



Innovative Thinking of Logistics Distribution Models for Fresh Agricultural Products in a New Era

Dan Hu^(✉)

School of Finance and Economics Management, Sichuan University of Arts and Science,
Dazhou, Sichuan, China
184403206@qq.com

Abstract. Agricultural product logistics distribution is a complex and comprehensive industry that connects agricultural production and consumers. It represents the value of agricultural products during the distribution process and serves as an integrated application of funds flow, business flow, logistics and information flow in the whole agricultural industry chain. Agricultural product logistics can not only break through the limitations of space and time, but also enhance the value and utility of agricultural products. Currently, in China, the main distribution models for agricultural products are self-built and third-party logistics distribution models. However, with a slow development of agricultural product logistics distribution system which can't keep up with the pace of information flow and business flow, there are high distribution costs and low distribution efficiency in agricultural products, making it difficult to meet the needs of the market for agricultural product logistics services. Therefore, it is necessary to strengthen government support, constantly promote the improvement of agricultural product logistics distribution system, and build infrastructures in rural areas, especially Internet and mobile information infrastructures. The distribution ability of agricultural product logistics enterprises should be enhanced while using science and technology, and talents who excel in agricultural product logistics distribution should be cultivated, helping establish a talent training system for rural logistics and promoting the steady development of agricultural product logistics in China.

Keywords: Agricultural products · Logistics models · Agricultural industry · Logistics distribution

1 Introduction

With the development of the social economy, people have a higher demand for quality of life. It's necessary to improve the distribution efficiency of fresh agricultural products which are important to meet people's daily needs, in order to ensure that people can eat healthy and safely. At the same time, the Internet facilitates the development of the logistics industry, which also speeds up the orderly development of the entire industry. Generally speaking, the agricultural products logistics in China have an important

impact on the development of the national economy, and narrowing the gap between urban and rural areas. Therefore, relevant departments should focus on the application of new technologies, and establish new channels suitable for the development of fresh agricultural products. On the above foundation, they should search for more sales models, comprehensively improve the quality of product sales, and create higher economic benefits. Taking the logistics distribution for fresh agricultural products as an example, relevant departments should change their previous development concepts, establish distribution sites based on the actual needs and addresses of current customers, and ensure that agricultural products can be delivered to customers and consumers in time [1–3].

2 Significance of Innovating Logistics Distribution Models for Fresh Agricultural Products in a New Era

Firstly, improving agricultural product logistics can promote building characteristic agricultural product brands, which can not only increase the value of agricultural products, but also drive the development of the whole agricultural industry. For some fresh agricultural products, it's particularly important to shorten the distribution time, which can ensure the timely distribution of products as well as enhance customer satisfaction, build up customer loyalty, and further boost the development of the entire industry. In addition, there are multiple parts in logistics, including the selection, processing, sorting, cleaning, and packaging of agricultural products, which can improve the service quality of products and promote the green development of agriculture.

Secondly, optimizing the agricultural product logistics system is conducive to promoting the development of “Three Rural Issues” (agriculture, rural areas, and farmers). The improvement of agricultural product logistics can speed up the distribution of agricultural products, serve fresher products in the market, meet people's basic daily needs, and promote rural economic development. Research found that scientific methods of management are important for reducing the production and circulation costs of agricultural products. Also, logistics connects producers and consumers. Shortening the distribution time can enhance customer satisfaction, and has played an important role in adjusting the agricultural production structure, promoting agricultural modernization and entering a new era of agriculture.

Thirdly, improving the speed of agricultural product logistics can enhance agricultural competitiveness. Improving the speed of agricultural product logistics can effectively save costs of hand haulage and alleviate the work burden of farmers. It's particularly critical to improving the distribution speed of agricultural products for agricultural development, which is the key to ensuring the quality and freshness of agricultural products and can enhance the value of agricultural products, bringing high income to farmers.

Fourthly, improving agricultural product logistics helps to ease employment pressure in rural areas. At present, during the process of rural development, there is a problem about finding jobs, and farmers have great difficulty in earning their living by cultivating crops. This simple model of employment also goes against rural economic development and will continue to widen the gap between urban and rural development in the long run. Optimizing agricultural product logistics can not only provide more job opportunities for rural people, but also make use of more excess labor in agriculture, thereby easing the

employment pressure in rural areas. Currently, there are some problems in the agricultural product logistics distribution, such as a low level of informatization, which to some extent increases distribution costs, and is difficult to meet the market needs for agricultural product logistics services. Moreover, there is a problem of homogenization in China's agricultural product logistics distribution service model, which makes enterprises with a cheaper price earn profits and don't give priority to service mode innovation. This is not helpful to update the logistics service system in the long term. Taking the key technology of agricultural product distribution—cold chain logistics as an example, in some poor areas, the lack of technology and equipment will limit the development of the agricultural product logistics distribution system. Therefore, it is particularly necessary to optimize the logistics distribution mode by starting from the update and reconstruction of the logistics distribution system and the training of relevant talents, which can drive the transformation and development of the entire agricultural industry [4, 5].

