

RESEARCH ON THE SUPPLY CHAIN MANAGEMENT STRATEGY OF AGRICULTURE PRODUCTS IN HENAN PROVINCE DURING THE “INTERNET+” ERA

YiKe Liang^{1*}, NuoYa Fang²

¹ Business College Xinyang Normal University, Xinyang 464000, Henan, China.

² Kansas International School of Sias University, Zhengzhou, 451100, Henan, China.

Corresponding Author: YiKe Liang, Email: liangyike798@163.com

Abstract: In the context of the "Internet +" era, the development of agricultural product supply chain in Henan Province faces both novel opportunities and significant challenges. This paper takes Henan Province as the research entry point, reviews the development status and problems of agricultural products in Henan Province. Subsequently, it delves into the pros and cons of the agricultural product supply chain development in Henan Province, providing a comprehensive analysis. And finally puts forward that under the background of "Internet +" era, The future development strategy of agricultural product supply chain in Henan Province also provides certain reference significance for China's agricultural product supply chain.

Keywords: Internet +; Agricultural supply chain; Management strategy

1 CONNOTATIONS OF AGRICULTURAL SUPPLY CHAINS

1.1 The substantive Content of Agricultural Supply Chains

The essence of supply chain is the vertical integration of enterprises, and the National Standard of the People's Republic of China - Logistics Terminology defines supply chain as the network chain structure formed by providing products or services to end-users in the production and distribution chain. Agricultural supply chain is a kind of functional network chain structure with specific scope of agricultural products. It includes suppliers of products (including suppliers of production materials such as seeds and agricultural tools), producers (producers of agricultural products), processors of agricultural products, distributors (wholesalers and retailers), and consumers of agricultural products.

1.2 Characterization of Agricultural Supply Chains

1.2.1 Difficulty in establishing synergistic mechanisms in the agricultural supply chain

There is a complex and lengthy waiting process from production to consumption of agricultural products. The contradiction between the low market share of core enterprises in the supply chain and the need for a high degree of coordination among the various links in the supply chain has led to an increase in the cost of cooperation.

1.2.2 Fragmentation of nodes in the agricultural supply chain

Owing to the natural attributes of agricultural products and objective reasons, different varieties of agricultural products require different production environments, resulting in the dispersal of agricultural production areas and the relatively limited scale of production. In addition, the lack of professional training and guidance for practitioners has led to a low level of standardized and specialized agricultural production.

1.2.3 Difficulties in realizing information sharing at all stages of the agricultural supply chain

The supply chain of agricultural products covers a number of links, of which farmers are the main nodes, and at present there is a general problem of relatively poor information networks and communication facilities. The need for immediacy of information in agricultural products transactions is high, which leads to difficulties in the transmission of

information. Consumers of agricultural products, due to the special influence of their regions and ethnic customs, have great differences and diversities in consumer preferences, and there are still difficulties in integrating this key information to the producers of agricultural products in a timely manner.

2 DEVELOPMENT STATUS AND PROBLEMS OF AGRICULTURAL SUPPLY CHAIN IN HENAN PROVINCE

2.1 Overall Production of Agricultural Products in Henan Province

Located in the hinterland of the Central Plains, Henan Province is blessed with a unique geographic location and excellent conditions for the development of agriculture. At the same time, the output of grain, cotton, edible oil and other major agricultural products in Henan Province is among the highest in the country, and it is one of the important production bases of high-quality agricultural products in China. In recent years, the comprehensive agricultural production capacity of Henan Province has been steadily improved, the industrialization of agriculture has been rapidly developing, and the infrastructure has been continuously improved. The overall agricultural resources in Henan Province are relatively rich, but the relative resources per capita are insufficient.

2.2 The Current Status of Agricultural Supply Chain Development in Henan Province

2.2.1 The logistics infrastructure for agricultural products is constantly being improved

The market structure of agricultural products in Henan Province is diversified. From the perspective of specialization, the markets for agricultural products are divided into two kinds, one is comprehensive and the other is specialized, one is a large market with a turnover of more than one hundred million yuan, and the other is a small and medium-sized trading market. The number of comprehensive wholesale markets for agricultural and sideline products in Henan Province and the number of wholesale markets with a sales volume of more than one hundred million yuan have increased significantly.

