Impact of COVID-19 on the End in Supply Chain of Fresh E-commerce Products and Risk Control

Jiayi Hu [1, *, †], Jiangxuan Li [2, †] and Yuxiang Wang [3, †]

[1] Department of Economics &Management, Shanghai Maritime University, Shanghai, China

[2] Department of Management, Chongqing University of Technology, Chongqing, China

[3] School of Civil Engineering and Transportation, Hebei University of Technology, Tianjin, China

* Corresponding author: 202010753030@stu.shmtu.edu.cn

[†]These authors contributed equally.

Abstract. COVID-19 has impacted many industries and caused severe disruptions in the food supply chain, which has also had a significant impact on the lives of people around the world. Some researchers have pointed out the long and short-term impact of the epidemic on the fresh produce supply chain, but there is a gap in research on the prevention and control of risks at the end of the fresh produce supply chain. Therefore, this paper uses a case study approach to analyze the challenges encountered by fresh produce e-commerce in the context of the epidemic from multiple perspectives and provide recommendations for risk prevention and control. It is found that the risks at the end of the fresh food supply chain are mainly in the areas of environmental risk, supply and demand risk, and transport risk. In response to the above risks, companies need to improve the following aspects: cost reduction and loss, product quality control, and sales channel innovation to seize the opportunity to develop fresh food e-commerce and improve risk response mechanisms at the end of the fresh produce supply chain to drive its own development.

Keywords: Fresh produce supply chain, Freshippo, Risk control.

1. Introduction

The COVID-19 epidemic will strongly impact the sustainable competitiveness of China's fresh industry supply chain, causing related enterprises to face problems such as a shortage of human resources, an increase in basic costs, difficulties in cash flow, and reduced stability of the supply chain [1]. It will cause adverse effects to varying degrees in raw material production, procurement planning, resumption of production, goods distribution, and market in the supply chain of fresh enterprises [2]. This raises the standards of the supply chain and other related technologies. As the epidemic situation of COVID-19 is becoming more serious, various industries across the country have been impacted more or less, and all sectors of society are worried about the future development of enterprises, especially the enterprises that control the supply of fresh products, because of their perishability [3]. Shelf life and other characteristics. It is even more challenging to tide over the difficulties and stabilizes the operation. Therefore, the state must promulgate relevant policies to restore industrial production, increase investment in enterprises and improve their economic strength. However, due to the supply chain's complexity, dynamic, and cross nature, once one link is interrupted, it will cause irreversible damage to the industrial supply chain. Therefore, the government and enterprises need to deal with the adverse effects of COVID-19 from different angles to ensure the stable operation of the fresh industry supply chain. This paper puts forward an appropriate solution by analyzing the risks that the epidemic may bring at the end of the fresh supply chain. Combined with the characteristics of the times, seize new opportunities for developing a fresh supply chain.

2. Literature Review

With the outbreak of COVID-19, the fresh produce supply chain was greatly affected by the disruption of transportation and logistics, especially on the retail side. The outbreak of the new

coronavirus disease has led to fundamental changes in consumer buying behavior and consumption habits.

Hongdong Guo (2020) pointed out the importance of e-commerce in ensuring food supply for the population when the supply chain of fresh produce is disrupted and unable to meet market demand [4]. Joris Beckers (2021) based on a newly constructed framework of e-retail accessibility to assess whether the current pandemic is a potential catalyst for e-commerce in Belgium. And two surveys in his paper indicated a significant boom in online shopping in Belgium due to the outbreak of the COVID-19 pandemic and associated measures [5]. Both of them pointed out the importance of e-commerce in ensuring food supply. Hongdong Guo also focused on the innovation of e-commerce in the supply model during the outbreak.

The epidemic has affected consumer shopping behavior, and as the epidemic spreads, consumers will prefer to order online to avoid the risks of offline shopping. In such a situation, it is significant for fresh produce e-commerce to seize the opportunity and retain the dividend. Chang Liu (2021) indicates that fresh produce e-commerce should position itself and improve its competitiveness. They can provide direct supply from the origin and exclusive supply of imports, reducing intermediary links, effectively improving logistics efficiency, ensuring product quality, and reducing costs [6]. Fei Lei (2021) analyzed the relationship between consumer motivation and fresh food e-commerce industry behavior. Based on this, he gave some suggestions for fresh food e-commerce [7].

