to accept new technology, new mode, in the digital age, to take effective means to change farmers traditional ideas, improve farmers' digital literacy, strengthen the cultivation of new professional farmers, promote farmers' professionalism. First of all, we should cultivate farmers' "Internet +" thinking. The information age has mastered the necessary Internet skills, which can effectively improve the ability of using the network to learn and collect and view various information. Relying on network platforms, agricultural products trading information and agricultural technology information need to cultivate and improve farmers' information retrieval and information analysis ability. Secondly, take multiple measures to strengthen the cultivation of professional farmers. Farmer professionalization is a powerful driving force to promote the development of agricultural modernization, and also a key point for the development of digital agriculture. Making farmers a profession and continuously enhance their professional identity helps professional farmers to actively innovate in the production process and actively use new technologies to engage in agricultural production. Thirdly, we should continue to introduce compound talents who understand both production and technology for the development of digital agriculture, and provide perfect guarantee and incentive mechanism, so that talents can be introduced or retained.

#### **4.3. Strengthen the Support of All Walks of Life to Digital Agriculture to form a Joint Force for Development**

In the context of the rural revitalization strategy, cities, industries, service industries and all sectors of society should actively feed back agriculture to form the centripetal force and cohesion of urban and rural integration and the union of workers and peasants. On the one hand, we should strengthen the agricultural technology guidance, information technology guidance and digital technology application guidance for agriculture, rural areas and farmers from the perspective of knowledge and technology to the countryside. Universities, related agricultural production and service companies, and agricultural universities should strengthen their awareness of support and take the initiative to connect with rural services. On the other hand, strengthen financial support. In addition to financial support funds, the joint development of industry and agriculture, leading enterprises docking with agricultural production, and the investment and financing convenience provided by major financial institutions will effectively promote the development of digital agriculture. In addition, the relevant government departments should strengthen the ideological publicity and guidance, enhance the confidence and motivation of farmers engaged in digital agriculture, promote farmers to take the initiative to respond to the new situation, actively explore new models, and stimulate the enthusiasm of farmers to take the initiative to accept training.

## 5. Conclusions

The integration of digital technology and real economy is speeding up, traditional industries are being transformed and upgraded, and economic growth modes are being innovated. Under the background of rural revitalization, it is necessary to strengthen the efforts to train and introduce talents, to provide more professional and skilled talents for rural areas, so as to gradually solve the problems existing in the process of development and to strengthen the digital construction, play a role in promoting the sustainable development of rural revitalization.

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## References

- [1] Jin Jiandong, Xu Xuchu. Practical Logic, Practical Challenges and Promotion Strategies of Digital Agriculture. *Research on Agricultural Modernization*, 2022, 43 (01): 1-10.
- [2] Lu Dayang, Li Feng. Study on the development path of digital agriculture in the context of rural revitalization. *Southern farm machinery*, 2022, 53 (4): 116-118,121.
- [3] Sun Bao, Tian ru-ya. Current situation and prospect of digital agriculture in China. *Agricultural outlook*, 2021, 17 (4): 62-67.
- [4] Tan Qiucheng, Zhang Hong. The feasibility, problems and relevant suggestions of the development of digital agriculture in our country. *Economic Research Reference*, 2022 (2): 23-29.
- [5] Wang Gang. Study on the development path of digital agriculture in the context of rural revitalization. *Southern farm machinery*, 2021, 52 (24): 96-98.
- [6] Wang Xuhui, Zhao Bo, Wang Xin. Research on Digital Agricultural Model Innovation- -Based on the case of netease Weiyang Pig. *Agricultural economic problems*, 2020 (08): 115-130.
- [7] Zhang Baiyang, Liu Jiaying, Zhu Ruibo. Digital Agriculture Development: International Experience, Emission Reduction Effect and Financial Support- -Case Analysis Based on Chengdu. *Southwest Finance*, 2022 (01): 28-39.
- [8] Zhang Taiyu, Wang Yanhong. Financial support mechanism for high-quality development of Digital agriculture. *Jiangsu Agricultural Science*, 2021 (22): 1-11.
- [9] Zhao Minting, Chen Dan. The realization path of the digital transformation of agricultural brands. *People's Forum*, 2021 (36): 76-78.
- [10] Zhu Jiaping. The development logic, realistic challenges and implementation strategies of digital agriculture. *Comprehensive agricultural development in China*, 2022 (9): 57 -60.