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Efficiency and Sustainability in X Fresh Fruit Supply Chain: Challenges and Solutions

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Abstract: With the introduction of the new retail concept, China's fresh fruit supply chain industry has seen rapid growth. However, the industry faces a series of challenges during this booming phase. With the vigorous development of the community fresh fruit industry, the traditional fresh fruit supplier X Fresh Fruit is also seeking transformation opportunities. By analyzing the X Fresh Fruit supply chain company case, this paper reveals the problems of opaque supply chain structure, inefficient supply chain management and production, and high supply chain costs. Measures are needed to address these issues, including optimizing the supply chain structure, improving production and management methods, and controlling procurement, transportation, and storage costs. These measures are expected to improve supply chain efficiency, reduce costs, and ensure the quality and freshness of fresh fruits, thus creating greater value and competitiveness for enterprises. The research in this paper helps X fresh fruit companies solve their current problems and provides useful suggestions for the sustainable development of the fresh fruit supply chain industry.

Keywords: Fresh Supply Chain, Efficiency Improvement, Cost Control, Sustainability Solutions

1. Introduction

Since the new retail concept was first proposed by Jack Ma at the Cloud Habitat Conference in 2016, major brands nationwide have been scrambling to develop their new retail business and carry out market layouts [1]. Online e-commerce strives to integrate offline retailers, while traditional offline retailers also begin to seek transformation and expand online e-commerce business [2, 3].

Now, the community fresh industry is in the stage of vigorous development. Consumers are increasingly willing to buy fresh food online, especially given the fast pace of urban life [4]. Online sales provide a convenient shopping experience and reduce the time and effort of supermarket shopping [5]. At the same time, consumers are increasingly focused on health and nutrition, hence the increasing demand for fresh fruits rich in vitamins, antioxidants, and fiber. People are more likely to choose fresh fruits that are natural, organic and free of pesticide residues [6, 7]. Therefore, the traditional X fresh fruit supply chain enterprises began to build a digital supply chain system for future operation and planned to meet customer needs and seize the market to make better profits.

The fresh industry has a market volume of one trillion and is the national basic consumer goods industry. In recent years, the growth trend has been stable. Fruits and vegetables, meat, poultry and eggs and other fresh products have the characteristics of high frequency and demand consumption.

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The purchase frequency of fresh food in China is about three times a week, higher than 2.5 times worldwide, a necessary consumer good for national life. Data show that the total domestic fresh retail market reached 4.98 trillion yuan in 2019, with a year-on-year growth of 5%, and the market size exceeded 5 trillion yuan in 2020, with a CAGR of 4.6% from 2014 to 2020, showing a steady growth trend. Even in the face of the pandemic, the fresh market is expanding and thriving.

Fresh fruit and fresh industry have also been highly valued by governments at all levels and supported by national industrial policies [8]. The state has issued several policies to encourage the development and innovation of a fresh e-commerce industry. Industrial policies such as "Notice on Further Strengthening the Construction of Cold Chain Facilities for Storage and Preservation of Agricultural Products" and "Implementation Opinions on Accelerating the Construction of Cold Chain Facilities for Storage and Preservation of Agricultural Products" provide a clear and broad market prospect for the development of fresh e-commerce industry, and provide a good production and operation environment for enterprises [9, 10].

2. Development Status of X Fresh Fruit Brand

X Fresh Fruit brand is a supply chain enterprise mainly engaged in apple sales, and its apple planting circle can meet the demand for apples within the business scope. At the same time, the enterprise has also purchased the agricultural products of scattered fruit and vegetable farmers around for a long time to enrich its product supply. As a traditional supply chain enterprise, x Fresh Fruit has many farmers who cooperate all year round. However, due to the seasonal nature of fruits and vegetables, there is a need for more self-owned drivers and transportation tools. When the demand is strong, all the transportation is carried out by temporarily leasing more cars, and the part that cannot be transported is transported to the fruit preservation warehouse of a third party for storage.

After x fresh fruit supply chain enterprise began to build its digital platform, its profitability did not get the expected growth. However, financial tension is due to the competition with enterprises such as Hema Fresh that have seized most of the market. Therefore, the enterprise urgently needs to optimize and improve the business plan, find out the existing problems, improve efficiency and control costs to improve the business situation.

3. Actual Problems in X's Fresh Fruit Supply Chain

3.1. Supply Chain Structure

There are many reasons for the opacity of the supply chain structure, and they all have corresponding effects. First, due to the sudden transformation of the traditional supply chain structure, x Fresh Fruit failed to make the whole supply chain transparent. Because the traditional structure level contains too many intermediaries, agents and distributors, the information circulation efficiency could be higher. It is difficult for consumers to know whether the entire supply chain is safe and whether they are buying fruit and other products at the most economical price, which leads to consumer insecurity.

