

Research on influencing factors of agricultural supply chain resilience

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Abstract

Due to the complex network relationship in the production, transportation, storage and other links of the agricultural product supply chain, the agricultural product supply chain is affected by external environment and internal factors, resulting in supply chain disruption events. Based on this, this paper first analyzed the connotation of the toughness of agricultural supply chain, then sorted out the factors affecting the toughness of agricultural supply chain, and finally put forward countermeasures to improve the toughness of agricultural supply chain.

Keywords

Agricultural products supply chain, Toughness, Influencing factor

1. Introduction

In the context of economic globalization, the links between countries are getting closer and closer, and the supply chain of agricultural products, as a bridge of trade between countries, has also become the focus of competition between countries. Affected by various factors, the supply chain of agricultural products in our country faces the problems of unstable external environment and low efficiency of internal operation. The supply chain resilience refers to the ability of the supply chain system to effectively cope with external shocks and maintain normal operation in emergencies, such as emergencies and natural disasters, and to make up for losses and reduce negative impacts to a certain extent. The study of agricultural product supply chain resilience can not only help agricultural product supply chain enterprises cope with emergencies, improve their ability to resist risks, reduce operating costs, etc., but also further promote the optimization and upgrading of agricultural product supply chain[1].

At present, the study of agricultural supply chain resilience mainly focuses on the vulnerability and vulnerability of agricultural supply chain. From the perspective of

research objects, the existing researches mainly focus on the recovery strategies after the interruption of node enterprises or links in the agricultural supply chain network and the research on the influencing factors of vulnerability. Supply chain resilience refers to the ability of the supply chain system to effectively adapt to changes, deal with crises and restore normal operations when impacted by external environment[2].

2.The concept and connotation of agricultural supply chain

The supply chain of agricultural products refers to the production, processing, storage, transportation and sales of agricultural products to the hands of consumers. In this process, suppliers, manufacturers, wholesalers, retailers and final consumers are involved[3]. In this process, a complete supply chain network of agricultural products is formed through the interaction of various links. As a complex network organization, agricultural product supply chain plays an important role in agricultural production and management activities, so how to ensure the normal operation of agricultural product supply chain is of great significance to the development of agricultural product supply chain.

According to the research, the research on the supply chain resilience of agricultural products is mostly concentrated on the macro level, and there are few studies on the supply chain resilience of agricultural products[4]. The definition of the resilience of agricultural supply chain mainly includes the following aspects: First, the resilience of agricultural supply chain refers to the ability of agricultural supply chain to maintain normal operation under the impact of emergencies; Secondly, the supply chain resilience of agricultural products means that it can maintain a certain degree of resilience in emergencies and can quickly return to normal operation. Thirdly, the supply chain resilience of agricultural products refers to the rational use of available resources and effective information to minimize losses under the impact of emergencies. In summary, this paper believes that the resilience of agricultural supply chain refers to the effective use of available resources and information and the minimization of losses in emergencies.

2.1. Organizational structure

The organizational structure of agricultural product supply chain refers to the contact mode between nodes in the supply chain, which has an important impact on the resilience of agricultural product supply chain. According to the existing research, it can be found that most scholars divide the nodes in the supply chain of agricultural products into suppliers, manufacturers, wholesalers, retailers and final consumers[5-6]. For different nodes, their risk tolerance is also different, for example, suppliers face the greatest risk, followed by retailers and wholesalers, and the final consumer is the least. Therefore, in different types of nodes, each node faces different risks. With the development of information technology, the organizational structure of agricultural supply chain has also changed, such as supply chain alliance

and virtual enterprise. This paper holds that in the organizational structure of agricultural supply chain, different nodes have different ability to face risks, so their toughness is also different.

