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Optimizing the Agricultural Supply Chain Through the "Internet +" Model: Enhancing Efficiency with a Case Study of TikTok

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Abstract: This study uses the TikTok platform as a case study to explore the application of the "Internet+" model in the agricultural supply chain and analyses the impact of "Internet+" model on improving supply chain efficiency and reducing costs. With the development of science and technology, "Internet+" has become an important trend in modern industry, which deeply integrates traditional agriculture with information technology and promotes the innovation and efficiency of supply chain management. This study not only discusses the practical application of the "Internet +" model in agriculture but also proposes to solve the bottlenecks in the traditional agricultural supply chain using logistics informatization, intelligent scheduling system, cold chain monitoring and intelligent warehouse management. Through case studies, the effectiveness of Internet technology in optimizing the supply chain, improving the circulation efficiency of agricultural products and reducing costs are verified, providing theoretical and case study support for promoting the development of agricultural modernization.

Keywords: "Internet +", Agricultural Products, Optimize Supply Chain, Improve Efficiency

1. Introduction

With the development of science and technology, "Internet +" has become a general trend. Integrating modern information technology and traditional industries can also be combined with various industries to realize the innovative technological innovation of "Internet +" [1]. This life service mainly concentrates on medical care, rent, beauty, catering, etc., which maximizes the satisfaction of people's diversified consumer needs and provides customers with a perfect shopping experience. For example, many popular online platforms, such as TikTok, Kuaishou and Pinduoduo, promote the development of "Internet+". China is a largely agricultural country; farmers comprise most of our population and are the most important. Therefore, solving the farmers' income is the top priority, and "agriculture + Internet" is a suitable innovation path if citizens want to be rich and strong [2].

Agricultural products and processed products are easily damaged. For example, fresh vegetables are easy to rot because of their high moisture and short life cycle. Farmers' production areas are generally far from densely populated areas in the city and rely on the inefficiency of offline manpower sales, so it is very difficult to produce agricultural products to sell smoothly. The time cycle is also

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long, especially from the place of production to the sales area and then to the customer, and the number of times removal and unloading is also increasing. This will lead to the deterioration and damage of agricultural products, and this will also lengthen the timeline of all links in the supply chain, which is fatal for the highly vulnerable agricultural products and ultimately leads to damage to the interests of farmers and related enterprises. However, the supply chain is transparent in front of the Internet, and it is easy to find out where the problem lies, which is better than manual calculation and deployment [3]. Therefore, through the Internet, coordinating the management of the supply chain procurement, transportation, warehousing, distribution, and the left processes can optimize the details of each link and significantly reduce the logistics supply chain costs.

Therefore, how to optimize the supply chain of agricultural products and improve the efficiency of the supply chain to reach high efficiency and high-quality transaction orders in the Internet platform, and how to improve national happiness and satisfaction to increase the interests of farmers and related enterprises are the problems to be solved. We will analyze the data to find out the shortcomings of the traditional offline sales, find out the links that can be improved by combining with the "Internet +" technology, put forward a series of solutions, and then analyze and argue from the typical real-life cases. This paper will examine the present "Internet +" mode of agricultural supply chain cost management research.

2. Causes of Inefficiencies in Traditional Agricultural Supply Chains

2.1. Low Circulation Rate of Agricultural Products

"Outside products cannot come in, home products cannot go out" is undoubtedly a vivid embodiment of the problem of imbalance between supply and demand of agricultural products in the farmers, agricultural supply and demand imbalance to the farmers is the direct impact of economic loss, and indirectly hit its enthusiasm, so the market often appears supply is greater than demand leading to price falls, and then farmers So the market often appears supply is greater than demand resulting in price decline, and then farmers reduce the scale of production leads to oversupply, price rise, and then farmers to expand the scale and lead to oversupply, price down and so on the vicious circle, which will not only cause a great waste of social resources, but also in the agricultural products industry chain at the bottom end of the farmers worried and anxious, income is very little or even the standard of living cannot be guaranteed.

As for agricultural enterprises, supermarkets and wholesalers are the main offline middlemen, under the condition of imbalance between supply and demand of agricultural products, they are similar to "secondary farmers", unable to timely and accurately capture the changes in market demand and even spend a lot of money and time to collect upstream information, and at the same time, to seize profits, they will also take different means to prevent peers, making the efficiency of agricultural products circulation, to seize profits, they will also adopt different means to prevent their peers, which makes the circulation of agricultural products inefficient. Therefore, agricultural products in the offline market fluctuate irregularly and irregularly between oversupply and undersupply, which seriously affects the market order and reflects the shortcomings of low efficiency of the traditional offline sales of agricultural products.