Secondly, due to more data and system support, orchard production needs appropriate information technology and a data management system. This makes it difficult to track and record the origin effectively and transportation course of products. This may result in physical conditions such as water pollution, soil erosion, and unethical or non-compliant behaviors such as harmful pesticides, illegal labor practices, or environmental damage that are not truly reflected to consumers. It may be a small thing for consumers in the past, but in the current situation where more and more attention is paid to the quality of life and health becomes the public's primary concern, the opacity will seriously affect consumers' trust.

Moreover, the legal and regulatory environment in the region where the orchard is located needs to be more relaxed to enforce supply chain transparency, and the orchard needs more incentives to

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provide transparent information in its previous operations. Before Internet feedback became familiar to consumers, the industry also needed to establish effective transparency standards, and various links in the supply chain may use different methods to record and share information, resulting in inconsistency and opacity.

Finally, the complex transaction and contract conditions between x Fresh Fruit and the distributor also lead to opacity because various terms and conditions are involved, which are difficult to show to consumers clearly. Once a trade secret must be kept secret, it is easier for competitors to develop strategies against it once freed up. This is a huge choice point for every enterprise and a pain point that must be experienced to realize the transformation from traditional to Internet e-commerce. This is especially true for x fresh fruit enterprise with a single product, which makes it difficult to show other product supply methods and conditions to competitors except Apple. The availability of retail purchases by farmers, which are inherently difficult to trace, makes quality control more difficult, leading to unstable product quality and damaging brand reputation.

3.2. Low Level of Supply Chain Management and Production Efficiency

Poor supply chain management ability is almost a common fault of traditional supply chain enterprises. In the era when the Internet is not widely used in logistics, the traditional supply chain is prone to unequal upstream and incomplete or high information delay. This problem improved after x Fresh Fruit Enterprise built a digital supply chain system. However, employees still need to adapt to the new system, and grassroots staff generally need more awareness of the importance of the new system and even timely and accurate information.

Fruit production, as agriculture, is highly susceptible to the external environment. Weather instability, climate change or seasonal demand fluctuations can cause difficulties in planning, and such problems can all lead to poor harvests and difficulty in ensuring production efficiency. Delays in fertilization, deworming and other links in production, machine failures, or unreasonable production processes can also lead to inefficient production and increased production costs. The lack of modern technology and automated systems can also lead to the adoption of tedious manual operations in large areas of orchards, increasing the complexity of management and production.

Other actors in the supply chain, such as suppliers or distributors, may need to cooperate or be stable, resulting in inefficient synergy. Farmers and suppliers may need help to predict and manage because of the contradiction caused by the purchase price or the harvest gap. Distributors may need help in stable management due to market fluctuations or changes in market demand. Natural disasters, political unrest, supplier closures and other emergencies will also lead to supply chain disruption, affecting the normal operation of the supply chain.

3.3. High Supply Chain Costs

3.3.1. Procurement Cost

Since x fresh fruit brand is mainly engaged in the apple business, it relies on individual farmers for other fruit and vegetable categories, so normal negotiation strategies are difficult to take effect, and the procurement cost will increase due to various reasons such as output and scattered procurement sources. If orchards source raw materials during seasonal peak demand, the price may be higher as supply may be insufficient. To ensure the complete range of fruit categories, the geographical distance and transportation mode of product procurement may need to be improved, leading to high procurement costs and making it difficult to exert competitive advantages even in large quantities. As individual farmers may be in different locations, under different conditions and using different planting methods, the quality of products may be uneven, and the unstable quality of purchased products may lead to loss and return, thus increasing costs.

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3.3.2. Logistics Cost

To ensure quality, the apple plantation of x fresh fruit enterprise has strict requirements for geographical location. Therefore, if the logistics planning of the orchard is not reasonable, it may lead to unnecessary transportation mileage, low vehicle utilization rate and low transportation efficiency. In fact, due to the geographical location of some orchards and the poor condition of the mountain road leading to the main road, it is challenging to load the transport vehicles fully, so additional space is needed to protect the fruit equipment.

The limitation of transportation modes also leads to high logistics costs. Road transportation by cold chain vehicles alone leads to delays, damage or loss of goods, resulting in many extra costs.

3.3.3. Storage Cost

Due to the fluctuation of production capacity and the impact of the environment, it could be more stable; coupled with the erratic market demand, especially in the Internet marketing to guide the market now, it will produce a large amount of fruit inventory overstock. Moreover, the inventory could be more stable and x fresh fruit cannot be targeted to establish cold storage, which can only be outsourced to third-party cold storage. However, the high cost of orchard rental storage space requires large storage equipment, increasing the storage cost. High labor costs, such as wages and benefits for warehouse workers, also greatly affect warehousing costs when there is a large amount of inventory during the peak production season and low sales season.

