Development of Agricultural Product Logistics from the Perspective of the 4PL

Alex Wuya ZHONG[1], Wei YAN[1,2]

1. College of Economics, Shenzhen University, Shenzhen 518060, China; 2. Department of Public Economics and Finance, Minjiang University, Fuzhou 350108, China

Abstract From the perspective of the Fourth Party Logistics (4PL), this paper elaborates the concept, background and development plight of agricultural products logistics, advises developing 4PL under the background of rapid development of agricultural products and logistics, *etc.* and explores issues of information, efficiency and supervision of agricultural products logistics, draws the conclusion that only construct an 4PL agricultural products logistics system can alleviate the aporia of cost, and speed the efficiency of China's agricultural products logistics.

Key words The Fourth Party Logistics (4PL), Agricultural Products, Logistics, Development

1 Introduction

At present, huge price difference lies between origin and terminal agriculture market in China. Accompanied by unbalanced supply and demand of agricultural products, it extremely wastes natural and social resources. Major reasons for this include lagged agricultural product logistics mode, single logistics channel, outmoded logistics concept, low logistics efficiency and drawbacks of agricultural product logistics system. It is of great practical and theoretical significance to establish a high efficient and stable logistics system which is suitable for circulation demand of China's agricultural products.

Agricultural product logistics is the sum of agricultural product logistics management activities in the circulation from origin to circulation, including transportation, storage (normal temperature, fresh keeping and cold storage), loading and unloading, handling, packaging, circulation and processing, delivery and information processing of agricultural products. The objectives of agricultural product logistics include increasing added value of agricultural products, saving circulation cost, raising circulation efficiency, reducing necessary cost and evading market risks. Natural property of agricultural products determines conflict between regionality of supply and extensiveness of demand, thus separately distributed towns are main terminal markets of agricultural products.

China's agricultural product logistics market has received remarkable development in rapid growth of national economy. At present, China's agricultural products are characterized by various types, different characteristics, and varied types, standards and levels of logistics demands. In particular, at the background of globalization of agricultural product origin and terminal market, natural property of agricultural products sets out specific heterogeneous requirements for logistics. Although diverse pattern of agricultural product logistics organizations and forms has basically formed, it is still not able to satisfy logistics demand of rapid growth of agricultural products. Agricultural product logistics field has accumulated a lot of problems urgently to be solved, such as high loss of agricultural product transportation, low freshness, and high logistics cost; imperfect logistics information network facilities and blind agricultural product market; various agricultural product logistics subjects and chaotic market order; barrier between different segments of relevant management departments of agricultural product logistics, difficult integration of industrial resources; service concept of agricultural product logistics lagging behind, high proportion of self-employed logistics, and agricultural product logistics facing rigid restraint; backward agricultural product logistics technology and quality inspection means. All these factors restrict all links of agricultural product logistics and their further development and upgrade. Therefore, it is urgent to plan and integrate agricultural product logistics with new concept, method, mode and organization, to satisfy quality and efficiency requirements of modern commercial mode and lifestyle.

2 Current situation of the problem study

Scholars have put forward many opinions and suggestions for problems in China's agricultural product logistics. Wan Min and Hu Zhenhu (2006)[1] and Zhang Zhaotong[2] introduced development history and experience of agricultural product logistics in some countries; He Feng (2006) present suggestions for development mode of agricultural product logistics in China with reference to experience of Japan and other countries[3]; Zhang Jingwei (2008) believed that it is feasible to learn Japan to foster intermediaries through developing the third party agricultural product logistics, so as to promote development of China's agricultural products[4]. Liu Dongying and Huang Zuhui (2005) studied external changes of logistics profit from institutional structure with the case of logistics of fresh agricultural products, pointed out that institutional innova-

Received: September 9, 2013 Accepted: October 24, 2013
Supported by Social Science Project of Fujian Provincial Department of Education (JB12197S).
* Corresponding author. E-mail: alexwyzhong@szu.edu.cn

tion promotes evolution of China's agricultural product logistics system[5]; they built a two-dimensional space model for logistics chain of fresh agricultural products, and contended that establishment of logistics chain of fresh agricultural products is influenced by organization degree and logistics activities of logistics subjects[6]. Hu Shujin (2007) proposed increasing investment in information system and strengthening macro control in line with restraints of development China's agricultural product logistics[7]. Luo Rong (2011) made a comprehensive summary of role and function of government in development of agricultural product logistics industry[8]. In technology field of agricultural product logistics, there are also many achievements, such as Wang Dong and Suo Zhilin (2007) solved location selection model for agricultural product logistics center by mixed integer programming (MIP) algorithm[9]. Zhang Mingyu and Li Xiaoyu (2009) studied risk factors of supply chain of agricultural product logistics[10]. Zhao Kun and Wang Xinli (2010) on the basis of neural network[11], Zhang Jingwei (2008)[12], Pan Fengchai and Qi Fangzhong (2012) on the basis of the third party E-commerce platform[13], explored information construction of agricultural product logistics. Cheng Lei and Wang Daoping (2011) measured efficiency of agricultural product logistics mode, providing a scale for objective evaluation of logistics efficiency[14].