2.2.2 The gradual improvement of various transportation routes

At present, the logistics transportation of agricultural products in Henan Province mainly passes through railroads, highways and inland waterways, and the rapid development of highways and high-speed railways in Henan Province has continuously improved the transportation capacity. Based on the strategic geographic location of Henan Province, the mileage of railroad has been growing steadily, and the operation capacity has been strengthened significantly.

2.2.3 The coverage of rural information networks is constantly improving

With the development of network technology and the popularization of 5G technology, the development of communication industry in Henan Province has also been greatly developed. From the perspective of the continuous expansion of communication network scale and the rapid improvement of technical level and service level, these factors have laid a solid foundation for the development of rural informatization.

2.3 Problems in the Development of Agricultural Supply Chain in Henan Province

2.3.1 Decentralization of the various actors involved in agricultural logistics

The first stop in the agricultural supply chain is for farmers to move the harvested agricultural products from the field to their homes by means of transportation, and then to realize the process of sorting, packaging, conveying and marketing. At present, after receiving the agricultural products, farmers have two main ways to sell them, one is to carry out some simple processing through their own means of transportation and transport them to the place of sale, or package them for sale in the wholesalers' place. Selling. The second is through intermediary traffickers, neither of which is organized in any way; they simply rely on the product itself, and the dispersed transport makes the intermediate stages more expensive. This means that, while reducing their own incomes, they also cause the market price of the produce to rise, thus significantly reducing their incomes.

2.3.2 Agricultural logistics technology lags behind

Agricultural products delivery technology is backward, farmers send the harvested agricultural products to their homes, or the traditional mode of transportation, the application of modern transportation technology is rare, which also leads to high logistics costs of agricultural products, especially fruits and vegetables and other agricultural products that are not easy to preserve. Agricultural products circulation and processing technology is backward, and there are fewer deep-processing enterprises in Henan Province that comprehensively utilize agricultural products, and if there are any, they mostly process agricultural products at the primary level, and the value chain of agricultural products has not been fully explored.

3 SWOT ANALYSIS OF AGRICULTURAL PRODUCTS SUPPLY CHAIN DEVELOPMENT IN HENAN PROVINCE

3.1 Analysis of the Advantages of Efficient Development of Agricultural Supply Chain in Henan Province

3.1.1 Rich in agricultural resources

Henan Province, with its vast area and rich material resources, is the main producer of agricultural products such as wheat, corn, oilseeds and cotton, and ranks first in the country in terms of livestock products such as meat, eggs and milk. Grain production in Henan Province in 2023 is expected to reach 132.5 billion kilograms. Henan is the second largest province in the country in terms of area under cultivation and production of grain, second only to Heilongjiang Province, and is truly the "Grain Silo of China".

3.1.2 Strategically located

Henan Province is located in the Central Plains, which is the middle zone for the transfer of industries from the east to the central and western parts of China, and is also the necessary route for the circulation of resources from the west to the economically developed areas on the eastern coast; Henan Province has a diverse terrain, and the geographic boundary between the north and the south of China passes through the territory of Henan Province, and its climate is characterized by the distinct seasons of spring, summer, fall and winter, and the same period of rainfall and heat, which is suitable for the growth of many kinds of agricultural crops; at the same time, the Huaihe River and the Yellow River pass through the territory of Henan Province, which guarantees the water supply for irrigation of agricultural production. Meanwhile, the Huaihe River and the Yellow River pass through Henan, guaranteeing the irrigation water for agricultural production. These favorable natural conditions provide a strong guarantee for the planting and cultivation of agricultural products in Henan.

3.1.3 Market and cost advantages

Henan Province is a "large population province" with strong radiation-driven capability. Henan's large population can provide sufficient labor for agricultural production and cheap labor for the logistics industry, which is also a labor-intensive industry. As a result, the prices of exported agricultural products will fall and become more competitive in the international market.