3 Current Situation of Agricultural Product Logistics Distribution in China

Logistics distribution services and e-commerce are dependent on each other. In recent years, with the development of Information Technology, the sales model of agricultural products has changed dramatically, with online live-streaming sales becoming mainstream. On this basis, new industry chains have emerged, such as packaging and warehousing. Currently, the agricultural product industry chains mainly include agricultural product cultivation, logistics, and the connection between consumers and markets. Logistics is considered a key link in agricultural product sales, so improving its speed can enhance consumer satisfaction, build up customer loyalty, and develop a good reputation, thus facilitating the popularity of agricultural products. However, in the actual process of development, some enterprises have neglected the importance of logistics management and consider logistics the same as product circulation, resulting in agricultural product overstock and a severe impact on agricultural development [6]. Moreover, in terms of agricultural product distribution, some enterprises still adopt offline distribution models and do not focus on the application of Information Technology and planning logistic system management, which also likely limits agricultural development. In addition, although some enterprises have established cooperative relationships with third-party logistics, they have not clarified their respective responsibilities, resulting in power intersection and issues that cannot be resolved promptly during agricultural product distribution. Furthermore, some enterprises have a strong subjective consciousness in logistics management and fail to analyze data on customer needs to adjust distribution plans, leading to complex distribution systems. To sum up, agricultural product logistics distribution involves multiple links, and if enterprises do not pay attention to updating their logistics distribution model, not only will the quality of fresh agricultural products not be ensured, but also consumer trust will decrease, which does no good to the maintenance of good supply and sales relationships, the improvement of quality of agricultural and the development of rural economy.

4 Logistics Distribution Service Model for Fresh Agricultural Products

Currently, there are two main distribution models for fresh agricultural products: The first model is a vertical distribution model where the willingness to sell products is up to various distributors. These people choose suitable sales models based on their own characteristics, such as offline marketing. Some also choose e-commerce platforms to promote their products while providing real-time logistics information to consumers. So consumers can know about the latest logistics information of the products for the first time. With this new logistic model, enterprises can track information on each logistic chain and manage logistics in each region accordingly. However, as time goes by, its shortcomings have gradually emerged, for instance, enterprises need to spend money on promotion while not always having satisfying sales. On the other hand, consumers are not evenly distributed, which requires higher standards for distribution services. For consumers who live in remote areas, it is difficult to deliver products within their shelf life, which not only acquires the improvement of refrigeration technology, but also requires additional funds to create different service stations with the consideration of people's addresses [7, 8].

The second model is a comprehensive distribution model based on platforms which mainly relies on platform support. After consumers place orders on specific platforms, the platforms will process the data about those products online, and then choose the most suitable way for distribution through wise connections with various logistic agencies and consideration of the consumers' addresses. However, there are also some shortcomings, for example, the cold chain technology is insufficient so the quality of fresh agricultural logistics distribution cannot be guaranteed. Furthermore, online shopping is also a little risky for consumers, since they can only know information about products through online photos and introductions. Their actual quality not being guaranteed, the number of customers who order only once increases.

5 Construction of New Products Logistics Distribution Model for Fresh Agricultural Products

5.1 Self-Built Logistics Distribution Model

The self-built logistics distribution model is only applicable under certain conditions and offers great advantages for some enterprises with e-commerce platforms, such as JD.com and Suning.com. In their operation process, there are mainly four important parts. Firstly, consumers find the products they need to purchase on the e-commerce platform, add them to the shopping cart, and submit the order. Secondly, the platforms quickly print the sales order after receiving the order, sort out the purchase information, and send it to the designated platform. Thirdly, after the suppliers receive the order, they begin to prepare the products, and can also distribute them according to different regions, that is, each self-operated platform in a certain region receives the order in that region and delivers the products to consumers in the first time, allowing customers to receive fresh agricultural products as soon as possible. Fourthly, the platforms select