Although the scholars mentioned above have different focuses, they all mentioned the impact of COVID-19 on consumers' short-term or long-term behavior. They mainly introduced the challenges brought by the epidemic on the supply of fresh produce for urban residents. Furthermore, they pointed out the role of fresh produce e-commerce in it, but little research has been done on the prevention and control of risks of fresh produce e-commerce during the epidemic. Based on this, this paper will focus on the risks posed by the epidemic to fresh produce e-merchants. At the same time, our study will make recommendations for risk control to promote better development of fresh e-commerce.

3. The risk of the epidemic situation on the end of fresh produce supply chain

3.1. Sources of risk

3.1.1. Environmental risk

Environmental risk mainly refers to the impact of uncontrollable external factors on the circulation of fresh agricultural products. Because of the characteristics of farm products, they are most affected by the environment in all aspects of the supply chain, especially in the production link. Aquatic products are self-explanatory in fresh products, and the prevalence of epidemic diseases severely impacts their quality. Fresh agricultural products are closely related to the season and the environment. Once the external conditions change considerably, the agricultural products themselves will be significantly affected. The epidemic's impact on the environment cannot be ignored, affecting all aspects of fresh agricultural products to varying degrees. For example, recently, the transportation channels of seafood products in China have significantly been curbed, and many areas have boycotted seafood products because of the impact of the COVID-19 epidemic.

3.1.2. Supply and demand risk

COVID-19 has the characteristics of high infectivity. To reduce the infection rate of our citizens in various regions of our country. Most of them have implemented "city closure", or road closure, according to the degree of risk in the area, by strict regulations for the division of the community and the implementation of different degrees of community closure management plans. In the worst phase of the epidemic, farmers' markets or shopping malls in many areas were forced to close. As a result, people could not buy fresh agricultural products through normal offline channels. Online shopping, such as Ma Xiansheng and Meituan, became the mainstream shopping method then, and orders in e-commerce channels soared. However, due to the lack of perfect response measures in the face of such a large order, the platform cannot meet the enormous order requirements in a short time.

3.1.3. Transportation risk

Because of the impact of the COVID-19 epidemic, many staff members were sent home to limit its spread in the region, which led to a severe labor shortage. Many fresh agricultural products are artificially planted and produced, so they need enough labor to ensure the regular operation of their industrial chain. As a result, many production bases lack sufficient labor to pick and process agricultural products. The main producing areas of fresh agricultural products are in rural areas, while the main places of sale of fresh agricultural products are in urban areas. Due to the complex transport conditions and perishability of agricultural products, the efficiency and technology required for the transportation process have significantly increased under the influence of the epidemic. Due to policy restrictions, many roads and villages have been blocked, agricultural products cannot be transported normally, many crops fester in the fields, and agricultural product dealers have suffered huge losses.

3.2. Case analysis

3.2.1. Overview of Freshippo

Born in January 2016, Freshippo is a new retail format that is part of Alibaba Group, a fusion of offline supermarkets and online APP orders. Freshippo is a new retail format part of Alibaba Group, a fusion of offline supermarkets and online APP orders. Thanks to Alibaba Group's strong financial support and technical solid backing, Freshippo has developed its system specifically for information management and has established an efficient supply chain system based on big data, the Internet of Things, and other technologies according to the changing consumer habits and content, which has enabled it to develop advantages that traditional fresh food e-commerce does not have: firstly, it enables it to position its consumer base more precisely, and It can better provide customers with products that meet their needs; secondly, it can shorten the delivery time significantly, especially for fresh food orders within 3 kilometers within 30 minutes. Thirdly, customers can visit the shops offline to make purchases and place orders on the online APP, which increases consumer stickiness through interaction with consumers. Become repeat customers, increasing the profit revenue of the company. According to the classification of the supply chain, it can be seen that Freshippo is mainly a direct-to-customer supply chain. It means that Freshippo needs to ensure the quality of its products from the upstream of the supply chain and directly face the end consumers downstream of the supply chain. The consumer experience, therefore, determines the quality of the entire supply chain.

During the epidemic, people gathered under strict control and reduced the movement of people around the country, and fresh food e-commerce became the grocery basket for most residents. At the same time, the spurt in demand is a massive test for the supply chain and operational model of fresh produce e-commerce. Usually, there are not many online orders during the New Year period, so many staff went back for the holidays. After the sudden epidemic outbreak, Freshippo, like all fresh food e-commerce companies, was at a deadlock. During the epidemic period, the order volume of Freshippo during the peak period reached 10,000. With such a large number of orders, it was a critical factor whether the company could catch them, which also reflected the problems of the entire supply chain. In response to the surge in demand in the short term, it has become a common problem for all significant fresh produce e-commerce platforms, and different platforms have given different responses. In response to the surge in demand, Freshippo quickly reached nationwide labor cooperation with 1919 wines&spirits Platform Technology Co., Ltd. to solve problems such as insufficient capacity. However, it still exposed many problems that have yet to be improved. The epidemic at the beginning of 2020 was a significant test of supply chain capabilities, with many fresh produce merchants exposing problems such as platform “burst orders”, supply “shortages”, and capacity “disruptions”. As a result, it allows those with relatively good supply chain systems to stand out while exposing fresh produce supply chain flaws.

