Research on the "Last Kilometer" Distribution Model of Cold Chain Logistics

Xiaolin Liu

Department of Economics and Management, Chifeng University, Chifeng, Inner Mongolia, 024000 China

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Abstract: Cold chain transportation is becoming more and more important with the change of economic structure, followed by various problems of cold chain transportation, among which the "last kilometer" problem is particularly prominent in the current problem of cold chain transportation. The "last kilometer" distribution affects consumers' evaluation of cold chain transportation. Through the research on the current "last kilometer" cold chain distribution model, this paper finds the problems and shortcomings of each model, and proposes how to improve the low-quality, low-efficiency and low-evaluation opinion strategy of the "last kilometer" cold chain distribution, providing solutions to the "last kilometer" problem of cold chain enterprises.

1. Introduction

With the development of modern information technology, the way the economy grows has also changed. The network has made many fresh agricultural and sideline products have a broader sales platform, and the growth is the distribution of cold chain logistics. According to the latest data from the Ministry of Commerce, the online transaction amount of agricultural and sideline products reached more than 90 billion yuan in 2016 and 140 billion yuan in 2017. In 2018, it increased by 42% from the previous year to reach 210 billion yuan. The increase in sales is accompanied by frequent problems in cold chain transportation. As the agricultural and sideline products require full chain cold chain transportation during the distribution process, the overall agricultural and sideline product sales industry has increased the requirements for cold chain transportation. At the same time, consumers have strict requirements on the quality of agricultural and sideline products. In particular, the "last kilometer" of cold chain distribution cannot meet the needs and requirements of consumers. Therefore, how to meet the consumer's requirements for the "last kilometer" can also meet the characteristics of agricultural and sideline products, which has become a major bottleneck in the development of cold chain logistics.

2. Status of the "Last Kilometer" Distribution Model of Cold Chain Logistics

In recent years, as the Internet has driven the development of fresh agricultural and sideline products, the fresh cold chain logistics has become a necessity in transportation. Its high quality transportation level makes the fresh agricultural products reach the best in the last kilometer of distribution. However, in the face of the high demands of time, quality and method of fresh agricultural products in the last kilometer, the traditional cold chain distribution has been unable to meet. Therefore, different "last kilometer" distribution modes have been implemented in the industry. Different distribution modes are analyzed below to clarify their respective advantages and disadvantages.

Self-Operated Direct Business Model. The cost of self-operated direct marketing model is the largest in the distribution of fresh agricultural and sideline products in the "last kilometer", but its distribution efficiency and quality are also the best in the "last kilometer" distribution. This model must be based on a certain scale online, start to establish their own distribution system, set up self-operated convenience stores according to the distribution of the market, and then carry out the "optimal one kilometer" distribution of fresh agricultural and sideline products through recruiters. This distribution mode has the following advantages: First, in the "last kilometer" distribution environment, the quality of fresh agricultural and sideline products is guaranteed, and the whole

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process has standard temperature control. Second, the delivery time under this distribution mode can be adjusted according to the needs of customers, and it will not cause quality problems when the final fresh agricultural and sideline products arrive in the hands of customers. Third, self-operated convenience stores can provide consumers with a series of offline services, such as the recommendation of fresh agricultural and sideline products for consumers, and after-sales treatment of the problem of returns and exchanges in the "last kilometer" distribution to improve customer satisfaction. Although this mode is the best for the "last kilometer" distribution of fresh agricultural and sideline products, it needs direct stores, refrigerated distribution trucks, personnel costs and so on because of the high cost of early investment, so only large-scale platform providers of fresh agricultural and sideline products can support it. For example, Ali company's Hema Fresh, and Jingdong fresh. These fresh agricultural by-products brands are all self-operated direct mode, using fresh stores + fresh aging distribution mode, achieving the efficient distribution of "the last kilometer".