In the organization structure of agricultural supply chain, the supplier is the biggest source of risk in the whole supply chain[7-8]. For suppliers, if they encounter irresistible factors that lead to the failure of normal supply or the cancellation of orders, the entire supply chain may be paralyzed. Therefore, suppliers play a very important role in the supply chain of agricultural products. For the manufacturer, whether the manufacturer has enough resources to cope with the emergency is particularly important. If manufacturers cannot build enough emergency resources in a short period of time to deal with the impact of emergencies, the entire supply chain may face paralysis. Wholesalers and retailers usually have different degrees of resilience to emergencies, so when emergencies occur, whether wholesalers and retailers can quickly restore normal operations is also one of the important factors affecting the resilience of agricultural supply chain.

2.2. Configure resources

Resource allocation refers to the reasonable allocation and utilization of available resources to make them meet the needs of the normal operation of the supply chain. Under the influence of emergencies, whether the supply chain of agricultural products, as a complex system, can maintain normal operation in the face of various shocks depends on whether each node enterprise can improve its coping ability through reasonable allocation of its own resources, and whether the strategy adopted in the resource allocation process is scientific and effective. According to literature research, resource allocation strategy mainly includes four aspects:

- (1) Information management strategy, that is, information sharing among enterprises at each node of the supply chain is realized by collecting and processing the information required by each link of the supply chain.
- (2) Coordination and control strategy, that is, to ensure the normal operation of the supply chain system in the process of realizing coordination and control among enterprises in the supply chain node.
- (3) Supply guarantee strategy, that is, through reasonable planning of node enterprises in the supply chain of agricultural products supply chain, to effectively meet their supply demands in emergencies.
- (4) Incentive mechanism strategy, that is, through reasonable incentive mechanism to enhance the cooperation between nodes in the agricultural product supply chain enterprises.

This paper believes that resource allocation strategy is one of the important factors affecting the resilience of agricultural supply chain. According to literature studies, resource allocation strategy mainly includes two aspects under the influence of emergencies: First, information management is used to improve the resilience of agricultural supply chain. Under the impact of emergencies, the loss can be reduced

through the effective use of information resources. The second is to improve the supply chain resilience of agricultural products through coordination and control. Under the impact of emergencies, the supply chain system can run normally through coordination and control among the supply chain nodes. This paper argues that the more scientific and effective the strategy and the more reasonable the resource allocation, the more the supply chain toughness of agricultural products can be improved.

2.3. Information management

The information management of the agricultural product supply chain includes information collection, processing and exchange, mainly including the monitoring of the agricultural product market and price, as well as the communication and cooperation of all links of the supply chain, and ultimately achieve the purpose of improving the supply chain resilience. At the same time, information management can also monitor the transaction behavior of enterprises at each node of the supply chain, so as to avoid the risks caused by violent price fluctuations of agricultural products in emergencies. At present, domestic scholars have few studies on the impact of information management on the toughness of agricultural supply chain, and only some scholars have discussed the relationship between information management and the toughness of agricultural supply chain from different perspectives. There is a close cooperative relationship among enterprises at each node of the agricultural product supply chain, and information sharing is the basis for establishing a good cooperative relationship. At the same time, information sharing helps to improve the coordination ability among enterprises at each node of the supply chain, thus enhancing the supply chain resilience. These studies have explored the impact of information management in agricultural supply chain on improving the resilience of agricultural supply chain from different perspectives, but no specific studies on the impact of information management on agricultural supply chain resilience have been found in the existing literature.

3. Influencing factors

In the supply chain system of agricultural products, key nodes are often the core of the supply chain, usually some large and strong enterprises, they generally have their own production base, can control the local production and market, so as to achieve the control of key node resources. For supply chain, resources are the core competitiveness of key nodes. The key resources involved in the supply chain of agricultural products mainly include labor, capital, raw materials, infrastructure and land. If the key resources involved in the supply chain of agricultural products are interrupted, it will lead to the interruption of the entire supply chain of agricultural products, so that consumers can not get adequate and timely supply of products, thus damaging the interests of consumers. Therefore, we should pay attention to the protection and management of key resources in the supply chain of agricultural

products. In the evaluation index system of agricultural supply chain toughness, many scholars have studied it. According to the existing research, the factors affecting the toughness of agricultural supply chain mainly include the following aspects: natural disasters, social events, market environment, supplier conditions and customer relations.

