Research on the construction and visualization of agricultural products circulation big data model from the perspective of regional economic integration

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Abstract. The degree of regional economic integration is one of the main factors affecting the efficiency of regional agricultural product circulation, and the two are generally positively correlated. My country's agricultural product logistics have been developed for a long time, but it is still low in level, high in cost and large in the loss. We analyzed the current situation and existing problems of agricultural product logistics, combined with the background of big data, summarize the role of big data in agricultural product logistics, and the measures for agricultural product logistics construction in the era of big data. To effectively promote the improvement of regional agricultural product circulation efficiency, after analyzing the influencing factors, this paper proposes that the government should build a full marketing system to improve circulation efficiency. It builds a multi-channel platform to improve circulation efficiency and create an era of big data. Data integration and smooth information have further improved the circulation efficiency of China's agricultural products.

1. Introduction
With the steady improvement of my country's economic development level, my country's agricultural product production and processing industry have also achieved unprecedented development achievements, but at present, the relationship between supply and demand of my country's agricultural products is still in a state of imbalance [1]. Combined with the current supply and demand status of agricultural products in my country, it can be seen that agricultural product circulation is an intermediate link between the supply and demand sides, and the efficiency of agricultural product circulation has an important impact on maintaining a balanced relationship between supply and demand [2]. However, how to ensure the smooth circulation of agricultural products, reasonably reduce the circulation links, and improve the degree of market integration of agricultural products has become the focus of the country and consumers. In recent years, many Chinese experts and scholars have conducted a lot of research on the efficiency of agricultural product circulation, and at the same time, they have drawn more valuable conclusions, providing a lot of technical support for my country's agricultural products circulation industry [3]. However, considering the actual supply and demand of agricultural products in my country at the current stage, it is necessary to further analyze the efficiency of agricultural product circulation through the perspective of regional economic integration, improve the efficiency of agricultural product circulation, and provide a guarantee for the long-term stability of my country's agricultural product supply and demand [4]. In the era of Internet big data, with the improvement of data collection, analysis, and processing capabilities, mass storage, and the widespread application of Internet cloud servers, it also brings new opportunities for the circulation of
agricultural products. In the new era, how to make better use of the advantages of internet big data and improve the circulation of agricultural products has become an important issue before us [5].

In the new media era of big data, it has more powerful computing power and more massive storage media. Data related to the circulation of agricultural products can not only be stored on the computer, but also on the Internet cloud server, making the storage process of agricultural product logistics information. You don't need to care about the size of the storage space at all, which improves the efficiency of information processing. All these have brought new opportunities for the overall layout, planning, and scheduling of agricultural product circulation, which is conducive to the realization of the optimal allocation of agricultural product resources by expanding the scale of circulation [6]. Using big data technology, it is possible to transform the agricultural product circulation system, integrate the information of countless "retail investors", build a logistics industry "cluster", grasp market information in time, and realize the improvement of agricultural product circulation efficiency. Big data models and visualization technology enhance the processing ability of complex data. The software can be used to process agricultural product logistics data in batches, effectively manage the logistics information database, and realize the optimization of information structure [7]. In the current era of the Internet of things, the informationization of logistics continues to advance, and the data related to the circulation of agricultural products have shown a geometric growth, which also brings new challenges to the timeliness of information processing. In the context of big data, this problem has been effectively solved. Calculations and statistics can be carried out anytime and anywhere, breaking through the limitations of time and space, using full data processing objects and multiple data processing tools to make the processing speed more real-time. The coordination and consistency of information processing in all links of the agricultural product circulation supply chain is promoted to promote the professional development of agricultural product circulation, reduce unnecessary "intermediate links" in the transaction process, and reduce transaction costs.

