Research on the Quality Supervision System of Agricultural Product Based on Big Data

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Abstract. The issue of agricultural product safety is important for the economy and the people's living in our country. It is necessary to build a quality supervision system to strengthen the quality supervision and improve the quality for agricultural products. This paper systematically analyzes the role of big data in the quality supervision system of agricultural products and its innovative driving mechanism for operation mode. It contains the design of the construction of quality supervision system for agricultural products based on big data and the quality supervision of agricultural products operation mode. It proposes measures to strengthen the construction of quality supervision system of agricultural product based on big data.

Keywords. Big data; agricultural products; quality supervision system; operation mode.

1. Introduction

Improving the quality of agricultural products has become a hot spot and focus of public attention. The leaders pay great attention to the quality of agricultural products. President Xi Jinping pointed out that it is necessary to ensure the good quality of agricultural products, focus on the quality of agricultural products, and adhere to the work of “agriculture, rural areas and farmers”. Our country’s “13th Five-Year Plan” clearly states that it is necessary to construct the quality supervision system of agricultural products from producing to consuming. However, the quality of agricultural products in China is still severe, especially, the shortage of quality supervision of agricultural products in our country is serious.

2. Literature Review

With the information technology being applied in agricultural production and circulation, how to keep the quality of agricultural products through the traceability has become the focus of attention. The results of Feng and Fu [1] research show that the main advantages of RFID-based traceability system is real-time, accurate and efficiently. It tracks supply chain information effectively. Ding Ning’s research [2] shows that the innovation of circulation at the organizational and technical level improves the quality traceability system of agricultural products and highlights the improvement of operational efficiency, while the government-led circulation system innovation provides a strong guarantee for the agricultural product quality traceability system. Dandage [3] pointed out that India’s food traceability is mainly based on the application of 2d barcodes, especially for Indian vegetables. Zheng and Liu [4] proposed to build a national unified multilateral platform for tracing the quality and safety of agricultural products based on time and space traceability codes, and to achieve efficient traceability of agricultural products. Hu et al. [5] adopted a series of techniques and methods such as spatial analysis, data gridding, cloud computing, and mobile internet to construct a food traceability system to form a traceability system for quality and safety of agricultural products that can cover the entire

1
production process of agricultural products. Hu, Lin et al. [6] in accordance with international trends and industry development needs of our country’s agricultural products which are traceable, recently proposed the four goals and three proposals for the quality and safety traceability system of agricultural products.

Scholars have done a lot of research on the quality supervision of agricultural products and have formed rich results. Bosona and Gebresenbet [7] pointed out that the modern food supply chain should provide information that consumers and other relevant institutions need to know, such as the diversity of food attributes, origin, animal welfare and genetic engineering related issues. Li and Lu [8] discussed the basic strategy of constructing agricultural product quality information monitoring platform from six aspects: standard base construction, information system construction and supervision team construction. Zhang [9] proposed quality and safety management modes such as source control type, processing control type, circulation control type, terminal control type and marketing control type, and selected quality and safety management paths such as internal control, external coordination and environmental adjustment. Ma [10] proposed a specific plan from the aspects of quality and safety supervision technology and effectiveness for agricultural products. Yang [11] draws on the practices and experiences of product quality supervision in Taiwan, and proposes countermeasures to strengthen and improve product quality in the mainland. Li and Gai [12] specifically analysed the problems existing in the quality supervision of agricultural products, proposed the plan for the supervision and reform of agricultural products quality. Liu and Zheng [13] analyzed the problems faced in China’s agricultural product quality and safety supervision informationization practice, and then proposed the concept of building quality and safety supervision information platform for agricultural products and the challenges it may face. Sun [14] proposed a quality control system framework of agricultural products under background of big data analysis.

The above studies are in the aspect of safeguarding the quality of agricultural products. Many studies on how to realize the traceability of agricultural products and the supervision strategies of agricultural products have been done. While there are few studies on how to achieve quality supervision of agricultural products. This paper will analyse the innovation power of agricultural product quality supervision based on big data, build a quality data supervision system based on big data, and put forward some suggestions for realizing quality supervision based on big data for agricultural products.

3. Innovation Power of Quality Supervision of Agricultural Product Based on Big Data

IBM uses four features combined to define big data: volume, variety, velocity, and veracity. China’s current agricultural product quality supervision big data are: (1) the agricultural product supervision institutions at all levels have conducted random inspection and inspection data on listed agricultural products over the years. (2) the quality of agricultural products market monitoring data. information. (3) over the years, agricultural marketing information. (4) form public databases and literature analysis of agricultural products’ quality, data related to the safety evaluation and other emergencies. (5) affect the health quality of agricultural products. These data types include diverse information, a huge amount, the effectiveness of its outstanding value, how to extract, manage, process the information services in the community is the key. Improving regulatory efficiency, saving regulatory costs, consuming healthy consumer demand, optimizing product mix, and improving regulatory credibility are consumer needs and an innovative driving force for agricultural product quality regulation based on big data.