3.2.2. Challenges faced by Freshippo during the epidemic

(1) Inadequate cold chain logistics system and high product loss

As a particular product, fresh produce is highly seasonal, easily lost, and not easily preserved. Hence, a perfect cold chain logistics system is vital in reducing loss and timely distribution. At the same time, consumers want to pick their fresh food and be assured of its freshness. This contradiction has existed for a long time.

Meanwhile, cold chain logistics support facilities and services are not perfect for domestic agricultural and sideline products. The cold chain circulation rate of meat is only 30%, fruit and vegetables less than 20%, while in developed countries, the average cold chain circulation rate of fresh food is more than 97%. Freshippo, a member of the fresh food e-commerce, cannot avoid these problems.

In particular, it is essential to emphasize that with the frequent occurrence of the new crown epidemic at multiple points, the demand for fresh products relying on cold chain logistics has increased intensively in a short period. However, Freshippo has not had sufficient cold chain storage to stock many fresh products and cannot minimize losses. At the same time, the strict requirements for cold chain warehouses, personnel, and goods for epidemic prevention and elimination, as well as factors such as logistics road blockages to be opened and capacity not fully restored, have resulted in sub-regional cold chain warehouses. The inability to deliver products promptly resulted in the platform being unable to replenish goods on time, resulting in secondary losses.

(2) Poor product quality and loss of users after the epidemic

Demand for fresh produce soared during the epidemic, and significant fresh produce platforms made multi-channel replenishments and deployed supplies urgently to ensure supply. The instability of the epidemic led to blind expansion and stockpiling of vegetables, resulting in a backlog of inventory. In contrast, fresh produce's perishable and low shelf life eventually led to poor quality of the stockpiled products, such as wilted leaves and wrinkled skins. At the same time, due to the sudden surge in orders on the platform, the logistics and warehousing capacity will be inadequate. It is unrealistic to confirm the quality of each order of goods carefully. In this case, as opposed to quality, delivery efficiency is the platform in the first place, so the quality of goods is sacrificed under efficient thinking.

The seller's market also leaves the platform with no guarantee of service. Fresh produce is an immediate need of life, and consumers have high requirements for quality. During the epidemic, consumers may have had no choice but to buy as their first need due to the shortage of supplies, but after the epidemic, they will still resume their high expectations for the quality of goods. The poor quality of the products bought on the platform during the epidemic will create a terrible consumer experience. With the improvement of measures to deal with the epidemic, traditional fresh food sales channels such as supermarkets and food markets will continue to open up on a revamped basis and become strong competitors for fresh food e-commerce. The platforms are at risk of a decline in users and orders. Under this situation, the fresh e-commerce platform needs to bear the consequences of user loss caused by user experience decline.

(3) Product supply and demand imbalance

Affected by COVID-19, many food suppliers face the problem of suspension of production. The production of fresh products is decreasing, and the sales channels are reduced, resulting in insufficient supply. In the stage of epidemic lockdown, users are affected by the dual mental effects of reduced shopping channels and epidemic fear. People keep hoarding goods in the face of goods shortages, which further increases inflation and aggravates panic, eventually leading to demand exceeding supply, thus forming a vicious circle. The information occlusion is the fundamental reason for the continuous improvement of the market price. The supply chain can be restored only by reasonable re-planning and design within a certain period. After recovery, the Bullwhip Effect will still affect the market balance.

(4) Lack of information sharing platform under “Internet +”

Cloud computing and big data technologies in “Internet +” can help design transportation routes, predict production and optimize inventory planning. After the outbreak of COVID-19, emergency plans should be made depending on the severity of the epidemic. Combined with transportation resources, workforce costs can be reduced to a certain extent. Freshippo’s extensive data application showed a less accurate prediction during the pandemic. Many new customers flooded online to buy products, and the number of orders surged, which was out of the control of Freshippo. At the same time, feedback is an essential link in the inverse supply chain. The mechanism of the Freshippo supply chain to collect feedback information is incomplete, and there are shortcomings in the logistics system. It should be optimized to avoid continuous expansion of negative feedback. Data should be corrected promptly to reduce errors and promote a balance between supply and demand.