2. Construction of a big data model of agricultural product circulation from the perspective of the regional regional economy

2.1. Problems in the circulation of agricultural products from the perspective of the regional economy

At present, the level of domestic agricultural product logistics is still very backward, and there are many circulation links, resulting in large losses in the logistics process and low circulation efficiency. The backwardness of domestic agricultural product logistics is mainly manifested in two aspects. On the one hand, producers can not sell the product promptly out; on the other hand, consumers still need to buy more expensive products.

There is a large amount of information to be transmitted in every link in the agricultural product logistics process. However, due to factors such as backward infrastructure and low degree of informatization, domestic agricultural product logistics lack a unified information platform and corresponding information standards. Various information technologies that have been widely used in the industrial field have not been promoted in the field of agricultural product logistics. In the process of informatization construction, due to the lack of information on overall planning, problems such as duplication of construction, low-level construction, and waste are caused.

The lack of a unified monitoring and forecasting system and information release system in the agricultural product market makes it very difficult to monitor product quality and safety. At the product production level, the lack of a credit system makes some producers not care about product safety, causing various food safety incidents to occur continuously. The lack of a supervisory mechanism has caused companies to black restraints, and even some companies have illegal acts to reduce operating costs, which seriously threaten the quality of life of the people. As shown in Figure 1, product quality cannot be guaranteed in the production and logistics of agricultural products.
Domestic agricultural production areas have established their information platforms to a certain extent. However, due to institutional problems and other reasons, the platforms cannot be interconnected, failing the entire information system to coordinate. Therefore, the slow transmission of agricultural product logistics information and poor sharing has led to a lack of coordination among various enterprises. There is no overall planning between the upstream and downstream of the entire supply chain, and the effective allocation of resources cannot be implemented, resulting in a waste of resources.

As far as intermediate transportation is concerned, the extremely high losses caused by backward logistics methods directly push up costs. Affected by the physical and chemical properties of agricultural products themselves and the excessive logistics links, the transmission process of products from producers to consumers is more complicated, causing great losses. Under the traditional extensive circulation model, the loss rate of fruit and vegetable products is as high as 30%, while in developed countries it is as low as 5%. In domestic agricultural production, decentralized planning still occupies a major position. Most of the technologies used in the production of agricultural products are not standard and cannot provide guarantees for product safety and product safety. At the same time, it also directly leads to the failure of agricultural product logistics enterprises to realize the rational combination of various elements and multiple links, and can not form standardization and scale, and the degree of specialization is low.

2.2. Research on the factors of agricultural product circulation big data model from the perspective of the regional regional economy

Many scholars at home and abroad have conducted a lot of research on the efficiency of agricultural product circulation, and with the development trend of big data and the impact of "Internet plus" on various industries, this article mainly focuses on the three aspects of circulation speed, scale, and benefit. The circulation speed mainly selects the total asset turnover rate, current asset turnover rate and fixed asset turnover rate of agricultural products wholesale and retail enterprises as the efficiency measurement indicators of the agricultural product circulation speed. The circulation scale mainly selects the agricultural product coefficient, the agricultural product wholesale and retail concentration degree, and the agricultural product retail enterprise concentration degree as evaluation. The profit rate of agricultural wholesale and retail enterprises and the sales of unit business area are selected as the measurement index of circulation efficiency.
The factors of agricultural product circulation input in the hypothesis of this article are mainly based on the level of informatization. Among them, the level of informatization in the circulation of agricultural products and the number of employees in computer services are the measurement indicators of e-commerce. The mileage of railways are the measurement factors of geographic location. The new fixed capital of the storage industry are the main factors in the evaluation of storage conditions. As shown in Figure 2, it combined the collected data and using factor analysis methods to obtain data on the influencing factors of China's agricultural product circulation efficiency.