2.2. Low Efficiency of Warehouse Turnover

Slow inventory turnover, poor inventory management, backlog of goods and slow turnover. Agricultural enterprises find it difficult to effectively communicate demand information accurately to farmers, cannot accurately control the amount of agricultural products ordered or purchased from farmers, and will hoard a lot of them when the price is high to the point that they are not sold and

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piled up in the hands, which leads to a sharp increase in the cost of warehousing, which greatly undermines the economic efficiency of agricultural enterprises.

2.3. Agricultural Products with High Rate of Cargo Damage

China is mostly in the subtropical monsoon climate and temperate continental climate. The temperature difference between day and night is large. Precipitation is not a certain amount, which leads to agricultural products storage a great deal of risk, humidity, temperature people can not predict in time, a period of heavy rain or drought, or a steep change in the climate is very likely to let a batch of agricultural products rot and be destroyed. Produce logistics plays a key role in determining the quality and supply of agricultural products and is an important means of improving supply chain efficiency. During the epidemic, supply chain disruptions occurred in vegetables and fruits. Because both human and material resources were severely affected, the supply chain of agricultural products suffered the obvious disadvantages of vulnerability and unpredictability. The imperfections of cold chain technology have also increased transportation difficulty and the rate of cold chain circulation and refrigerated transportation is lower than that of developed countries. Yet, it is the most appropriate mode of transportation for vegetables, fruits, and meat.

2.4. Low Procurement Efficiency and Transportation Efficiency

The procurement cycle of agricultural products is long, traditional agricultural products need a better market orientation, and procurement is purposeless, which consumes a lot of procurement costs. There is no information interoperability and communication between suppliers and farmers, so the supply chain cannot be well coordinated, resulting in low procurement and supply chain efficiency.

The traditional logistics time is long, and there are many transit links in the transportation process, resulting in agricultural products spending a lot of time in transportation. Agricultural products have a high cargo damage rate, in the process of transportation, loading and unloading, agricultural products are easily damaged, resulting in losses. At the same time, there needs to be more cooperation, better communication, and coordination between the links, which affects overall efficiency. The seasonal fluctuation of agricultural products is very large; in the peak season, agricultural products and logistics efficiency make it difficult to meet the demand. Because of the imperfection of the logistics network, the transportation routes are unreasonable, and the coverage is limited. The low efficiency of transportation ultimately leads to an increase in transportation costs and high logistics costs, affecting the market competitiveness of agricultural products.

2.5. Lack of Core Enterprises

The core enterprise of the agricultural supply chain is responsible for resource allocation, and the lack of core enterprise is the most prominent problem facing the agricultural supply chain in China. Mainly by a variety of agricultural products wholesale market to play this role. The wholesale market for agricultural products is still the link between China’s agricultural supply chain members. The lack of a core enterprise main body of China’s agricultural supply chain is not only related to the characteristics of the production and circulation of agricultural products but also related to the special national conditions of China. For example, a market failure phenomenon exists in China's agricultural products upstream supply, downstream sales channels, logistics infrastructure, information platforms and other aspects [4].

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2.6. Weak E-commerce Foundation

The foundation of agricultural e-commerce needs to be stronger. Many businesses engaged in agricultural logistics often have weak financial strength, so few specialized, large-scale agricultural logistics enterprises exist. There are also many areas for improvement in logistics technology and transportation methods. The proportion of agricultural products circulating through e-commerce channels is relatively low, and there is a lack of systematic integration between logistics networks, which makes it difficult to form a scale effect and meet the huge market demand for agricultural products logistics, thus making it difficult to optimize the supply chain efficiency [5].

3. Overview of the Agricultural Supply Chain Combined with The "Internet +" Model

In the production and circulation of agricultural products, the network structure is formed by all the node enterprises that provide consumers with agricultural products and related services, which is the agricultural supply chain [4]. "Internet +" is the further practical result of Internet thinking, representing advanced and powerful productivity, promoting the continuous evolution of economic forms, thus driving the growth of social and economic entities and providing a broad network platform for reform, development and innovation. The supply chain costs include all the material costs, labor costs, transportation costs, equipment costs, etc., incurred in supporting the supply chain operation from the procurement of raw materials to the production to the final product sales to the hands of customers.

Commonly speaking, "Internet +" is "Internet + traditional industries", but this is not a simple addition of the two, but the use of information and communication technology and the Internet platform so that the Internet and the traditional industries carry out in-depth fusion, to create a new development ecology [1]. For example, due to the combination of the Internet, Internet finance has given birth to many low-threshold, good-care financial investment products, such as the balance of treasure, wealth management, and various investment and financing products. For example, Internet health care and traditional medical institutions, due to the access to the Internet platform, making it possible for people to realize online medical treatment, are the most typical cases of "Internet +".