4. Improvement Measures and Suggestions

4.1. Direction of Supply Chain Structure Optimization

Structural optimization has different ways and methods inside and outside the enterprise. Enterprises can start internally by establishing a digital traceability system that can track the flow of products from the orchard to market using modern technologies such as blockchain, Internet of Things and data analytics. Such systems can provide real-time data and ensure transparency of supply chain information without being overly cumbersome or expensive. It can also build long-term partnerships with farmers and third-party logistics companies along the supply chain to share information, enhance trust, and encourage all parties to disclose more information. Furthermore, training and education can be provided to enhance the awareness of orchard staff and supply chain participants on the importance of transparency. This can help them understand how transparency can improve product quality and sustainability. Finally, incentives can be provided to encourage all parties in the supply chain to actively participate in improving transparency by providing financial subsidies.

The outside of the firm can start from the perspective of setting industry standards, and parties within the industry can cooperate to set standards for supply chain transparency. These standards can cover information sharing, data recording, and quality control, improving circulation efficiency. At the same time, integrated combined transportation is adopted to transport according to the procurement needs of similar fruit and vegetable products in small batches or small merchants. To ensure that all parties in the supply chain can better comply with the same rules and improve the operating efficiency of the whole market.

4.2. Methods to Improve Supply Chain Management and Production Efficiency

Methods to improve the efficiency of supply chain management given the above problems are as follows:

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The first step is to re-evaluate the supply chain structure to ensure it meets product needs and eliminates unnecessary links, simplifying the supply chain and improving efficiency. For example, through zero inventory in lean logistics, part of the warehousing-related links can be omitted.

The second is to invest in information technology and automated systems to enhance production, inventory and supply chain management. This includes using ERP (enterprise resource planning) software, IoT sensors, and automated production equipment while training and improving employees' skills to ensure that they can perform work tasks efficiently and understand the importance of supply chain management. Improved demand planning and forecasting methods to more accurately respond to fluctuations in market demand, combined with the application of more advanced production equipment to reduce the risk of instability caused by environmental factors. Data analytics are used to monitor supply chains and production performance, identify problems and take corrective actions promptly.

Finally, it is to improve communication and collaboration with supply chain partners and establish stable and reliable relationships to improve supply chain reliability and efficiency. Establish a continuous improvement culture, encourage employees to constantly suggest improvement, encourage the upstream and downstream of the supply chain to put forward suggestions for improvement of the enterprise, and regularly review and update the supply chain management practice guidelines. A risk management plan is also established to respond to unexpected events, such as natural disasters or political instability, to mitigate their impact on the supply chain.

4.3. Suggestions on Cost Control

4.3.1. Procurement Cost

Reducing procurement costs can consider merging multiple suppliers and integrating farmers in the whole village and county to reduce procurement and negotiation costs. This can be achieved by negotiating bulk purchase agreements with farmers and giving certain rebate strategies for better prices and conditions. To prevent the risk of price fluctuations, we can predict in advance by combining futures trading, formulating price and purchase quantity contracts, and dividing products into different stalls for final purchase according to product quality and quantity. This can effectively reduce procurement and management costs while improving product quality.

4.3.2. Logistics Cost

Reducing logistics costs can be achieved by using low-cost route planning tools to arrange the delivery of goods optimally and reduce transportation costs. Railway transportation has also recently opened up to the fruit and vegetable industry. There is a precedent of the China-Laos railway special train for fruit import. You can negotiate with railway companies and use road and railway multimodal transportation for transportation, significantly reducing logistics costs and time costs in large quantities. When demand is low in the off-season, it may be considered to cooperate with other farms or businesses to share transportation resources to reduce transportation costs. This can be achieved through logistics cooperation or logistics-sharing platforms.

4.3.3. Storage Cost

Because of its asset-heavy nature, storage costs are difficult to reduce by low-input means. As warehousing costs are reduced, other costs, such as administrative or logistics costs, are bound to rise. Logistics inventory is the source of all evil, and storage costs can only optimize a better scheme. There are two main directions for optimization: one is to use low-cost IoT sensors to monitor inventory and transportation to reduce inventory losses. Two is to use lean principles to manage

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inventory or to distribute inventory pressure to each sales terminal's transportation line, reducing inventory levels and inventory overhang, thus reducing warehousing costs.

More costs can also be shifted to market and production forecasts so that they can react in advance and plan to meet large inventory needs with low-cost warehousing.

5. Conclusions

In conclusion, solving the problems of x fresh fruit supply chain requires a comprehensive approach, including optimization of supply chain structure, improvement of production and management methods and reduction of procurement, transportation and storage costs. These measures will help improve the efficiency of the supply chain, reduce costs, and ensure the quality and freshness of fresh fruit to create greater value for the enterprise and improve the competitiveness of x fresh fruit among industries. While reducing costs and increasing efficiency, it can promote the customization of industry-standardized benchmarks to improve resource utilization efficiency and meet environmental and social responsibility requirements.

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