agricultural products which need to change distribution addresses or need further processing, and finally deliver them to consumers after secondary processing. From the above distribution model, it's clear that the self-operated logistics has many advantages. Firstly, self-operated logistics can shorten the distribution time of agricultural products, and allow consumers to receive fresh products as soon as possible. Secondly, it can give timely feedback about problems occurring during the product distribution process. For example, when problems take place in logistics distribution, enterprises can know about those problems in time and solve them quickly. Thirdly, it can maximize cost savings. In summary, the logistics distribution process involves many links. If an enterprise adopts a third-party logistics model, it has to negotiate the costs incurred in the distribution, warehousing, and distribution processes of agricultural products, which will increase the whole costs to a certain extent. However, the application of self-operated logistics can reduce distribution costs of agricultural products and meanwhile enhance transaction security. Fourthly, it is beneficial for creating a characteristic brand and enhancing the commercial value of agricultural products. The self-operated logistics has many advantages, mainly manifest in that enterprises can know exactly about the condition of logistics distribution at any time, and on such basis, they can combine it with changes in customer demands to adjust distribution plans to provide customers with more full services. For example, the self-operated logistics of JD.com can make same-day distribution in a certain city that situates the logistics warehouse. In the whole logistics system, JD Logistics has a core value and relatively strong competitiveness. From its experience in development, improving logistics speed can attract more customers and enhance customer loyalty. Surely, the self-operated logistics also has some disadvantages, mainly about two aspects: firstly, the early investment in self-operated logistics is relatively high, which is very risky for some developing enterprises. In addition, besides basic infrastructure construction, enterprises also need to invest in a large amount of human capital, which invisibly increases the operating costs of those enterprises; secondly, there is a lack of professionalism in self-operated logistics. The logistics industry, as a separate industry, requires enough management skills. If an enterprise doesn't introduce personnel with professional logistics management skills, it will have a certain impact on the entire logistics system and increase operational risks [9].

5.2 Third-Party Logistics Distribution Model

The third-party logistics distribution model is so important that is commonly used in agricultural product distribution. This distribution model refers to the use of specialized logistics technology to optimize the entire distribution process, including product packaging, loading and unloading, storage, distribution, etc. In this way, third-party logistics is firstly responsible for delivering agricultural raw materials to manufacturers, including warehousing, distribution, and management. After receiving the products, manufacturers conduct preliminary processing and then hand them over to the third-party logistics that delivers products to sales personnel, who then begin secondary marketing. Certainly, third-party logistics can also provide a last-link distribution service, and deliver agricultural products to consumers. Compared with self-operated logistics, third-party logistics has stronger professionalism and costs less money. Furthermore, third-party

logistics fully serves enterprises in coping with logistics management. It can help enterprises provide agricultural product logistics services, and can save more time for them to improve other aspects, further increasing their operational efficiency. In addition, third-party logistics also needs to be conscious of its reputation, provides better services for customers and enterprises and builds ties between them, which can also bridges the gap between consumers and merchants. Compared with the self-built logistics distribution model, this model costs much less money and eases the management burden on enterprises [10]. However, in the practical application process, the drawbacks of this model have gradually appeared. Firstly, there are great inadequacies when enterprises entrust third-party logistics with logistics management, mainly manifested in their untimely understanding of logistics information. Once customers give feedback about problems, enterprises need to confirm those problems with third-party logistics enterprises again, ultimately judging who should shoulder the responsibility and solving problems in time. Secondly, the distribution process and the service type are relatively simple. Seen from the service process, third-party logistics enterprises focus more on the management of the entire distribution process and do not pay attention to the innovation of management models, which can easily lead to difficulties in development in the long run. In addition, some logistics companies do not pay attention to the control of each link, which may cause problems with agricultural products in a certain link. In this case, the quality of the products received by consumers cannot be guaranteed, and it invisibly increases the contradictions between consumers and enterprises, which may have an impact on the sales volume of agricultural products and bring potential risks to enterprises.

5.3 O2O (Online to Offline) E-commerce Logistics Distribution Model

O2O e-commerce logistics distribution model is a new marketing model with the development of logistics distribution services in a new era. Compared with third-party logistics, this distribution model system is better but also has some problems. To put this matter in perspective, the O2O logistics distribution model regards the Internet and offline business as its core, combining the two wisely and making the Internet a complete offline trading platform. With this distribution model, agricultural products are directly delivered to consumers' homes through self-operated or third-party logistics, and can also be sent to convenience stores for consumers to pick up themselves. To ensure that consumers can pick up products they have bought, currently convenience stores use QR code scanning as a verification method, confirming the identity of consumers before allowing them to take away the products, which can also reduce disputes between merchants and customers. In recent years, with the development of the Internet, more and more online shoppers are emerging, but the main consumption pattern for agricultural products is still offline consumption. However, there are also some problems in the O2O logistics distribution model. For instance, it has a high early investment and long payback period, which can increase the operational risks of enterprises if not managed properly. In addition, this distribution model also has limited coverage, and the infrastructure for cold chain logistics still needs to be improved. Compared with other products, fresh agricultural products are difficult to preserve and can easily spoil, which will affect their quality. Based on the above situation, in the practical application process, relevant personnel can use the O2O model, that is, consumers order products online and

the merchants deliver them as soon as possible upon receiving the order, which can also improve consumer satisfaction.

