

# Research on the application of computer extensive data analysis technology in rural e-commerce

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**Abstract.** According to the framework of national rural revitalization, rural e-commerce has developed under the drive of informatization to solve the problem of rural economic development. In the context of the Internet, big data technology is used in rural e-commerce to innovate marketing models, and the system effectively optimizes distribution efficiency. While analyzing the status quo of the application of big data technology in rural e-commerce, this paper also puts forward some improvement suggestions for related problems. It analyzes feasible measures and corresponding technical methods to optimize the existing business processes. After implementing the optimization measures, it can effectively promote the construction of big data in the agricultural product industry chain and the effective integration of rural e-commerce, and promote the take-off of the agricultural economy.

**Keywords:** Computer, Big data; E-commerce; Rural e-commerce.

## 1. Introduction

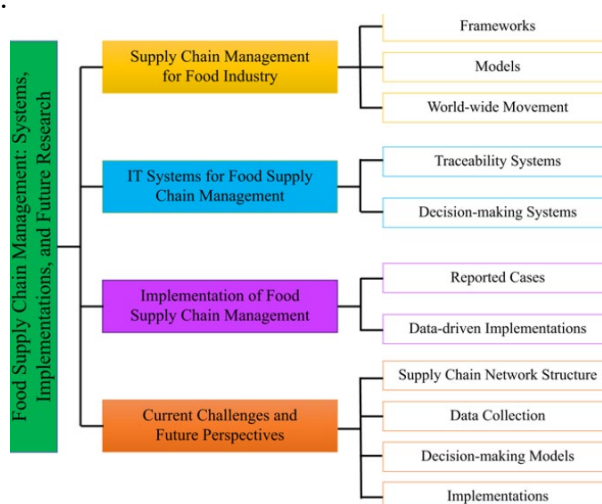
In order to complete the development of social new rural e-commerce logistics in an all-around way and achieve the ultimate goal of shared prosperity, the first problem facing the country is to effectively increase the income level of farmers. The whole industry chain of agricultural products refers to the refined connection of all the processes of agricultural products, from the initial sowing and receiving to the later processing and transportation, and finally to people's dining table, to carry out the management of the whole process and the whole life cycle. A large amount of data and information will be generated during the management of the entire industry chain. The development and application of big data technology integrate this information and data well, forming an extensive data information management system for the entire industry chain. One system can well realize the management of the entire cycle of agricultural products, and it also forms an intense information flow for the accumulation of massive data, which is more convenient for the sales and channels of the entire agricultural products. The effective integration and mutual promotion of extensive data construction of agricultural product industry chain and rural e-commerce have become the general trend.

## 2. The significance of the effective integration of extensive data construction of the whole agricultural industry chain and rural e-commerce

### 2.1 Big data in the whole industry chain boosts the development of the agricultural industry

The construction of big data in the whole industry chain of agricultural products refers to the management of the whole life cycle of agricultural products, from the picking of agricultural products to the consumption of agricultural products. The big data of the whole industry chain of agricultural products can effectively summarize various information and data related to agricultural products, and it is convenient to control all aspects of the production and sales of agricultural products. First of all, the prices of the means of production of agricultural products are constantly changing. Previously, farmers could not predict the price changes of the means of production of agricultural products, so they could only buy them randomly, which may cause the cost of agricultural products to remain high. The trend of data price changes gives scientific and professional suggestions and guides farmers to purchase relevant raw materials within a reasonable range to reduce costs further. Secondly, the production process of agricultural products is greatly affected by natural environmental factors. Lousy

weather, soil, and other factors are all important reasons for affecting the output of agricultural products. Traditional agricultural production has nothing to do with the natural environment and can only rely on the weather. The construction of big agricultural data, mastering a large amount of data, is convenient to predict and analyze the natural environment, and it is convenient for farmers to take measures in advance to reduce the reduction of agricultural production due to changes in the natural environment. See Figure 1.



**Figure 1.** Big data construction of the whole industrial chain of agricultural products

## 2.2 The whole industry chain of big data promotes the development of rural e-commerce

The construction of big data in the whole industry provides a superior technology platform and brings together information and data from all over the country and even around the world. The development of rural e-commerce is based on networks and platforms, bringing together consumers from all over the country, expanding the scope and area of consumers, and increasing the sales revenue of agricultural products:

The construction of big data in the whole industry chain can well integrate consumers' preferences in the market, which significantly benefits the sales director of rural e-commerce. The big data platform can accurately recommend rural e-commerce platforms that consumers may like according to consumers' preferences. This precise recommendation also makes it easier to reach transactions, and sales can also increase accordingly.

The extensive data system of the whole industry chain can quickly collect relevant information about consumers and conduct an accurate analysis of consumer information and data. When conducting e-commerce sales, some marketing strategies can be accurately formulated. E-commerce can also carry out targeted marketing activities according to the different needs of consumers during sales [1].