Therefore, we choose "Internet + agriculture" as a new production mode, give full play to the optimization of the Internet in the allocation of social resources, deeply integrate the innovative achievements of the Internet into the supply chain, enhance its productivity, and form a wider new form of supply chain development with the Internet as the infrastructure and realization tool.

4. Suggestions for the Efficiency of Agricultural Product Transportation via the Internet

Logistics informatization. They are using Internet technology to realize real-time tracking and sharing of logistics information and improve the transparency of the transportation process. First, to form a more complete set of agricultural products e-commerce logistics model, it is necessary to combine logistics transportation and distribution outlets through the combination of logistics, but also to increase the pace of the promotion of rural informatization construction projects so that the construction of rural network facilities and information and communication full coverage. This requires higher government departments to take the lead and build a specialized agricultural service information network platform and agricultural trade information service platform. Secondly, the training and support efforts for the agricultural products logistics management personnel should be increased, and the scientific agricultural products logistics management personnel training system should be established and improved. Because of the development of agricultural products, e-commerce logistics is key in the construction of the people and logistics management personnel team to smooth the intelligence, technology, management, and other channels [5].

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Intelligent scheduling system. Based on Internet data analysis, it optimizes transportation routes and scheduling, reduces transportation time and improves transportation efficiency. The communication intelligent scheduling system uses advanced AI algorithms and big data analysis technology, which can realize real-time collection and processing of transportation journey information. The system can re-plan the optimal route based on the data received from the starting location of the goods, weather conditions, emergencies on the road, holiday traffic jams and other factors, combined with the geographic information system (GIS) and real-time positioning technology, to make a quick and accurate assessment of the scene of the emergency. At the same time, the system can also grasp the distribution of transportation power in real-time, including the location and status of vehicles, ships, transportation personnel, etc. Based on the above information, the communication intelligent scheduling system can use optimization algorithms and decision-making models to automatically calculate the optimal transportation resource allocation scheme [6].

Solve the Problem of High Loss Rate of Agricultural Products through Cold Chain Logistics Monitoring and Intelligent Warehouse Management. The real-time cold chain logistics monitoring system utilizes GPS technology to collect geographic location data and wireless temperature sensors to collect temperature data of the vehicle interior and ingredients when the vehicle is in operation. Finally, the data transmission is completed using GPRS as a data link. The control center will transfer the data to the database after receiving the data. The GIS system always monitors the vehicles while they are exercising. Consumers can query the transportation routes, lengths and temperatures of refrigerated foodstuffs with the help of the network or cell phone App query, etc., to improve the circulation rate of the cold chain [7]. Internet information technology provides suggestions for inventory optimization by monitoring and analyzing inventory data in real-time. It can intelligently manage inventory levels, reduce excess or out-of-stock situations, minimize inventory costs, and improve the efficiency of warehouse turnover based on factors such as sales velocity, product life cycle, and supply chain conditions [8].

5. Case Analysis: TikTok

5.1. ERP System

TikTok utilizes an ERP system, which consists of eight logistics information centers that can ensure data accuracy and logistics information integrity while achieving information sharing with third-party logistics. Figure 1 shows that the merchants will recognize the orders after consumers place orders on the platform; then, the ERP system will identify the logistics centers and warehouses where the customers are located according to the receiving address of the customers who placed the orders. After the order is passed down, the agricultural products will be automatically or manually sorted and packaged, allowing automated warehousing management to be realized. Once the picking and packing are completed, the machine scans the goods and sends shipping information to the picking center. The most important point is that the system can also update the logistics status of each order in real time so that customers can always know the logistics status of the goods, which can ensure that the products are delivered to the terminal. This reduces warehousing costs [9].

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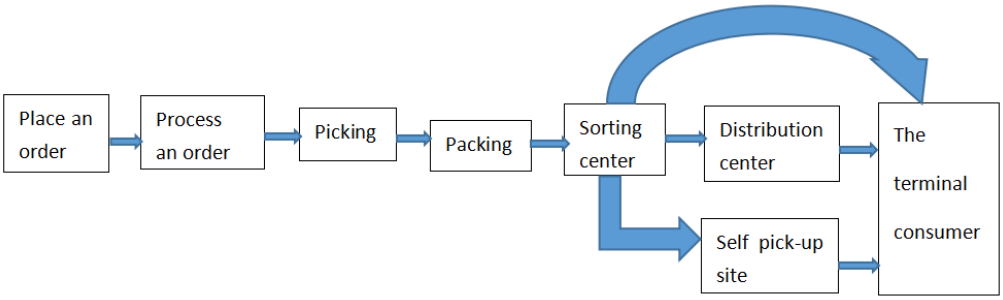