5.4 Pick-Up Stations for Express Distribution and Centralized Distribution

Unlike other products, fresh products are more perishable. Only by improving the distribution efficiency can we ensure their freshness and increase customer satisfaction. The traditional distribution model is relatively simple. To improve efficiency, it is commonly used to increase the number of distribution personnel or stations. Although this method has played an important role in a certain period of time, its disadvantages have gradually appeared as the distribution system continues to improve. For example, some distribution personnel happens to encounter occasions when customers are not at home while delivering, failing to distribute products successfully, which undoubtedly has a huge impact on some fresh products. If these products cannot be delivered to the customer in time, it will not only reduce the product quality, but also have a significant impact on the service level of all the logistics enterprises. To avoid these problems and improve customers' sense of experience, relevant departments can build new distribution stations, such as pick-up stations for customers. Certainly, we can also change the distribution model, such as introducing a centralized distribution model. This distribution model can collect the product information of the same address, making centralized preparations and distribution by merchants, simplifying the distribution process and improving distribution efficiency. Currently, many large enterprises have introduced the above distribution model, such as JD.com, which sets up product pick-up stations and different JD convenience stores in multiple regions, creating a suitable environment for preserving fresh agricultural products and enabling customers to pick up products anytime. In general, this change in the distribution model also provides convenient conditions for online sales of fresh agricultural products. Seen from the current development of logistics in China, there are still many problems, which mainly manifest in centralization. To radically solve this problem, relevant departments need to establish an integrated connection between information, funds, and logistics, then build an efficient logistics system for centralized distribution on this basis. In this way, low levels of centralization can also be avoided. Therefore, relevant state departments are also supposed to improve related laws and regulations. Also, the government should encourage logistics distribution services more, supporting relevant enterprises to pursue green development.

6 Key Points for Constructing a New Logistics Distribution Model for Fresh Agricultural Products

Generally speaking, the distribution of fresh products involves various steps, and the concerted efforts of multiple departments are required in the process to reduce distribution risks. Meanwhile, all the departments can share resources and then reconstruct the distribution mode of fresh agricultural products.

6.1 Building a Smart Distribution System to Improve Quality and Efficiency

In recent years, with the development of Information Technology, logistics distribution systems have also undergone new changes, laying the foundation for the development of a smart logistics service system. Thus, enterprises also need to change their previous development concepts, focus on the application of “Internet Plus Technology”, and find new ways for logistics development to establish a smart distribution system. At the same time, logistics enterprises should further promote modernization drive, change the development paradigm of the current logistics distribution system with smart technologies, and enable customers to enjoy faster and more comprehensive services, further improving distribution efficiency. Besides, enterprises can also focus on the application of high technology, such as vigorously introducing 5G technology to create a virtual world for customers to have product experiences. Thus, we can break through limitations of time and space to allow customers to know about product information and accurately grasp the origin of products and arrange distribution time in accordance with the weather and the time customers are available to ensure that products are delivered to customers safely.

6.2 Opening Channels for Simple Offline Sales and Combing with Online Sales

Researches found that only by opening channels for simple offline sales can the entire industry be boosted. In the process, relevant enterprises should combine offline sales with online sales, and based on data technology, achieve organic integration of online and offline sales, and improve the intelligence level of the entire logistics distribution system. On the whole, different sales channels vary in logistics distribution modes. Taking e-commerce sales as an example, the cycle of product sales is quite palpable, and there are also some requirements for efficiency in distribution, which put higher standards on fresh agricultural product distribution. To improve distribution efficiency, we must take several aspects into account, such as product backlog and lagged distribution. In addition, improving distribution efficiency is crucial in the entire logistics distribution process of fresh agricultural products. Hence, relevant departments can combine the logistics distribution system with the online sales system, collect various data of distribution in platforms with the help of big data and cloud computing technology and reasonably allocate logistics resources to improve the overall sales level. Besides, when building online sales platforms, relevant enterprises should also widen channels for sales, such as using WeChat mini-programs and Weibo to sell products, effectively using more ways in agricultural product distribution, and ensuring that fresh agricultural products are delivered to consumers promptly.