The new sales system of rural e-commerce also makes it easier to supervise and control the quality of agricultural products.

The extensive data information system dynamically monitors the flow of each batch of agricultural products. Consumers can check the production, sales, and transportation of agricultural products through the extensive data system, which is conducive to accurately grasping agricultural products' quality. It can also enhance consumers' trust in agricultural production, thereby enhancing consumer loyalty.

## 3. Applications of Big Data Technology

### 3.1 Reforming the Marketing Model

E-commerce marketing mainly refers to enterprises relying on the Internet to use various methods to improve the transaction behavior between enterprises and customers. The early e-commerce

marketing model could not conduct in-depth research on customer needs. The marketing model mainly relied on the subjective recommendation of products and services and disregarded customers' consumption habits to promote products. For example, in traditional e-commerce, a standard marketing model places products at the top of consumer search terms blindly. Although this marketing method can expand the sales volume of some products, it cannot practically meet the purchasing needs of every customer. The primary and most crucial goal of marketing is to meet customers' needs, and the potential needs of customers continue to exist for mining in the marketing process. In the process of browsing the Internet, all activities will generate information. According to this information, big data technology can achieve market segmentation and precise customer positioning [2]. The generated data information can be analyzed by big data technology to obtain the potential needs of customers and provide assistance for rural e-commerce enterprises to achieve targeted marketing. Big data technology can also improve the pertinence of corporate preferential activities and product promotion and reform the original marketing model. See Figure 2.

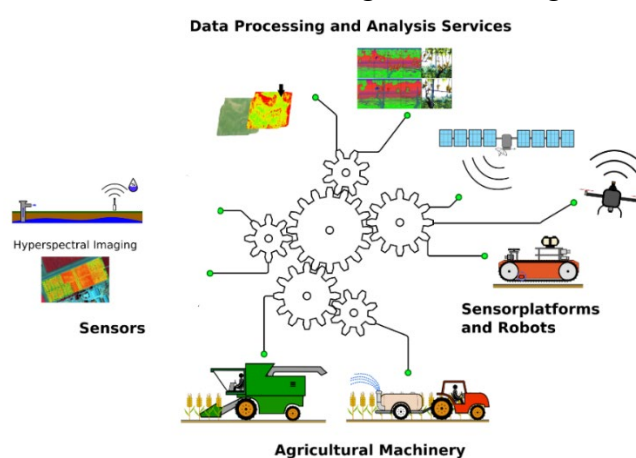


Figure 2. Research on smart agriculture big data technology

### 3.2 Improve product transportation efficiency

The main products sold by rural e-commerce are fresh agricultural products. As a particular product, it generally has high water content and perishability characteristics. Therefore, improving logistics efficiency is crucial for agricultural product e-commerce platforms. At the consumer level, customers of fresh agricultural products have higher requirements than other products in terms of small scale, scattered locations, and timeliness. The information generated in the transportation process and the feedback process can be analyzed by big data technology to optimize the logistics efficiency of products.

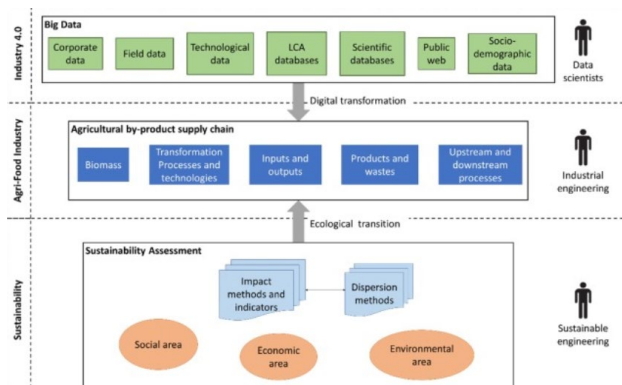


Figure 3. Application of big data technology in agricultural e-commerce

First of all, the accuracy of logistics distribution information is improved. Logistics is the end link of customer purchase behavior. The timely processing of orders and the safe and rapid arrival of goods significantly impact customer satisfaction. Collect logistics data, analyze and process it through

big data technology, and find information related to optimizing logistics from a large amount of data. For example, e-commerce companies or logistics companies can discover the distribution rules of a particular region based on big data technology, optimize management and the setting of logistics points, and maximize the utilization of resources [3].

Secondly, as a transportation method affected by road conditions and weather conditions, logistics can formulate scientific distribution routes according to the provided data technology and flexibly change them according to changes in the situation to achieve more efficient transportation at the exact cost. See Figure 3.