3.1.4 Transportation and logistics advantages

Henan Province has obvious transportation advantages, the Beijing-Guangzhou Railway, Beijing-Kowloon Railway, Longhai Railway and other 9 major railroad lines in China pass through Henan Province, forming a crisscross railroad network. The pace of high-speed railway construction in Henan Province is accelerating, and the highway network in Henan Province is well-connected, forming a radioactive highway network; the civil aviation industry in Henan Province is developing rapidly, with 31 cargo airlines operating at Zhengzhou Airport and 48 cargo routes in operation. Henan's modern comprehensive transportation system and the increasingly perfect modern comprehensive transportation system, for Henan Province, rapid cargo collection and distribution and reduce logistics costs provide great advantages; Henan Province has tens of millions of labor resources, most of the colleges and universities for the logistics industry to train professional and technical personnel. More and more logistics enterprises are growing rapidly, and the core competitiveness of logistics enterprises in Henan Province is increasing.

3.2 Analysis of the Disadvantages of Agricultural Supply Chain Development in Henan Province

3.2.1 Poor information systems for agricultural products and weak outward economic development

As a traditional agricultural province, Henan Province has a rich variety of agricultural products, which provides sufficient supply for the export of agricultural products. However, due to the fact that Henan Province is located inland, not along the border, not along the coast, and far away from the sea ports, its degree of economic openness is relatively low, which leads to the weak development of outward-oriented economy in Henan Province. At the same time, due to the status of Henan Province as a major agricultural province, with a vast rural areas, rural areas, closed information, a single source of information, agricultural information network is backward, so that the majority of rural areas are difficult to receive information on foreign agricultural products, resulting in the sale of agricultural products of the international awareness of the low, can not keep abreast of the international demand for agricultural products, resulting in cross-border sales of agricultural products of the incentive is not high.

3.2.2 High logistics costs, slow speed, imperfect logistics system

The rapid development of supply chain management of agricultural products in Henan Province has high requirements for logistics, due to the specificity of agricultural products, the timeliness of its logistics and distribution requirements are even stronger, the development of the logistics industry in Henan Province can be found in the current situation of the infrastructure construction of the starting point is low, the scale is small, synergistic operation ability is weak and other related shortcomings, resulting in the current logistics system is relatively inefficient, and also indirectly caused by logistics The cost of logistics is rising. Although Henan Province has a superior location and convenient transportation advantages, but compared with other logistics e-commerce, economically developed regions, logistics development time is relatively short, the foundation is still relatively weak, infrastructure is not perfect, logistics information technology is not high, logistics system construction is unreasonable, resulting in the current logistics system in Henan Province fails to meet the needs of high-speed transportation of agricultural products in Henan Province.

3.2.3 Low level of logistics technology

In agricultural storage, storage facilities are backward, many kinds of agricultural products need a certain degree of fresh storage, so that the storage and preservation of agricultural products have certain requirements. From the current situation, the storage capacity of agricultural products in Henan, there is a certain gap, and there are many general-purpose strong special warehouses, such as cold storage, low-temperature warehouse, three-dimensional warehouse, such as the number of specialized warehouses is seriously inadequate.

In the transportation of agricultural products, for food transportation, is still mainly packaged transportation, which will cause a lot of waste, did not use the optimization of logistics management to prevent, resulting in all kinds of unreasonable transportation phenomenon in the transportation of agricultural products. This also can not be effective protection of agricultural products, in the process of transportation loss is very large, can not be effective food preservation and preservation, to extend the shelf life of food.

At present, China's agricultural products logistics informationization construction is still in the stage of development and improvement. There is a lack of professionals, such as cyberspace construction, the opening of a unified market, the Internet of Things, wireless radio and other high-tech applications have not yet been popularized.

3.2.4 The irrational structure of the agricultural market system

There are many types and numbers of markets in Henan Province. However, the current agricultural market in Henan Province is still dominated by the traditional farmers' market, other types of large-scale integrated wholesale markets are fewer in number, uneven distribution, there are imperfect infrastructure, complete protection system is not sound and other related issues. At present, most of the agricultural markets have simple business premises and backward facilities, which cannot provide consumers with efficient processing, preservation and storage services.

