

# Application of Agricultural Information Big Data Technology in Rural Economic Revitalization

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## ABSTRACT

The main purpose of this paper is to explore the application of big data technology in the implementation of rural revitalization strategy. From the perspective of “prosperous industry, livable ecology, civilized rural customs, effective governance, and prosperous life”, this paper expounds the collection, storage and analysis of agricultural information big data. It also expounds the key points of the follow-up audit of the implementation of the rural revitalization strategy from the perspectives of pre-, in- and post-audit. Specifically, the article first clarifies the basis of the demands and functional positioning of the core stakeholders, and then uses the principal-agent theory to explore the incentive mechanism for cooperation between local governments and big data operating enterprises and uses evolutionary game theory to explore the relationship between big data operating enterprises and agriculture-related enterprises. Finally, MATLAB software is used to simulate and analyze how key parameters affect the evolution trend of the system.

## KEYWORDS

Big Data, Rural Revitalization, Agriculture

## INTRODUCTION

Rural revitalization is an overall and historic task related to building a powerful modern socialist country in an all-round way (Liu et al., 2022). Winning the tough battle of poverty alleviation and implementing a rural revitalization strategy are effective ways to make up for the shortcomings of building a well-off society in all aspects in the new era and to solve the problem of unbalanced and insufficient rural development (Tang, 2022). The report of the 19th National Congress of the Communist Party of China pointed out that the general requirements of rural revitalization are “prosperous industry, livable ecology, civilized rural customs, effective governance, and affluent life” (Hu & He, 2021). For the first time in history, the Fourth Plenary Session of the 19th Central Committee put forward data as a factor of production, which has breakthrough significance (Bakdur et al., 2018). The implementation of the rural revitalization strategy is inseparable from the support of big data (Lu, 2021, July). Big data technology can boost rural revitalization; provide more means and tools for agricultural upgrading, rural progress, and farmers' enrichment; and provide new ideas for the implementation of the rural revitalization strategy (Zhou, 2021). Rural local governments should follow the party, guidelines, and policies on “agriculture, rural areas and farmers” in the new era; seize opportunities (Zhu & Jian, 2021); build smart countryside and smart agriculture with the

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help of big data technology; promote high-quality development of rural economy; and fully realize the strategic goal of rural revitalization (Geng, 2021, February).

To achieve rural revitalization, we must first revitalize rural industries, especially in the process of rural economic development in some areas (Morin et al., 2019). Due to the influence of regional resources and geographical environment, economic development is at a disadvantage. The effective integration of information technology in agricultural production is conducive to adding vitality to the rural revitalization work and reducing the production pressure of farmers (Lacković, 2018). Accelerating the construction of agricultural informatization is conducive to improving the quality and efficiency of agricultural production, ensuring farmers' income and at the same time improving the efficiency of land and water use, effectively alleviating the problem of insufficient resources (Liu, 2021). Agricultural informatization is mainly realized by integrating the following measures in rural revitalization: cloud computing technology, Internet of Things (IoT) technology, big data technology, and mobile Internet technology (Li, 2021).

Cloud computing technology is an indispensable and important technology in the construction of agricultural informatization. It has obvious advantages in distributed computing processing (Tang et al., 2021). Therefore, when applied to production activities, it can control costs and achieve efficient use of resources. Building a complete agricultural informatization platform with cloud computing technology as the core is more scientific in agricultural production, especially the construction of a smart agricultural system, which is conducive to the rapid and efficient integration of agricultural resources. IoT is a key technology developed based on the Internet. It can be integrated and applied in agricultural informatization to improve the current agricultural production structure (Zhao et al., 2020). For example, in the process of monitoring light intensity, air humidity and temperature, soil moisture, and carbon dioxide concentration, the use of IoT technology can ensure the accuracy and reliability of information data. The mature development of mobile Internet technology can also provide a guarantee for the development of agricultural informatization in the context of the rural revitalization strategy (Li et al., 2021). Under a specific protocol, the notebook computer and mobile phone are connected to the Internet or, relying on wireless communication, the mobile terminal can quickly access the wireless application protocol website (Sun et al., 2021). Especially with the gradual popularization of smart phones, the development of mobile Internet technology has become more and more mature, which will help to achieve balanced development of agriculture and promote the optimal allocation of agricultural resources. The emergence of 4G and 5G communication technology has made the advantages of mobile Internet technology more significant in agricultural informatization and played a key role in industrialization upgrades (Xie & He, 2022). Through the construction of the agricultural production information platform, farmers can obtain relevant information in real time by means of mobile phones; the traditional habits of agricultural production are broken, which helps to speed up the dissemination of information and expand the scope of dissemination. In addition, with big data technology as the core, a complete data system of the whole industry chain is constructed to realize the optimization of each production link and prevent the restriction of industrial integration due to data barriers (Liao et al., 2019). For example, in the pig breeding industry, big data technology can be used to comprehensively collect data from various industrial links, including veterinary, quarantine, and wholesale markets (Jang & Lee, 2019). In the process of optimizing the data chain, it is necessary to integrate various external data to enhance the integrity of the data set. In data mining and comparative analysis, market conditions can be assessed to provide reference for policy formulation and production planning. In addition, data mining and comparative analysis can also help farmers to obtain more market information, ensure the transparency of agricultural information, and prevent farmers from receiving inaccurate information (Cai, 2022).

At present, due to the existence of data barriers, information-isolated islands, and unreasonable allocation of production factors among the various links of China's agricultural industry chain (Tu & Zhang, 2021), the overall efficiency of domestic agriculture is low (Bai, 2021). The application of big data technology in the production, circulation, sales, logistics, and other links of the agricultural

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