### **3.3 Optimize user shopping experience**

Big data can analyze and process data such as customer consumption preferences and purchasing habits and classify and integrate customers accordingly. The analysis results are of great significance in meeting the satisfaction of each customer. Therefore, each customer's shopping page products are personalized and generated according to their consumption habits, ensuring that each customer's shopping experience meets their own needs. In addition, rural e-commerce can divide the market according to customers' needs and better develop new customers while maintaining existing customers to ensure the continuous expansion of the product market. Only by optimizing the user's shopping experience can the products bring profits to the enterprise and ensure the economic benefits of the enterprise.

## **4. Problems existing in the development of rural e-commerce logistics**

### **4.1 The construction of logistics infrastructure is not perfect**

With "Internet +" agricultural products going out of villages and cities, rural revitalization strategy, "village-to-village" and other projects, the infrastructure construction in rural areas has been dramatically improved, but in the process of rural e-commerce development, transportation, warehousing, Road, network and other bottleneck restrictions. On the one hand, in order to promote the rapid development of rural e-commerce, the government has made some improvements to rural roads, but this improvement is mainly on main roads, and the branch roads are mostly field roads, which are still uneven and difficult for vehicles to drive, resulting in trunk and branch logistics—challenging to link with end distribution. On the other hand, agricultural products have strong seasonality, which requires fresh products to be kept fresh in logistics operations. Due to the inadequate cold chain facilities and technologies in rural areas, the nutritional value of fruits, vegetables, and other products in the warehouse distribution is lost, deteriorated, and rotten, resulting in high rural logistics operation costs and low customer satisfaction.

### **4.2 There are few rural outlets and high distribution costs**

During the development of rural e-commerce logistics, many large express delivery companies in China considered cost factors, and most of the express service points were set up in cities. In contrast, remote rural areas have not yet set up distribution points, and a small number of rural distribution points are mainly concentrated in towns and villages. When villagers sell agricultural and sideline products online, they need to transport the goods to the township express collection point first, resulting in the one-way empty driving of the vehicle. There are few logistics outlets in rural areas, it is challenging to provide door-to-door collection services, the utilization rate of vehicles is low, there are many distribution links, and the information is incomplete, reflecting the characteristics of the "long logistics chain." In addition, some villagers in China still retain the characteristics of a small-scale peasant economy, and they are accustomed to purchasing daily necessities in shopping malls and markets. In the sales of agricultural products, due to the lack of awareness of e-commerce, they still cooperate with agricultural cooperatives and wholesalers, reflecting the characteristics of the "low consumption density" of rural e-commerce. "Long logistics chain + low consumption density" is the main reason for the high logistics cost of rural e-commerce.

### 4.3 The level of logistics informatization is low, and goods cannot be tracked online in real-time

In the era of big data and the "Internet +," information technology has brought great convenience to people's work, life and study. The logistics industry also develops digital, flexible, and intelligent logistics. Logistics enterprises can build a logistics information system through big data, cloud computing, EDI, and RFID to achieve information sharing and perform precise sorting and efficient distribution of logistics orders involved. Due to the lack of popularization of the Internet in China's rural areas, the poor infrastructure, and the low level of informatization, logistics companies have not yet perfected the construction of logistics informatization such as rural logistics order management systems, transportation management systems, and warehouse management systems. After the third-party logistics company delivers the goods, the merchants and consumers cannot use the modern logistics information technology to track the parcels online in real-time, resulting in loss of goods, delayed delivery, and damage to the goods. See Figure 4.

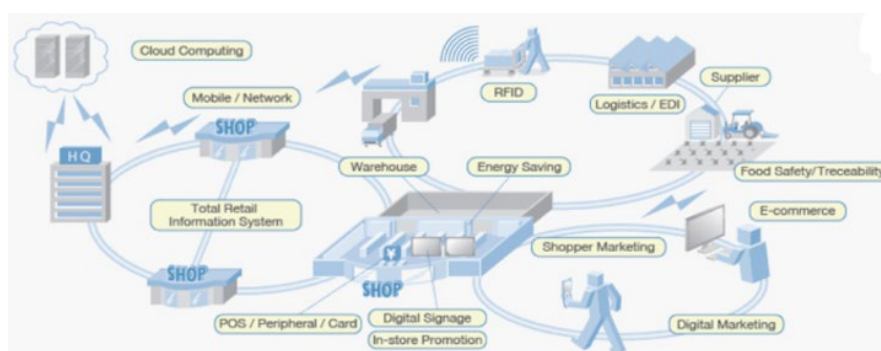


Figure 4. Analysis of rural e-commerce logistics process

### 4.4 Lack of professional logistics talents

In the era of big data, logistics enterprises need compound talents who are both knowledgeable about e-commerce and proficient in applying big data technology. In the distribution of rural e-commerce logistics, considerable data talents will analyze and technically process the data generated in warehousing, transportation, distribution, and other links to improve operational efficiency and increase revenue for logistics companies. In recent years, although the government has proposed an urban-rural integration development strategy and provided many preferential policies for the coordinated development of rural e-commerce and logistics, due to the vast land and sparse population in rural areas, backward infrastructure, hard work, and low wages, many logistics professionals Talents are reluctant to work at the grassroots level in rural areas, and residents can only do the distribution work. Because farmers' education level is generally not high, they cannot use advanced technologies such as big data and cloud computing to improve work efficiency, resulting in severe air return problems, damaged goods, and low distribution efficiency.