3.3 Analysis of Opportunities for the Development of Agricultural Supply Chains in Henan Province

3.3.1 Wide market space

As we all know, Henan Province is a large population and agricultural province with abundant labor resources, but in

the past, many laborers preferred to work in the coastal cities in the south, but now more and more laborers are choosing to work at their doorsteps due to the rapid development of the local area or the impact of the new crown epidemic. In addition, a large number of excellent enterprises will move their factories to Henan, which will greatly increase the demand for agricultural products in Henan, thus accelerating the development of the agricultural supply chain in Henan. With the steady improvement of the quantity and quality of agricultural products in Henan Province, the rise of a large number of local brands of agricultural products in Henan Province, more and more enterprises outside the province on the demand for agricultural products in Henan Province is growing, in the international market, international trade demand for agricultural products has also been soaring, which also puts forward higher requirements for the management of the supply chain of agricultural products in Henan Province.

3.3.2 Strong government support for the logistics industry

The main feature of the logistics industry is that it employs a large number of people, involves a wide range of fields, absorbs a large number of employment, and plays a great role in promoting production and stimulating consumption, which fully explains the role of the logistics industry in promoting the national economy as a whole. In recent years, the government of Henan Province has attached great importance to the logistics industry and strongly supported the development of the logistics industry. At present, Henan has built up a central logistics hub in Zhengzhou as the focus, Luoyang, Shangqiu, Anyang, Nanyang, Xinyang five regional logistics hubs as the support, mutual coordination, reasonable layout of the network logistics system. At the same time in order to better utilize the advantages of Henan Province in natural resources, industrial products, Henan Province has identified eight categories of food, cotton, food and other industrial logistics development priorities.

3.4 Threats Encountered During the Development of Agricultural Supply Chains in Henan Province

3.4.1 Higher requirements related to logistics in the agricultural supply chain

Because of the unique characteristics of agricultural products, such as perishable, seasonal, not good preservation, etc., in addition, different agricultural products harvesting time is not the same, so the time of transportation logistics and preservation of freshness conditions put forward higher requirements, and finally, agricultural products from planting to harvesting takes a certain amount of time, but people's demand for agricultural products has always existed, and so the supply and demand information is sometimes there is an asymmetry, and all of this has put forward higher requirements for the supply chain of agricultural products. All these have put forward higher requirements for the supply chain of agricultural products.

3.4.2 High hidden costs in the agricultural supply chain

In recent years, despite the emergence of a number of leading enterprises related to agricultural products in Henan, such as Mudyuan, White Elephant, Shuanghui and Sanquan, which have done a good job in the processing of agricultural products, the supply chain cost of agricultural products is still on the high side. In addition, agricultural products are an indispensable part of people's life, its consumer group is relatively small, and it can be found that the demand of individual consumers for agricultural products is not very large. This leads to high costs in agricultural trade and is not conducive to the formation of a stable supply chain.

4 STRATEGIES FOR DEVELOPING THE SUPPLY CHAIN OF AGRICULTURAL PRODUCTS IN HENAN PROVINCE IN THE ERA OF "INTERNET PLUS"

In order to develop the supply chain of agricultural products in Henan Province better and better, it needs the cooperation of the government, enterprises and farmers. According to the current situation of agricultural supply chain management in Henan Province, the following strategies are organized.

4.1 Integration of Resources and Strengthening of Joint Efforts and Cooperation among Agricultural Logistics Enterprises

The government should call for the integration of existing agricultural logistics enterprises, the establishment of third-party logistics enterprises, so that agricultural production, processing, storage, transportation, sales and other different logistics activities of the operator and the logistics business in many areas to concentrate together, to give play to the effect of scale, the establishment of large logistics services group. Actively cultivate agricultural intermediary service institutions, for farmers need food planting, food collection and other professional agricultural knowledge for guidance, so that farmers' production is not blind, targeted, but also able to organize the effective supply of agricultural materials in a timely manner, agricultural intermediary service organizations can connect farmers and the market, pay attention to market dynamics in a timely manner, timely feedback to the farmers, and the farmers to communicate fully, so that farmers less detour and promote the good development of agricultural products logistics. Good development of agricultural logistics.