Current researches mainly focus on the path of "efficiency – tool – mode". Such research paradigm has strong pertinence and overall regulation. With extensive application of information technology and rapid expansion of market scale, theoretical and practical application of logistics field advances rapidly. Expansion of economic aggregate, expansion of economic scale, and advance of urbanization process, change of people's lifestyle, as well as long term plight of agricultural product logistics, objectively make the logistics need arrangement, analysis, planning and selection of new concepts and new perspectives. At such background and in this precondition, we explored current development problem of China's agricultural product logistics from the perspective of the fourth party logistics on the basis of current researches, and put forward relevant recommendations for development of agricultural product logistics.

3 Problems of agricultural product logistics from the perspective of the fourth party logistics

At present, operating efficiency, development speed and operating mode of China's logistics are already not suitable for rapid growth of economy, and background logistics ability has become a bottleneck for expansion of economic scale and improvement of operating efficiency. The fourth party logistics has received extensive attention and is deemed as a rational choice for solving current logistics problems. We analyzed information transmission mechanism, efficiency and supervision of China's agricultural product logistics with reference of intensification and advantage of the fourth party logistics, in order to provide ideas and references for development of China's agricultural product logistics.

3.1 Information transmission mechanism of the fourth party logistics and agricultural product logistics

At present, information construction of China's agricultural product logistics lags behind, hardware investment and software configuration are not imperfect, network system construction still remains at the starting stage, transmission and feedback of agricultural product supply and demand information are not timely, accurate and effective, and market regulation is extremely blind. Selection of agricultural product logistics mode is greatly limited. Low integration of commercial flow, material flow, capital flow and information flow results in huge waste of resources. Timely-based agricultural products have higher dependence on information platform than ordinary industrial products, especially information of market supply and demand, logistics tools, delivery and combination makes price of agricultural products have higher elasticity for information. Influence of information factors on logistics of agricultural products includes following aspects: (1) Feedback mechanism of terminal demand for origin information. Due to restriction of natural property and life cycle, agricultural product market fails to rely on market control like industrial product market as production signal, but actual market competition causes agricultural products to fail to refuse function of the law of value. Therefore, for stable development of agricultural products, adequate and symmetrical market information is particularly important. Otherwise, it will dampen enthusiasm of farmers, and short supply will disturb economic order. (2) Selection of tools and modes of agricultural product logistics. Without significant cost stimulation or external impact, selection of tools and modes of agricultural product logistics will have strong path dependence. When information system expands feasible set of cost selection, tool selection, time arrangement and means of transport, market will be dynamic comparison, acceptance or rejection and choice. Therefore, its balance result is inevitably an effective Pareto improvement. (3) Carrier selection of agricultural product logistics. Generally, at the early stage of logistics development, logistics information is limited, the first party logistics or self-employed logistics is the only choice. Selection space of agricultural product logistics is limited. This will inevitably lead to low logistics efficiency. With development of logistics market, demanders and suppliers of logistics services become diversified, and transaction methods also become diversified. It is able to reflect such diversification on information platform. Therefore, it is able to realize Pareto improvement on the basis of original logistics. (4) Monitoring of transport status of agricultural product logistics. As it is known to all, the loss rate of China's agricultural product logistics exceeds 30% on average, more than 10 times the level of developed countries, such as USA and Japan. Thus, information platform not only can realize flow of agricultural product trade information, but also can achieve monitoring of agricultural product logistics information. At the background of tracing and monitoring in the whole process, agricultural product logistics information inevitably can reduce unnecessary physical loss, technological loss, and other emergencies.

With reference of information efficiency, the fourth party logistics has significance advantages in information exchange, information sharing and integration. The fourth party logistics integrates logistics employees, facilities, information, schematic design and other industrial resources. Take agricultural product logistics market as an example, demanders of agricultural product logistics can make screening, comparison and selection of logistics service providers on the information platform, and can also make customization and confirmation of logistics tools, schemes and paths. In addition, under the framework of the fourth party logistics, diversified logistics service providers can actively select demanders, customize individualized scheme to participate in competition, and also can conduct standardized business to exploit market. Diversified logistics subjects conduct market-oriented competition and cooperation in the fourth party logistics information platform. The efficiency will certainly be higher than the past agricultural product logistics mode with limited information. Furthermore, more transparent and rapid information platform established by the fourth party logistics can effectively feed back supply and demand information of agricultural products, and reflect process of agricultural product logistics and ensure transport safety of agricultural products.