## 5. Countermeasures for the development of rural e-commerce logistics under the background of big data

### 5.1 Improve the construction of rural logistics infrastructure

The development of the agricultural product logistics industry will involve infrastructure construction, industrial policy, investment and financing, logistics information technology, taxation and product quality standards, etc., and requires specific policy and technical support from the government, enterprises, and relevant departments. On the one hand, the government should promulgate preferential policies that are more conducive to the development of e-commerce logistics in rural areas, increase the Internet penetration rate in remote rural areas, improve road traffic conditions, and establish infrastructure such as innovative modern warehousing, so that farmers can

conduct online transactions of agricultural and sideline products or manual workshops. I can truly appreciate the convenience and benefits brought by e-commerce. On the other hand, agricultural products have a certain seasonality. Logistics companies should configure advanced logistics equipment, strengthen investment and construction in facilities such as cold storage and refrigerated vehicles, and improve the logistics transportation, packaging, loading and unloading, distribution processing, etc. of agricultural and sideline products such as fruits and vegetables. Investment in cold chain equipment and technological improvement ensures the freshness and nutritional value of agricultural products in circulation and promotes the development of the rural e-commerce industry.

### **5.2 Establish "rural cooperative sites" to form a standard distribution model**

Under the extensive data background, various logistics companies can join forces to build "rural cooperative sites" through cloud computing, the Internet of Things, and other technologies to form a joint distribution alliance. Before the goods arrive at the county-level distribution center, each logistics company operates independently and manages the collection, transportation, sorting, and distribution of logistics orders. After each logistics enterprise's order enters the county-level distribution center of the "alliance company," the alliance logistics enterprise will carry out the unified receipt, warehousing, intelligent sorting, transportation, and distribution of the order to the "rural cooperation site." Then, through "professional logistics personnel" or "rural extension agents," services such as door-to-door delivery, valet order placement, cash on delivery, and collection of goods are provided. The "rural cooperative site" model can integrate the flow of various logistics companies, realize resource sharing among alliance enterprises, improve the overall efficiency of logistics, and reduce logistics costs.

### **5.3 Establish a comprehensive logistics management information system to improve service quality**

Under the background of big data, the government, e-commerce enterprises, and logistics companies should work together to make full use of new technologies such as big data, artificial intelligence, and the Internet of Things to establish a comprehensive logistics management information system and improve the popularization of network information [4]. First of all, the government should provide policy support to develop rural e-commerce logistics and big data technology and build more signal base stations and network lines in response to the low penetration rate of rural networks and poor signal. Secondly, establish a "rural cooperation site" so that e-commerce enterprises and logistics companies in the site can jointly establish a comprehensive logistics management information system using big data, cloud computing, the Internet of Things, and other technologies so that the circulation process can be seamlessly connected, to achieve commodity tracking and the query: volume forecast, resource integration, intelligent sorting, evaluation feedback, and other full-process management. Thirdly, for a small number of scattered parcels that must be delivered in rural areas, logistics companies can use big data analysis models to plan optimal distribution routes and use drones to deliver them to improve the efficiency of the last mile of rural e-commerce logistics.

### **5.4 Strengthen the construction of a rural e-commerce logistics talent team and improve service level**

Talent is the driving force for development. In the era of big data, the government should take corresponding measures to attract professional logistics talents to work in rural areas and strengthen the construction of rural e-commerce logistics talents. On the one hand, the government can increase wages and attract outstanding logistics talents to work in rural areas through employment subsidy policies [5]. On the other hand, logistics companies can cooperate with local colleges and universities to train rural logistics talents in "order-based" training or invite logistics experts to regularly train employees who are fighting in rural logistics in the form of online classrooms, transfer the most cutting-edge logistics knowledge, and improve employees. Professional skills.

## 6. Conclusion

A large amount of data is generated during e-commerce transactions. Applying big data technology to collect, analyze, and process these data allows enterprises to formulate operational strategies, realize precise marketing to consumers, and realize refined product management. However, due to the lack of data awareness of operators and the defective equipment for collecting and processing data, there are still some limitations in applying big data technology in rural e-commerce. Only by constantly innovating information technology and continuously exploring marketing models can we maintain the competitiveness of enterprise products and achieve profit growth.

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