4.2 Promoting Standardized Production of Agricultural Products and Raising the Level of Technology

At present, the various links in the supply chain of agricultural products in Henan Province have not been standardized management, which is an urgent problem. The root cause is that the production and processing of agricultural products have not formed a unified standard. Therefore, promoting the standardization of agricultural products production link will lay a solid foundation for the benign development of agricultural products supply chain management in Henan Province. With the improvement of people's economy and living standard, people have put forward better requirements on the quality, specification and packaging of agricultural products, therefore, farmers should strictly follow the green product standard and organic agricultural product standard in the production and operation process, and categorize the harvested agricultural products and classify them according to the difference in quality, specification and quality of packaging.

4.3 Cultivate Logistics Talents and Form a Modern Logistics Team for Agricultural Products

Today's society, people have a higher demand for logistics technology, whether it is to enhance the level of equipment, or software system upgrades, we need more high-tech personnel. At present, the demand for logistics personnel in Henan Province has a large gap. In addition, logistics companies are also emerging, with the demand for talent is also increasing. However, at present, many logistics companies are still made up of individual small companies, their capital is very limited, and their staff culture and professional and technical level is limited. Therefore, it is necessary for the government and enterprises to take the lead to increase the introduction of relevant talents, only in this way can the advanced modern logistics management ideas into reality, thus greatly reducing the unnecessary costs of logistics companies, in order to better enhance the efficiency of the logistics company, enhance the competitiveness of the company. At the same time, the institutions of higher learning in Henan Province should vigorously develop the logistics-related disciplines and strengthen the training of students' practical skills in order to meet the needs of enterprises for talents.

4.4 Strengthening the Legal System and Standardizing the Tax System

Government departments should accelerate the improvement of the regulatory environment of the agricultural supply chain, and at the same time actively promote the legislative process of the relevant laws, and further amend the deficiencies and loopholes in the existing laws. In addition, the government departments also need to further improve the logistics market access legislation, more efficient management of agricultural logistics market enterprises, and will be included in a perfect agricultural tax system, so that the rights of farmers and consumers to get effective protection, and then protect the interests of all parties, and for the country to open up a new way of tax revenue, so that the enterprise and the entire logistics chain of each link can be benefited from. The benefits will be realized by the enterprises and all the links in the whole logistics chain.

5 CONCLUSION

At present, there are still many problems in the supply chain management of agricultural products in Henan Province. Under this circumstance, it is very necessary to put forward supply chain management strategy for agricultural products. On the premise of giving full play to the main advantage of "The Belt and Road Initiative", Henan Province should at the same time give full play to its own advantages of airports, seize the opportunities, effectively avoid the risks, and utilize the Internet technology to promote the realization of new growth of agricultural products in Henan Province.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

This article was supported by the Humanities and Social Sciences Project of Education Department of Henan Province: Research on the Path of Enabling Henan Province to Achieve Common Prosperity in the New Era of Digital Economy (2024-ZDJH-289); and the Youth Research Fund Project of Xinyang Normal University: Research on Supply Chain Management of Agricultural Products in Henan Province under the Era of "Internet Plus" (2023-QN-022).

REFERENCES

- [1] Cao Bingru, Fan Yanqing. Research on performance evaluation of green agricultural product supply chain based on DEA and principal component analysis. *Science and Technology Management Research*, 2017, 37 (6): 72-77.
- [2] Cao Yanmei, Wang Yonghong, Gao Ying. Research on Performance Evaluation of Agricultural Product Supply Chain. *Anhui Agricultural Science*, 2011, 36 (8): 3400-3402.
- [3] Wang Yong, Deng Xudong. Empirical Study on Performance Evaluation of Agricultural Product Supply Chain Based on Factor Analysis. *China Circulation Economy*, 2015 (3): 10-16.
- [4] Zhang Min. Organizational Mode of Agricultural Product Supply Chain and Quality Safety of Agricultural Products. *Rural Economy*, 2010 (8): 101-105.
- [5] Hu Dinghuan. On the new model of "supermarket+agricultural product processing enterprise+farmers". *Agricultural Economic Issues*, 2012 (1): 36-39.
- [6] Zhang Qian, Li Chongguang. Supply Chain Management Mode and Countermeasures for Agricultural Products Logistics Development. *Soft Science*, 2011, 22 (1): 91-93.