3.2 Efficiency of the fourth party logistics and agricultural product logistics Due to different emphasis points, measurement criterion of logistics efficiency is varied in different industries. In general, evaluation of logistics efficiency can be divided into logistics speed, cost and quality. Limited by strong constraint of natural property, agricultural product logistics has high dependence on information efficiency, but adequate information is only a necessary but not sufficient condition for high efficiency of agricultural product logistics. To realize high efficient agricultural product logistics, we must control logistics speed, cost and quality. The existing agricultural product logistics system has problem of long in-transit time, high transport loss, and low freshness, leading to high logistics costs. What's worse, high proportion of self-employed agricultural product logistics does not conform to market demand of labor division, specialization and competition. Therefore, China's agricultural product logistics market has large scale, but the efficiency is relatively low. In the condition of existing resource endowment and market development degree, how to stimulate enthusiasm of agricultural product market subjects, how to bring into play creativity of agricultural product market system, how to improve efficiency of agricultural product logistics system are problems difficult to be solved simply through increasing technological efficiency. Logistics development process in developed countries has proved that technological efficiency plays limited role in optimizing the system and structure, thus innovation of organization form and mode is an inevitable choice for objective development law of logistics. With rapid economic growth, the third party agricultural product logistics system develops rapidly in China. Nevertheless, development stage, scale and efficiency of the third party agricultural product logistics in China are not satisfactory, huge market demand urgently requires more efficient development mode.

As to the logistics efficiency, the speed, cost and quality of agricultural product logistics under the framework of the fourth party logistics are substantially improved. Generally, logistics speed depends on rational logistics planning, advanced logistics facilities, and integral logistics services, while logistics cost largely depends on logistics quality and the competition of logistics service market. At present, China's agricultural product logistics market still remains at primary stage, the market lacks order and competition lacks efficiency. The fourth party logistics can integrate diversified market subjects, logistics approaches and operating ways in system integration manner, and promote high efficient market competition of agricultural product logistics in diversified logistics planning. Logistics demanders can select optimum planning scheme through automatic comparison of system platform, and select optimum logistics facilities, so as to formulate most competitive logistics scheme and realize most efficient logistics combination. In addition, based on the present third party logistics resources, construction of agricultural product logistics under the framework of the fourth party logistics system does not need increase of investment. Only through proper organization and inventory logistics resources, it is able to realize great increase of agricultural product logistics efficiency.

3.3 Supervision of the fourth party logistics and agricultural product logistics In this study, supervision of agricultural product logistics includes supervision of logistics subjects, supervision of logistics safety, and supervision of market services. Agricultural product logistics subjects include demanders, suppliers and intermediaries of agricultural product logistics services, while supervision objects are mainly suppliers and service providers. At present, China's agricultural product logistics remains the starting stage of the third party logistics development, enterprises engaged in agricultural product third party logistics are few, small and lags behind in management level. At immature market, driven by benefits, enterprises may take various irregular actions, which influence healthy development of the entire market. Thus, it is required to strengthen guidance and supervision of market regulations. Supervision of safety of agricultural product logistics includes safety supervision of agricultural product transport, safety supervision of product quality in the process of agricultural product logistics, and safety supervision of agricultural product logistics facilities. Service supervision of agricultural product logistics market is pertinent to regulation and quality supervision of service actions of market managers, so it belongs to functional supervision of government departments. Similar to market management functions of industry, commerce and taxation, service supervision of agricultural product logistics market is an integral part of benign development of agricultural product logistics market. The purpose of subject supervision and safety supervision is to guarantee healthy development of agricultural product logistics market, to make agricultural product logistics system smooth, high efficient, safe and

convenient.

China's agricultural product logistics mode is different from East Asian, Western European and North American modes. Although current transaction mode is diversified and transaction subjects are diversified, there is still a long way to realize mature market. Therefore, market development needs more cultivation and regulation. In the aspect of supervision, the fourth party logistics is more autonomous than the third party logistics, and market development has larger selection space. The development of the third party logistics needs time, space and exploration. In the rapid development of information, its supervision method and efficiency have exposed many drawbacks, which have been proved in developed countries. Therefore, at the background of globalization and informationization, China's agricultural product logistics market can directly enter the mode of the fourth party logistics without choosing the normal mode development, and actively conduct cultivation, guidance and regulation through supervision. This can be realized through following three points. Firstly, from the perspective of service supervision of agricultural product logistics, government should integrate the thirdly party logistics subjects, resources, platform and information and actively build the fourth party logistics system, to realize high rapid, stable and modernized development of agricultural product logistics market. Secondly, from the perspective of supervision of agricultural product logistics subjects, government should encourage diversified development of participating subjects, and carry out regular, standardized and large-scale management of participating subjects with the aid of the information platform. Thirdly, from the perspective of agricultural product logistics safety, government should strengthen review and supervision of logistics quality, safety and process. Many safety incidents about agricultural products have occurred in links of agricultural product logistics, and logistics safety becomes a public concern. With the aid of advantages of the fourth party logistics information integration, it can realize monitoring and guidance of agricultural product logistics process at low cost, in high efficiency, and with full transparency. Also, it can realize efficiency of agricultural product logistics and strengthen safety of agricultural product logistics, which is one of the problems to be urgently solved in China's agricultural product logistics at present.