4. Control measures

4.1. Reduce fresh produce losses and save costs

Precise product sourcing and operations are guided by big data from the technology team, which is used to predict customer demand and achieve precise matching. It ensures that customer demand is met without the risk of a backlog of stock. It allows companies to eliminate warehouses and pack fresh produce directly from shops for delivery. In similarly, product and packaging intermediate processing can cut costs and minimize client losses during pickup. Big data can also help analyze the price elasticity of consumer demand and help develop marketing plans to increase profit margins.

4.2. Control the quality of goods and improve the quality of services

Meeting the vast volume of orders during the epidemic is the top priority for fresh produce e-commerce how to retain users after the epidemic is an issue to be considered and resolved. This paper argues that the only way to retain the "epidemic flow" is to ensure product quality and improve customer satisfaction. Companies should manage and monitor their supply chains, including supplier management, cold chain, transport and storage, packaging and distribution, quality control, and customer feedback. Improve the standardization of last-mile delivery and the cold chain delivery system, prevent "broken chains," and create an efficient supply chain system to prevent high costs while improving the quality of fresh produce. At the same time, in the post-epidemic era, consumers can go out shopping, no longer like during the epidemic when shops could only dispatch them. Improving the user consumption experience is an inevitable direction for developing new fresh food retail enterprises such as Freshippo. Freshippo should combine offline and online while putting more focus on offline. Specifically, a range of shopping-related services can be offered to consumers, such as membership services, parking services, children’s entertainment services, Etc., to maximize users’ consumption experience, cultivate users’ stickiness and drive users’ recognition of the brand.

4.3. Expand e-commerce channels

Under the epidemic situation, various offline shopping channels have been restricted. In contrast, e-commerce channels have significant advantages for consumers. They are efficient and convenient, cost-effective, and diversified. Therefore, consumers prefer online shopping. Moreover, with the help of big data, enterprises can share customer information so that enterprises can design personalized shopping. Customers can get various product information through the network, comparing it to other products and purchasing goods. Improving the interface between e-commerce platforms and transportation processes is critical.

4.4. Improve each link of the supply chain by using blockchain technology

Blockchain, as its name implies, is composed of many blocks to form a chain structure, and each block contains information, and the information of the whole chain is stored in all servers as long as

one of the servers is runnable. The information stored in the entire blockchain is very secure. These servers play the role of nodes in the whole blockchain, and if you want to modify the information stored in it, you need the consent of more than half of the nodes. These nodes are in different subjects, so changing their information is challenging. This provides technical support for the logistics process of fresh box horses so that the sale, logistics, distribution, and after-sale have high stability and security. In addition, because the data of the blockchain is open, the fresh use of the blockchain can be transparently traded, which can be traced back to the production and transportation process at any time. When blockchain technology is applied to the logistics tracking field, the blockchain's commodity traceability platform will be combined with Internet technology to master the whole process of commodity production, processing, and transportation. The high security of blockchain technology not only ensures the authenticity of the stored information and improves the reliability of the Internet of things technology. Hence, consumers scan the information on the goods to know the information. The application of Internet of things technology can install the sensor in the production of goods remember, through the sensor in production process of goods to understand the information of goods. For example, the origin of the goods, production time and operation, and other related information, and then upload the relevant information to the database. When the product comes out of the warehouse, the development, packaging, and production information will be uploaded to the supply chain. When the logistics provider receives the product information, it will scan the logo above and upload the logistics provider's information to the supply chain. Then the car is ready to be shipped out [8]. When the product arrives at its destination, it must trade with the retailer, who will verify the product information before entering the warehouse, upload the retailer's information to the supply chain, and finally reach the consumer's hand. Consumers can scan the source code on the packing box to understand all the information related to the goods and to buy and eat with peace of mind due to the corrosiveness of fresh products and the influence of transportation conditions. Blockchain can perfectly adapt to the logistics process of fresh box horses, ensure the quality and distribution efficiency of agricultural products, reduce distribution costs, and form an open customer feedback system to protect the interests of consumers to the greatest extent. To provide customers with a reliable shopping environment. Moreover, although the blockchain data is open, the account information is highly encrypted, so the customer's information is highly protected, and there is no need to worry about disclosing customer privacy.