In practice, economic risks and natural risks often occur at the same time, which makes each node in the supply chain of agricultural products vulnerable to a certain extent. If there is a major social event, it will cause disruptions in the supply chain of agricultural products. Therefore, the supply chain resilience of agricultural products is affected by many factors. Among many factors, natural disasters are one of the most common social events. When the supply chain of agricultural products is affected by natural disasters, it often leads to a series of problems such as production interruption, raw material supply interruption and product delivery interruption. For a supply chain of agricultural products, if a natural disaster occurs, it will cause problems in the operation of its supply chain system. Therefore, it is particularly important to repair the supply chain of agricultural products in time after natural disasters.

4. Countermeasures

Factors affecting the resilience of agricultural supply chain are complex and diverse. This paper only puts forward countermeasures to improve the resilience of agricultural supply chain from three aspects: risk management, supply chain structure and information sharing. The details are as follows:

- (1) Establish a risk management mechanism. Risk management is one of the key factors of agricultural supply chain resilience. Risk management mechanism mainly refers to a series of measures taken to reduce the probability of risk events. To strengthen the construction of agricultural product supply chain risk management mechanism, it is necessary to first establish a risk identification and early warning mechanism to provide information support and guarantee for enterprises at each node of the supply chain. Secondly, it is necessary to establish an emergency response mechanism to reduce the impact of emergencies on the agricultural product supply chain by formulating emergency plans.
- (2) Optimize the supply chain structure. The supply chain structure of agricultural products includes two aspects: product supply channel and product consumption channel. Whether the structure design of agricultural product supply chain is scientific and reasonable will directly affect the toughness of agricultural product supply chain. Therefore, it is necessary to rationally plan the supply chain structure of agricultural products, strengthen the supervision and control of agricultural production, circulation, sales and other links, and reduce the impact of external environmental uncertainties on the supply of agricultural products.
- (3) Strengthen information sharing. Information sharing is one of the safeguards for

the resilience of agricultural supply chain, and strengthening information sharing is an important means to improve the efficiency of agricultural supply and reduce costs.

On the one hand, it is necessary to improve the construction of information infrastructure, establish an information database centered on agricultural products, and transmit data information to upstream and downstream enterprises in real time; On the other hand, we should strengthen cooperation with upstream and downstream enterprises to realize information sharing.

4) Improving IT application. The informatization level is one of the important means to ensure the supply efficiency and reduce the cost of agricultural products, so it is necessary to improve the informatization level of agricultural products supply chain and realize the information sharing from production, processing to sales.

5. Conclusion

The improvement of the toughness of the agricultural product supply chain can effectively enhance the elasticity of the agricultural product supply chain and improve the anti-risk ability of the agricultural product supply chain. However, at present, no scholars have conducted comprehensive and in-depth research on the factors affecting the toughness of agricultural supply chain, mainly because the structure of agricultural supply chain system is complex, subject to great changes in internal and external environment, and its toughness improvement is affected by many factors. By analyzing the literature of domestic and foreign scholars on the resilience of agricultural supply chain, this paper finds that different scholars have different definitions of the resilience of agricultural supply chain. Some believe that agricultural supply chain is an organic whole, while others believe that it includes various departments and links involved in the whole process from production to consumption. In order to improve the supply chain toughness of agricultural products, this paper firstly analyzes the connotation of supply chain toughness of agricultural products. Secondly, the influence factors are sorted out. Finally, the paper puts forward some countermeasures to improve the toughness of agricultural supply chain. There are two problems in the research process: First, although scholars believe that there are many factors affecting the development of agricultural industry, there is no unified and complete research framework for comprehensive and systematic analysis of these factors; Second, most of the current research on the development of agricultural industry is aimed at a certain link or a certain industry, and few scholars have studied the agricultural industry as a whole. Therefore, the research of agricultural industry can be further expanded in the follow-up research.

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