Figure 2. Logic diagram of the elements of the agricultural product circulation big data model from the perspective of regional integration

3. Countermeasures to improve the circulation of agricultural products based on big data model construction and visualization research

3.1. Systematization of the distribution of agricultural products to realize the transformation from individual economy to scale economy

The era of big data requires that the circulation of agricultural products must be transformed from traditional "individualization" to "systematization. The function expansion of the highly scalable distributed batch processing system, which will achieve the goal of achieving the best of the entire agricultural product circulation system. Its huge data storage and processing functions have further expanded the circulation of socialized agricultural products. In future development, industrial regions should realize the transformation from individual economy to scale economy through the systematization of the distribution of agricultural products.

On the one hand, it is necessary to use big data technology to strengthen the government's macro-control and unified layout of the circulation of agricultural products and establish an efficient agricultural product circulation information system to serve agricultural development. According to
the agricultural area status of resources, it can be agricultural areas by accelerating the application of modern logistics park. Based on the data analysis of big data, it is necessary to plan the construction of production and supply bases for wine grapes, green ecological safety pigs, beef cattle, broilers, aquatic products, edible fungi, vegetables, sweet potatoes, corn, dried and fresh fruits, Chinese medicinal materials, and flowers. It has realized the large-scale concentration of agricultural product logistics data through integration with agricultural product logistics. All of these have strong reference significance for agricultural product regions. On the other hand, we must use big data technology to strengthen the classification and control of the circulation of agricultural products. Judging from the current circulation of agricultural products in key districts and counties, the economic development of each region is not balanced, and the location conditions, resource endowments, and development foundations are also different. Therefore, it is necessary to use big data to do a good job of positioning the characteristics, and it is necessary to adopt measures to local conditions and highlight characteristics.

It is not possible to establish a unified development standard. It is necessary to adhere to classify guidance and implement different strategic approaches to the circulation of agricultural products according to the current economic development foundation and resource endowment. We must strive to find a new path for the circulation of agricultural products with distinctive characteristics. The development of differentiated agricultural industrialization should be taken as the main carrier of industrial structure adjustment and development mode transformation, and guide various regions to form industrial clusters. In terms of food and vegetables, we mainly focus on characteristic key districts and counties. The leading role is to do a good job to produce circulation and fine processing circulation. For the fruit industry and livestock and poultry, it is necessary to implement “consolidated contiguous areas and build parks in space”, give full play to the advantages of low-tax areas, build a regional agricultural product circulation center, accelerate the construction of cold chain logistics and storage systems, and build famous brands.

3.2. The oxidization of agricultural products circulation nodes realizes the transformation of local interests to supply chain driving

In the era of big data, the network of agricultural products circulation nodes must be realized. In the context of big data, due to the more in-depth data analysis and mining functions, this brings new opportunities to the traditional agricultural product circulation. It is necessary to cluster, classify, and analyze the massive agricultural product circulation data. Finally, the "grid-based win-win" of nodes is realized through "data-based interaction".

The circulation of agricultural products should strengthen the agricultural supermarket to achieve a win-win situation between farmers and supermarket terminals. In the key production and marketing areas of agricultural products, it is necessary to use technologies such as RFID, EDI, GIS, ICT, SCM, VMI, ERP, etc. We analyzed characteristic data in terms of quantity and type. It connects various links such as "pre-production, mid-production, and post-production", and upgrades the short-term "sales and purchase relationship" between supermarkets and farmers to a long-term "strategic channel partnership".