5. Information-sharing platform building has various effects

5.1. Influence of Blockchain technology information sharing platform on logistics

The problem of trust is the biggest bottleneck of the current logistics development. The logistics industry has many problems, such as long processes, complex goods-handling links, goods damage, disordered responsibility distinction, etc.

(1) The platform solves the trust between logistics enterprises.

Traditional logistics enterprises apply a centralized system. The automatic accounting system settles documents, orders, waybills, and other data exchanged between enterprises in the supply chain, breaking information occlusion. The accounts receivable vouchers of the core enterprise are converted into transferable and financeable vouchers so that the information of the core enterprise is transmitted along the trusted trade links. The electronic certificates of all links (such as electronic contracts, logistics documents, digital identities, credit ratings, billing data, etc.) can be linked. In the functional processes of right asset confirmation, asset transaction, accounts receivable factoring, bill discount transfer, warehouse receipt pledge, goods transfer, and so on, fraud costs are increased, realizing the effective and reliable transmission of information [9].

(2) The platform solves the difficulty of quality audit of logistics practitioners

If the information of logistics practitioners is updated, a complete credit information base of the logistics supply chain industry can be built. This information can be shared between the different fields. If having goods information of each section is updated (cultivation, production, processing and

packaging, transportation, warehousing, sales, etc.), we can realize the flow of goods each link back and draw a clear responsibility distinction.

5.2. Optimization of supply chain information collaborative management based on Blockchain

5.2.1. Optimization of information collaborative management objectives

Based on the realization of supply chain information synergy benefits, the information-sharing platform achieves the following optimization objectives to establish the supply chain information synergy system with the zone chain as the core. 1. Optimize the traditional information sharing mode, establish a distributed database based on the supply chain, reduce the threshold for edge enterprises to use data, improve the flow level of supply chain information, and realize the comprehensive coordination of supply chain information; 2. Innovative contract technology is introduced to maximize the separation from manual operation. By improving the efficiency of information transmission, the circulation speed of supply chain information flow is accelerated, error probability is reduced, operation cost is saved, and intelligent management mode is realized; 3. Utilize blockchain information management technology to greatly minimize information risks, standardize information transfer, increase information openness and transparency, and achieve collaborative supply chain sharing [10].

5.2.2. Optimization of information collaborative management framework

In the traditional supply chain, nodal enterprises have poor logistics information flow, strong lag in obtaining information, and reduced accuracy. Even through GPS information technology, it is difficult to achieve the expected goal. After the optimization of the traditional supply chain, the specific distribution process is optimized: the manufacturer enters the supply chain database after packaging the data; Suppliers use existing intelligent contracts and respond to delivery needs to generate a list of pickup plans automatically; According to the distribution demand information, the supplier makes the vehicle deployment plan and the delivery record; Then the system automatically executes the contract content. On the one hand, the system schedules the vehicles for distribution, and on the other hand, the system automatically makes the shipment arrangement. At the same time, the data generated in the whole process is shared with the blockchain database. After the delivery is completed, the supplier generates the list according to the intelligent management system; Finally, the truck driver receives the delivery notice and sends it off with the electronic document. The data generated from the whole process is shared with the database.

The distribution management system of the traditional supply chain system has a low level of intelligence, and the interference of human factors is serious. After the optimization is completed, the intelligent contract can be used to realize the automatic connection, which can accelerate the response speed of the supply chain, reducing the error rate and optimizing the operation process. After the optimization of the supply chain, the synchronization of data update and sharing can be realized, and the real-time query of data can be carried out according to the time stamp. The high degree of data coordination within the supply chain can be realized from the aspects of breadth and depth, and scientific and rational decision-making can be improved.

6. Conclusion

Given the severity of the outbreak, the cold-chain is challenging to meet the needs of many users in terms of its current development. There are significant potential risks in cold-chain logistics. The risks of the fresh supply chain are mainly reflected in environmental, supply and demand, and transportation risks. To avoid these risks, suggestions should be made regarding reducing cost loss, product quality control, and sales channel innovation. Combined with the special natural attributes of fresh products, the fresh information-sharing platform should be improved. The timely logistics information will help replan the fresh distribution route, cultivating customers' consumption and getting into the habit of "no contact delivery home". The epidemic is more likely to continue, and

people may still face inflation. The supply of fresh products will only continue to increase to fresh suppliers, so it is urgent to improve the cold chain logistics system.

Taking Freshippo as an example, there are still significant problems in the transportation of fresh products. The government, enterprises, and relevant departments should collaborate on transportation efficiency.

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