6.3 Reducing Product Loss During Distribution Process by Applying Cold Chain Technology

In the distribution process of fresh agricultural products, there is a great problem, which mainly manifests in a high rate of product loss. To address this issue, relevant departments can establish cold chain distribution systems to optimize the distribution process, effectively reducing fresh product loss in distribution, and providing more full services

for consumers. Based on the current conditions of agricultural product distribution, enterprises who use cold chain technology account for less than one-fifth, and products in such way of logistics distribution will also cost service fees. Thus, relevant departments should increase investment in cold chain logistics distribution facilities to effectively improve the quality of fresh products. Moreover, relevant departments should make efforts in research and development of cold chain technology, such as developing temperature and humidity automatic regulators according to optimal storage conditions of various agricultural products automatically, which can adjust accordingly, and reduce agricultural product loss.

6.4 Optimizing the Layout in Offline Stores and Focusing on Improving Customer Experience

Strictly speaking, offline stores are the outlets for fresh agricultural products logistics distribution, whose improvement also affects the sales of products to some extent. In a new era, departments that sell agricultural products should change their sales ideas in the past, stick to improving the layout in offline stores, and then improve the consumer experience, increase consumers' satisfaction with logistics distribution services, and optimize the layout in offline stores, as well as achieve the integration of high-quality resources. In this process, new sales models can also be introduced into offline stores, such as setting up pick-up counters that do not require manual management to reduce disputes between consumers and merchants. In addition, relevant departments should fully make use of big data technology, optimize the location of offline experience stores in line with consumer demand, and try to open offline stores in relatively populous areas. On this basis, centralized distribution can be implemented to improve efficiency and ensure the freshness of agricultural products.

7 Conclusion

It's important to manage well logistics distribution for fresh agricultural products, which can not only solve people's livelihood issues but also widen channels for sales that were previously blocked, and then drive the development of related industries. In a new era, it's particularly necessary to innovate agricultural product logistics distribution models, which can create unique agricultural brands as well as help boost the development of the whole industry. In the process of constructing logistics distribution models, relevant units should comprehensively consider the advantages and disadvantages of multiple models, scientifically choose distribution methods based on their actual needs, improve the efficiency of fresh agricultural product distribution, and promote the development of the entire industry.

Acknowledgements. This project is supported financially by the Projects of Sichuan University of Arts and Science (No. 2020HX020).

References

1. Y Zhang, YC Dong. (2021) Optimization model and solution of O2O fresh agricultural products logistics distribution. *Journal of Shaoyang University*, 2021, 18(01): 8–14.
2. ZG Wang. (2020) Research on Fresh Agricultural Products Logistics Mode Optimization and Resource Integration under Cloud Logistics. *Logistics Sci-Tech*. 2020, 43(12): 144–146.
3. BZ Wang; H Li. (2019) Complex Network Layout Design of Fresh Agricultural Products' Intra-city Distribution. *Statistics & Decision*. 2019, 35(12):40–44.
4. HR Yi. (2019) Study on the Selection of Logistics Terminal Distribution Mode of fresh produce from Supermarket Chain under O2O Conditions. *Hunan University of Commerce*.
5. X Zhang. (2019) Research on Joint Distribution and Path Optimization of IoT Cold Chain Logistics for Fresh Agricultural Products. *Chongqing University of Technology*.
6. JV Duin, WD Goffau, B Wiegman, et al (2016). Improving Home Delivery Efficiency by Using Principles of Address Intelligence for B2C Deliveries. *Transportation Research Procedia*, 2016, 12: 14–25.
7. WH Zhang, QQ Miao, F Guan et al (2018). Route Optimization of Fresh Agricultural Product Distribution under O2O Mode. *Logistics Technology*, 2018, 37(12): 78–82+88.
8. WH Xia, X Zhang, QY Xia. (2019) The Cold Chain Logistics Distribution Model and Collaborative Mechanism of E-commerce for Urban Fresh Agricultural Products. *Jiangsu Agricultural science*, 2019, 47(04) : 321–325.
9. JC Kuo, MC Chen. (2010)Developing an Advanced Multi-temperature Joint Distribution System for the Food Cold Chain. *Food Control*,2010,21(4) :559–566.
10. BD Song, YD Ko. (2016) A Vehicle Routing Problem of Both Refrigerated and General Type Vehicles for Perishable Food Products Delivery. *Journal of Food Engineering*, 2016, 169: 61–71

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