Figure 1: The ERP system of TikTok

5.2. Data Collection and Analysis

The platform has higher requirements for data processing capability. Based on the large number of users, there is a large scale of data, a wide range of data channel sources, and various data types. It is necessary to collect data through its platform and across platforms, increase the scale of data collection, communicate with suppliers voluntarily, and achieve data convergence of the upstream and downstream. In addition, it also includes other partner companies' commodity information, such as colors, prices, varieties, quantities, purchase cycles, and relevant information on the demographic and cities.

In terms of data analysis, this platform is highly capable of screening data, using professional models to analyze and focus on current and future market trends to better guide business decisions. Finally, TikTok provides a deeper understanding of users' shopping preferences, hobbies, behavioral habits and other information. As a result, the platform shows users products and services that meet their interests and needs and makes personalized recommendations. This greatly reduces the time users spend choosing the products they need in many products while effectively filtering out invalid information. Doing this enhances the user experience and improves purchase conversion and retention rates, thus increasing sales. This reduces purchasing costs.

5.3. TikTok E-commerce Cloud Warehouse: Reduce Costs and Increase Efficiency

To collaborate with e-commerce merchants to deal with supply chain problems, Wei Wenwen, president of Tik Tok e-commerce, announced that running a business around the whole area of interest in e-commerce operations at the second ecological conference of Tik Tok e-commerce on May 31, 2022. TikTok e-commerce has carried out a series of business layouts from cloud retailing to cloud supplying. On the cloud warehouse end of the supply chain, the purpose of releasing the TikTok e-commerce supply chain cloud warehouse product is to provide merchants with solutions and fulfillment guarantees for the users to provide a better logistics experience.

As the annual brand of TikTok e-commerce, Nortland knows it well. Because of the burst warehouse and inability to fulfill the delivery, Nortland has encountered many user returns and refunds, one after another. In the face of this operational pain point, Nortland attended the in-the-cloud warehouse TikTok e-commerce in Guangzhou. Through the TikTok e-commerce supply chain cloud warehouse core solution, the operational problems were easily solved. Aiming at its single warehouse can't meet the user's time limit, and the return rate is high, the continuous explosion of orders, weak response capacity and insufficient resources, especially in “618, 818” and other e-commerce promotions. “Regional warehousing” is a core solution suggested by Tik Tok, which strengthens the delivery capacity for Nortland in various regions such as South China, North China and East China.

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The "regional warehousing" means that the first original warehouse goods will be distributed as dry delivery to the Cloud Warehouse. Additionally, Tik Tok e-commerce supply chain cloud warehouse provides "Merchant Warehouse + Tik Tok E-commerce Supply Chain Cloud Warehouse" collaborative shipment with "Ultimate Fulfillment" service capability to quickly alleviate the pressure of single-warehouse warehouse blowout, improving supply chain efficiency in warehousing and distribution. In the end, Tik Tok E-commerce Supply Chain Cloud Warehouse not only guarantees the order timeliness and quality of Nortland's orders but also increases the next-day delivery rate of its stores by about 55% and promotes the re-purchase of new users in the stores, realizing member precipitation and synchronously increasing the settlement rate of the stores [10].

6. Conclusion

This research optimizes the traditional agricultural supply chain link through Internet technology, aiming to improve the supply chain efficiency, increase the economic income of agricultural enterprises and outputs, and reduce the loss of agricultural products to achieve the effect of saving. This study uses logistics information technology, intelligent scheduling system, cold chain logistics monitoring and intelligent warehouse management to solve the problems of low transparency, efficiency and high loss rate of agricultural products. Through the TikTok network platform as a case for a case study, the analysis concludes that Internet technology can optimize the supply chain link and improve the efficiency of the supply chain to achieve the purpose of the study. To promote the healthy development of China's agricultural supply chain, we must also play the role of government regulation and use the "visible hand" to overcome the many factors that constrain the development of core enterprises.

The "Internet + agriculture" model still faces big challenges, including agricultural business lines, government policy, etc. Therefore, the government, agricultural enterprises, relevant departments, farmers and other relevant personnel should pay more attention to the promotion of agricultural products and the combination of Internet technology, put it in the core position, and according to the actual situation to develop the best promotion strategy, to promote the agricultural network industry to a new level, and promote the development of the rural economy.

Authors Contribution

All the authors contributed equally, and their names were listed alphabetically.

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