4 Conclusions

Natural property restraint determines that technological requirement and logistics form of agricultural product logistics are definitely different from logistics of industrial products. At present, China's agricultural product logistics market is still at primary stage of the third party logistics, and fails to satisfy cost, efficiency and quality requirements of agricultural product logistics. Thus, it is required to break the original frame and explore a more efficient and practical logistics mode suitable for current practice.

The fourth party logistics has advantages of information integration, resource integration and many logistics subjects. In the perspective of the fourth party logistics, agricultural product logistics has many problems, ideas and concepts, but this paper only analyzes agricultural product logistics information, efficiency and supervision. The information platform built by the fourth party logistics has remarkable advantages in information exchange, sharing and integration, and can make the market competition and cooperation more transparent at the background of diversified subjects. This can effectively realize improvement in efficiency of agricultural product logistics. Besides, supervision of agricultural product logistics market under the framework of the fourth party logistics includes supervision of logistics subjects, supervision of logistics safety, and supervision of market services. With the aid of advantages of information platform, it can realize cultivation, guidance and regulation of agricultural product logistics market in a more comprehensive way, so as to facilitate prosperity and development of agricultural product logistics market.

References

[1] WAN M, HU ZH, XIA HJ. Experiences of the development of agricultural products logistics industry in foreign countries[J]. Ecological Economy, 2006(2): 242 – 245. (in Chinese).

[2] ZHANG ZT, ZHANG JW. Analysis on the development of agro-products logistics in developed countries and the enlightenment[J]. Agricultural Economy, 2007(7): 71 – 73. (in Chinese).

[3] HE F. Patterns of agro-products logistics: A study based on wholesale market[J]. Journal of Agrotechnical, 2006(5): 40 – 44. (in Chinese).

[4] ZHANG JW. Analysis on the development patterns of agro-products logistics in Japan and the enlightenment[J]. Rural Economy, 2008(1): 126 – 129. (in Chinese).

[5] LIU DY, HUANG ZH. China's logistics system for agricultural products: Their development and institutional aspects[J]. Issues in Agricultural Economy , 2005(4): 49 – 53. (in Chinese).

[6] LIU DY, HUANG ZH. On logistics chain of fresh agricultural product and its formation mechanism[J]. Chinese Rural Economy, 2006(11): 4 – 8. (in Chinese).

[7] HU SJ. Analysis on key restraining factors of agricultural product logistics development in China and the countermeasures[J]. Journal of Anhui Agricultural Sciences, 2007(18): 5578 – 5580. (in Chinese).

[8] LUO R. The government function in the developmenr of agricultural product logistics industry[J]. Agricultural Economy, 2011(1): 44 – 46. (in Chinese).

[9] WANG D, SUO ZL. A model for choosing a place for an agricultural logistics center and its application[J]. Journal of Agrotechnical, 2007(6): 51 – 55. (in Chinese).

[10] ZHANG MY, LI XY. The generative mechanism of supply chain risk of agricultural product logistics and early-warning mode[J]. Modernization of Management, 2009(4): 47 – 49. (in Chinese).

[11] ZHAO K, WANG XL. Study of agricultural product logistics: Demand prediction based on neural network theory[J]. Journal of Agrotechnical, 2010 (2): 62 – 68. (in Chinese).

[12] ZHANG JW. Study on agricultural products logistics development under electronic commerce[J]. Guangdong Agricultural Sciences, 2007(5): 99 – 102. (in Chinese).

[13] PAN FC, QI FZ, ZHENG TT. Analysis on agricultural products logistics modes based on the third-party electronic commerce platform[J]. Agricultural Economy, 2012(11): 106 – 108. (in Chinese).

[14] CHENG L, WANG DP, LI F. Empirical study of agricultural products logistics modes in China: Based on K-means cluster analysis[J]. Research on Financial and Economic Issues, 2011(2): 108 – 113. (in Chinese).

[15] ZHONG WY, YAN W, JI C. Exploring of 4PL development under the perspective of economic growth[J]. Journal of Harbin University of Commerce (Social Science Edition), 2012(5): 105 – 109. (in Chinese).