4. Construct Quality Supervision System of Agricultural Product Based on Big Data

The quality supervision system of agricultural products based on big data relies on the Internet information platform, big data thinking and “cloud” computing technology to develop online information services and improve the transparency of agricultural products information. Meanwhile, with the existing warehousing, logistics, retail and other offline service terminals of agricultural product dealers, offline services will be carried out to improve the quality of agricultural products and
meet the health consumption of consumers. Its system includes agricultural information service platform, agricultural product supply cloud center, offline service entity terminal and so on. The construction of quality supervision system of agricultural products based on big data is showed in figure 1.

**Figure 1.** The quality supervision system of agricultural product based on big data.

First, build an agricultural product information service platform. The government or agricultural cooperative associations set up a platform for agricultural product information service systems based on big data. The platform not only has the function of releasing agricultural products, the types, quality, and price of agricultural products, but also has the function of traceability of agricultural products.

Second, establish an agricultural products supply cloud center. Through the system platform, various agricultural product producers, related dealers, and various agricultural products information are integrated, and these information resources are virtualized by using “cloud” computing technology, and stored in the system platform to form an agricultural product supply cloud center.

Third, form a “one-stop” information service platform. The platform combines the production, circulation and sales of agricultural products to realize the scale, centralization and efficiency of online information flow, realize the “one-stop” agricultural product quality information service, and save consumer information acquisition time and economic cost.

Fourth, build an entity service terminal network. The system platform develops the offline service entity terminal in the form of direct operation, franchise or cooperation, lays out the terminal service site, and constructs the physical service terminal network, so as to strengthen the quality supervision of the entity sales terminal and ensure the authenticity of the products it sells.

Fifth, build a platform for agricultural product quality supervision system. The system platform integrates agricultural product information service platform, agricultural product supply cloud center and physical terminal service terminal to construct an agricultural product quality supervision system integrating online and offline supervision.

The quality supervision system of agricultural product based on big data is conducive to the realization of agricultural product supply information and ordinary consumers, consumers and physical service terminals, physical service terminals and agricultural product supply information. Producers of agricultural products realize zero-distance contact with consumers through network
5. Build a Large Data-Based Quality Supervision System of Agricultural Products

(1) To strengthen the construction of information system hardware facilities and build a unified network information platform. Big data is based on information network coverage and information terminal popularity. Therefore, strengthening the construction of information system hardware facilities, popularizing Internet terminal equipment, and improving network coverage and information transmission capacity are the basic requirements for quality control of agricultural products based on big data. Strengthen the construction of information system hardware, on the one hand, improve network coverage and network information transmission capabilities, such as network speed, on the one hand; on the other hand, popularize network terminals, such as PCs and mobile APPs, and pay attention to personal information privacy protection. The information system platform is a platform for the concentration and release of agricultural products based on big data. Driven by commercial interests, the false information and fake products of some websites not only harm the interests of consumers, but also reduce the consumer confidence of agricultural products. The authenticity of agricultural product producer information, physical terminal information and distribution information is urgently needed. Therefore, the construction of a public agricultural product network information platform, integrated information on agricultural producers, agricultural product sales terminals, agricultural product logistics distribution and consumer demand, and the release of information, to achieve seamless integration of agricultural production, distribution and consumption, is significant to ensure the quality and safety of agricultural products.

(2) To optimize the physical terminal network layout. The physical terminal is not only the agricultural product offline product sales entity, but also the terminal link of online agricultural product storage and distribution. The optimization of the layout of physical terminals is of great significance to satisfy the offline consumption of agricultural products and increase the consumer confidence in online consumers.

(3) To strengthen the quality supervision of logistics distribution terminals. On the one hand, it strengthens the supervision of facilities carrying agricultural product distribution terminals, and links the logistics distribution terminals with the information platform based on real-time information transmission technology, realizing the real-time information, agricultural products producers, physical terminals and consumers in the process of logistics and distribution. On the other hand, it supervises the timeliness of logistics distribution, based on big data and cloud computing technology, realizes the optimal allocation of logistics distribution and physical terminals, reduces logistics time and quality risks, and ensures the distribution process.

(4) To strengthen legislation and build a reasonable income distribution mechanism. The main body of the agricultural product supply chain is complex and diverse. The agricultural product supplier, distributor, offline entity terminal, agricultural product information service platform, agricultural product supply cloud center, etc., through the perfect law, on the one hand, the entity participants are constrained. Quality control behaviors such as production, warehousing, and distribution, on the other hand, restrict the quality of information services for entity participants and virtual information service entities, and reduce the “speculation behavior” of various participants. At the same time, by establishing a reasonable income distribution mechanism among different participants, the quality of each participant’s “moral hazard” behavior is reduced.

6. Conclusion

The quality supervision system of agricultural products which is based on big data has improved the quality supervision of agricultural products from producing to selling, with particular emphasis on strengthening the information service and information quality of agricultural products which is based
on big data, realizing online and offline regulatory integration, It is of great significance to improve the quality level of agricultural products, meet the needs of consumers' healthy consumption, and promote healthy development of agriculture.

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