Third Party Joining Model. Because of the high investment cost and slow profit of the self-operated direct operation mode, the basic distribution mode of most fresh agricultural by-product platforms is the third-party alliance mode. This model needs to separate the third party from the franchise. The third party refers to the distribution of fresh agricultural and sideline products by the third party logistics enterprises, and the franchise refers to the cold quality assurance of the "last kilometer" agricultural and sideline products by the third party community stores. Firstly, the third-party logistics enterprise cold chain distribution is explained. Fresh agricultural by-products platform, through the use of third-party logistics to establish a cold-chain logistics distribution system and mechanism, will need to distribute fresh agricultural by-products to the third-party logistics enterprises for cold-chain distribution, and finally to the hands of consumers. Under this mode, enterprises can not only save the cost of self-construction and self-operation through outsourcing by third parties, but also concentrate on promoting the development of their main business. Although the third-party cold chain "last kilometer" cost is low, but the quality of its distribution is not high. There are many uncertainties in the "last kilometer" cold chain distribution, for example, customer time is uncertain, district distribution is not allowed to enter and other distribution problems are not flexible, resulting in many disputes in the third party "last kilometer" distribution of fresh agricultural by-products. In order to solve this problem, many platforms introduce the third-party Community Alliance model to assist the third-party cold chain logistics to carry out the "last kilometer" cold chain distribution. Specifically, it is to provide refrigerated lockers by joining the storefronts, and to require them to deliver the goods according to the detailed requirements of the customers, and to give commissions according to the number of deliveries. Joining in the "last kilometer" cold chain distribution of the franchise mode effectively solves the cold storage problem and the waiting problem of the third party cold chain logistics distribution. Third-party cold chain logistics only needs to transport fresh agricultural and sideline products to the third-party franchise stores. Store owners keep the products in cold storage to ensure the freshness of their fresh agricultural and sideline products, and then reach the "last kilometer" of high-quality distribution of fresh agricultural and sideline products through small-scale distribution. At the same time, this model also has the problems of store quality management and different storage standards.

Customer Self-Service Model. Customer self-service mode is established through the above two modes of self-operated direct stores, third-party franchise stores or intelligent refrigerated self-service cabinets, allowing customers to arrange their own time to pick up goods. This "last kilometer" distribution mode of fresh agricultural by-products can effectively solve the time lag of distribution, and ensure the quality of fresh agricultural products delivered to customers. It not only improves customer loyalty, but also enhances the customer's experience of purchasing fresh agricultural by-products. The first is the self-service mode of self-service stores. Customers place orders online and then prepare goods offline by self-service stores. Customers directly propose a self-service mode of goods when they arrive. This self-service mode can ensure the quality of lettuce agricultural by-products without a lot of manpower, material and financial resources, and

also reduce the investment in cold chain distribution. The second mode of third-party franchise is to solve the problem of “last kilometer” distribution inflexibility by cooperating with community convenience stores and utilizing convenience of convenience stores. There is no need to invest as much in the stores as in the self-operated stores, so as to achieve the self-lifting effect of the self-operated stores, and the degree of convenience is higher than that of the self-operated stores, but the quality assurance is worse than that of the self-operated stores. The third is the intelligent refrigeration self-extracting cabinet mode. The development of the intelligent refrigeration self-extracting cabinet benefits from the development of the current Internet technology. It uses the storage cabinet similar to the supermarket storage cabinet and refrigerates it. Under the premise of notifying the customer in advance, the customer can send the cargo extraction code to the customer. The customer can extract the cargo by himself according to his own time schedule.