The circulation of agricultural products should strengthen "agricultural enterprise docking. It is necessary to use big data to conduct adequate "supply and demand analysis" to strengthen and further consolidate and enhance the market position of agricultural business entities. We make full use of the power of professional farmer cooperatives to promote the fingerless connection and balanced development and rational development of farmer professional cooperatives and agricultural markets. Stimulate enthusiasm of farmers and effectively connect with market demand, and encourage various market entities to participate in the circulation of agricultural products. It builds a diversified investment model that combines government, enterprise, and social capital, transfer the initiative of production and operation to farmers, and mobilize the enthusiasm of industrial and commercial capital and private capital to participate in the circulation of agricultural products.
It vigorously establishes a leading enterprise-driven agricultural product supply chain to achieve a win-win situation for enterprises and farmers. It is necessary to use big data market information to cultivate and expand leading agricultural industrialization enterprises, and focus on supporting and comprehensively developing several large-scale, strong driving force, technology-intensive, and capital-intensive agricultural product circulation leading enterprises. As shown in Figure 3, we use the data mining function of big data to enhance the industrial relevance of leading companies, transform "homogeneous" competition into "heterogeneous" complementarity, and jointly participate in the operation of agricultural product circulation to create a more complete value chain. It is necessary to continuously get out of the vicious circle of "low-level processing and extensive circulation" and increase the added value of products. And we must firmly grasp the two core links of "product development" and "brand", strengthen investment in the research and development of new agricultural products, green agricultural products, and high-end agricultural products, and transform the "low-quality running volume" of traditional agricultural product circulation enterprises in agricultural regions. Through big data analysis technology, enterprises and farmers can establish a balance of interests and sign long-term contracts with farmers through orders, leases, joint ventures, cooperation, and shareholding, so that leading enterprises and farmers can realize the upstream and downstream connection and integrated management.

3.3. The sharing of agricultural product circulation information realizes the transformation of economic growth point to growth pole
In the context of the big data era, it is necessary to use the advantages of big data to promote "information sharing" among enterprises and regions. We used the data coupling analysis function relational database of big data to construct a system composite structure, analyze the industrial relevance between regions and enterprises, calculate and evaluate the benefits of cooperation, and maximize the utility of agricultural products in circulation. Through information sharing, inter-regional agricultural product logistics industry cooperation has saved transaction costs and reduced vegetable logistics operation costs. Agricultural products regions can also learn from the successful experience in this area, use the information processing functions of computers. Heating and cluster development" will eventually form an agricultural product circulation system centered on regional
agricultural product circulation centers and local wholesale markets as nodes, making agricultural product regions an important agricultural product circulation center radiating northeast and north China and affecting the Beijing-Tianjin-Hebei economic circle. As shown in Figure 4, it is necessary to accelerate the informatization construction of agricultural product circulation from the government level, build an information platform among enterprises, farmers, and industry organizations, closely link various market entities, and enable various institutions to realize the "linkage" of agricultural product circulation through the construction of information systems. It is necessary to strengthen the construction of e-commerce, vigorously develop B2C, B2B, C2C, and other new models, actively cooperate with China Huinong.com, Nongbao.com, JD.com, Taobao and other e-commerce companies, explore the establishment of online signing and transaction trials, and carry out online transactions and contracts. Trading and futures trading enables the agricultural products of the agricultural product region to truly "go out" and enhances the influence of agricultural products in the agricultural product region.

![Figure 4. Visual analysis of changes in the online retail of agricultural products on various platforms based on big data](image)

**4. Conclusion**

The circulation of agricultural products is the link and bridge connecting the production and consumption of agricultural products and is a catalyst to stimulate consumption and activate the market. In the era of Internet big data, with the widespread application of massive storage and cloud servers, it also brings new opportunities for the circulation of agricultural products. The application of Internet big data is conducive to exert the economies of scale in the circulation of agricultural products. The supply chain driving effect of the circulation of agricultural products, and the polarization effect of the circulation of agricultural products. In the future development, it is necessary to realize the transformation of the individual economy to scale economy through the systematization of the distribution of agricultural products circulation; through the utilization of agricultural products circulation nodes, realize the transformation of local interests to the supply chain driving; through the sharing of agricultural product circulation information. Only then can it give full play to the functions of big data collection, analysis, processing, and visual analysis, and promotes the overall improvement of agricultural product circulation efficiency.
Acknowledgment

Key Soft Science Project of Shandong Province, Innovation Mechanism and Development Model of Shandong Agricultural Science and Technology Park, Project Number 2018RZB01121

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