3. Obstacles to the Development of “Last Kilometer” Distribution in Cold Chain Logistics

Difficulties in Franchise Management. Whether it is the third-party cold chain “last kilometer” distribution in franchised outlets or the fresh agricultural and sideline products self-extraction mode in franchised outlets, the mode of cooperation with non-governmental organizations seems to be cheap, but there are a lot of problems in the standardized management of stores. First of all, the service quality of the staff who join the cooperative stores is uneven. At present, most of the modes of cooperation are community retail stores and individual supermarkets. The cultural and educational level of the franchised shopkeepers themselves may not be high. The cold chain awareness of fresh agricultural and sideline products is weak. In the absence of supervision from their superiors, many franchised shopkeepers do not store according to the prescribed standards in order to save costs. This mode also has communication problems. Because of the lack of communication and communication, the superiors lack market control, which is not conducive to the sustainable development of fresh agricultural and sideline products.

High Cost of Self-operated Direct Business Model. The high cost of self-operated fresh agricultural and sideline stores has been the main problem hindering the distribution of “the last kilometer”. This kind of self-operated direct business needs to find stores in crowded places, professional refrigeration and refrigeration equipment to ensure the quality of fresh agricultural and sideline products, so these are fixed costs of self-operated direct business model. In addition, in the later period, a large number of distributors and service personnel are needed, as well as the periodic replacement and maintenance of refrigerated vehicles and old equipment purchased and distributed, which makes the investment in the early and middle stages of the self-operated direct operation mode enormous, and there is also a huge uncertainty about the income in the later period because of the influence of the market. As a result, only large platforms are able to invest, and it is difficult to achieve the “last kilometer” of low-cost distribution services.

Distribution Cost and Convenience are Difficult to Balance. The cost of self-run direct operation is high and the loss of third party alliance is high. As long as it involves the distribution of fresh agricultural and sideline products “the last kilometer”, it must use cold chain loading to distribute, and control the time difference of distribution and the temperature of equipment, so as to deliver fresh agricultural and sideline products to customers. While increasing the intelligent cold chain self-contained cabinet can increase the convenience of distribution, it also faces the problem of high cost, and its economic benefit is not high, which makes the economic benefit and investment inversely proportional. The unbalanced distribution cost and convenience of fresh agricultural by-product “last kilometer” greatly hinders the improvement of customer experience and loyalty, and also hinders the development of cold chain “last kilometer” distribution.

Lack of Distribution Infrastructure and Resources. For the distribution of “last kilometer”, there is a fundamental problem: At this stage, the overall cold chain distribution infrastructure and equipment are seriously lacking, and the existing cold chain transport tools and refrigerated storage are far from meeting the people’s demand for fresh agricultural and sideline products at this stage. Due to the lack of cold-chain equipment, both the mode of self-operated direct operation and the mode of third-party alliance are used in the “last kilometer” distribution, and even in trunk

transportation, ordinary vehicles are used for transportation and distribution. Moreover, in order to save the loading cost of vehicles, fresh agricultural by-products are mixed with general goods. The temperature control environment is different and the time of mixed transportation and distribution is prolonged. The loss of products is also increasing. Some vulnerable agricultural by-products have decayed and deteriorated even before reaching the “last kilometer”.

4. Optimized Solution to the “Last kilometer” Problem of Cold Chain Logistics

Actively Adopt Joint Distribution. Under the current social and economic conditions, the single and scattered cold chain distribution companies in the “last kilometer” distribution of fresh agricultural and sideline products have become normal. The single and scattered “last kilometer” distribution of fresh agricultural and sideline products will inevitably lead to low distribution efficiency, high distribution cost and poor distribution timeliness. In order to solve these problems, we must actively adopt the mode of joint distribution. Joint distribution refers to the selection of a common “last kilometer” cold chain distribution site by several nearby businesses according to their own conditions, by which the scattered cold chain distribution services can be gathered together and the fresh agricultural and sideline products of each business can be uniformly distributed. After the establishment of the “last kilometer” cold chain joint distribution station, the merchants in the scope can make full use of the refrigerated transport equipment of the distribution station and use the third party logistics service, so they need not establish their own distribution system and methods. With the support of third-party logistics, this mode of joint distribution enables customers to enjoy the most professional cold-chain logistics services, and also makes the joint distribution system form a scale effect quickly, so as to achieve the “last kilometer” of cold-chain logistics cost reduction. At the same time, it saves the cost of fresh agricultural by-products merchants, which can also make the third party logistics solve the problems in distribution quickly, and reduce the impact on the reputation of their own brand.

Strengthen Cooperation with Third Parties to Reduce Cold Chain Distribution Standards. To strengthen the cooperation with the third party, first of all, we should strengthen the cooperation with the third party cold chain logistics. At this stage, the development of fresh agricultural and sideline products is in the primary stage. It is unrealistic to establish large-scale self-operated cold chain logistics. In the future, it is particularly important to strengthen cooperation with third-party cold chain logistics. Fresh agricultural by-products suppliers reduce the “last kilometer” distribution cost by making full use of the network advantages of third-party cold chain logistics and specialized cold chain layout. Secondly, from the point of view of the third-party franchised stores, we should strengthen cooperation and communication with franchised stores, standardize the service of franchised stores, and improve the service level of franchised stores. However, in the primary stage, in order to develop the “last kilometer” of third-party distribution rapidly, the service standard of third-party distribution can be reduced appropriately. As can be seen from the cold-chain distribution graded Tuck, consumers’ expectations for low-price and low-quality products are not high, and for low-price and low-quality products, they can avoid high-price and high-quality products. Quantity products are suitable for the same cold chain distribution standard. For commodities with general prices, traditional ice pack can be used to ensure their quality. Through scientific distance selection and spatial arrangement, high quality cold chain service can be achieved in the “last kilometer” distribution.

Expanding Distribution Distance by Self-operated Direct Business and Reducing Costs. Self-operated direct stores can not only bring high-level “last kilometer” cold chain service, but also enhance the product image of their own products, and promote self-operated direct stores to get consumers’ trust directly, thus obtaining consumers’ direct information and providing good market planning for the development of products. However, the biggest limitation of self-operated direct stores is the large investment cost, low economic benefit and limited service radius. In order to reduce the cost of self-operated direct business, we should start with expanding the service radius. Expanding the service radius of the original “last kilometer” to the “last three kilometers” can meet the needs of more customers. At the same time, the expansion of the service radius can reduce the

construction of self-operated direct stores, thus solving the problem of expensive rent, together with the cooperation of other distribution modes. It makes fresh farm and sideline products meet the needs of customers and control the cost in a controllable range in the terminal distribution. At the same time, it also forms a propaganda effect because of the high quality service.

Increasing Convenient Receiving Points and Improving Distribution Resources and Facilities. With the development of shared economy, in order to make the distribution of “last kilometer” better meet the needs of consumers and reduce the high cost problems caused by time difference and high cargo loss, it is a better way to solve this problem to establish and construct intelligent refrigeration storage cabinets with shared economy. Shared Intelligent Refrigeration Container can be temporarily signed by the container when the consignee fails to sign in on time. By the way, the intelligent code can be sent to the customer, so that the customer can complete self-collection. That is to say, it increases the convenience of the people and reduces the investment cost because of the sharing mode. Secondly, we should improve the distribution resources and facilities in the “last kilometer” distribution. For goods with higher product requirements, we should implement the whole cold chain, increase the number of refrigerated vehicles, and control the standard refrigeration temperature. For the “last kilometer” cold chain distribution with lower requirements, small incubators should also be used to ensure that the distribution is damaged when the temperature is high.

5. Conclusion

In the “last kilometer” distribution of cold chain logistics, through the analysis of each “last kilometer” distribution mode, it is found that the problem between service quality and cost is the most important problem in the “last kilometer”. As the key link of fresh agricultural by-products, the distribution of “last kilometer” has a direct impact on the future development trend of fresh agricultural by-products. Solving the contradiction between service quality and cost, reducing costs and improving service quality are the core of the “last kilometer” problem of cold chain logistics.

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