Blockchain Promotes Collaborative Development of Fresh E-Commerce Supply Chain

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Abstract. Following the expansion of the fresh e-commerce market, problems in fresh e-commerce supply chain have appeared. At present, there are some problems in China's fresh e-commerce supply chain, such as imperfect cold chain logistics system, lack of traceability means, numerous contradictions between upstream and downstream, and low transparency of product information. At the same time, the normalization of the global epidemic has put forward higher requirements for the safety of cold chain logistics mainly imported fresh products. For the sake of the development of fresh e-commerce, those questions urgently need to be solved. Blockchain have features of Decentralized, information immutable and information traceable. The best way to break the current situation is to realize the integrated development of fresh e-commerce and blockchain technology. It can not only solve problems, but also improve the systematic platform of fresh e-commerce supply chain, so as to provide sustainable development strategies for Chinese fresh e-commerce.

Keywords: fresh e-commerce · supply chain · blockchain technology · cold chain logistics · traceability information

1 Introduction

With the continuous expansion of the fresh electricity industry and increasing consumer demand, the shortcomings of the fresh electricity supply chain are increasingly exposed. Too many circulation management links, low degree of standardization implementation, low transparency of product-related information, lack of security and trust system at each node and many other problems have gradually become a major pain point in China's fresh logistics industry. At the same time, in the context of the global epidemic normalization, the safety issue of fresh electricity business has attracted much attention. Since the outbreak in Beijing, cold chain logistics has also become the focus of epidemic prevention and control in China. Especially after entering the winter, many provinces in China have detected viruses in fresh food, including cold-chain seafood, frozen meat and other family regular food ingredients. More alarming is that, earlier in Qingdao, Tianjin and other areas, cold storage workers also appeared cases of virus infection.

And the rise of blockchain technology, for the fresh electricity business supply chain provides a way to break the game. At present, blockchain information technology has become a focus of technology research and development highly concerned by the industry, the government and the society. General Secretary Xi Jinping has clearly proposed that we should actively explore the extensive development of "blockchain+" in promoting the security field of China's major livelihood public services, and promote the extensive application of blockchain technology in promoting major medical and health care, commodity security, food security and other major livelihood services.

Blockchain enterprise technology has outstanding technological innovation points such as decentralization, openness and autonomy, strong confidentiality, information security and reliability, unillegal tampering and user information traceability. In the national fresh food supply chain and e-commerce industry supply chain, the full use of blockchain technology to integrate the food industry and fresh e-commerce industry, to create a systematic fresh food supply chain technology platform, can realize the complementary advantages and synergistic drive of upstream and downstream enterprises. Enterprises through fresh electricity service platform, can face multiple levels of supply chain data combing and information classification, help fresh enterprises effectively internal basic logistics business management, business process execution and production process quality supervision, make food orders, warehousing and food logistics and other important links of management efficiency, to improve the safety of fresh food, reduce the degree of information asymmetry between fresh electricity participants, promote the development of fresh electricity industry.

2   Current Situation of the Fresh Supply Chain

1. Fresh cold chain logistics management system is still not perfect. Fresh frozen products have three characteristics of easy heat deterioration, perishable, easy heat damage and so on, and the preservation time and conditions of the products are very high. However, there are still problems in China's cold chain logistics at present, such as unstable supply, backward preservation technology, high cost and missing industry standards [1]. The uneven distribution of industrial infrastructure and supporting facilities, the low construction level of infrastructure and enterprise informatization, the "small but scattered enterprises, the lack of special personnel, the lack of funds", and the imperfect regulatory system have become the four weak links that hinder the development of the cold chain storage and logistics industry [2]. Moreover, in the existing cold chain information transmission, the automatic information transmission and acceptance system has not been fully used, unable to achieve real-time information sharing [3], and it is difficult to guarantee the safety of the cold chain transportation environment. Since the outbreak of the epidemic, the cold chain environment and product nucleic acid have been frequently abnormal in many provinces in China. It is not difficult to find that the low temperature environment of cold chain logistics provides a hotbed for the incubation of novel coronavirus, and fresh products, as the carrier of the virus, infect consumers and become a major crisis of epidemic prevention and control.

2. Lack of traceability means, the quality is difficult to guarantee. In China, when the company's fresh products have problems, the vast majority of companies will remove

the unqualified products from the shelves, but for consumers have bought and used the products but do not provide a complete after-sales service scheme. This is mainly because the current domestic has not yet established the corresponding industry specification and traceability standards, the lack of advanced traceability infrastructure technology and testing equipment, thus not strict supervision of the whole process, also can not really establish a sound traceability supervision mechanism [4], it is difficult to obtain accurate traceability data, leading to difficult to achieve comprehensive and systematic management and tracking of fresh food supply chain target [5].

3. Multiple contradictions between the upper and lower flow [6]. The upstream of China's fresh supply chain is mainly "small-scale farmers' production and scattered distribution", and the upper flow supplier distribution is fragmented and scattered, and some commodities are dual-unit management. The upper and lower flow demand units are not consistent, which greatly increases the overall management difficulty. The traditional mode of multi-level wholesale is long and overlapping, and the work efficiency is low. After many distribution and layers of price increase, the price difference between the production and marketing of fresh products is large. There are many circulation links and links in the fresh supply chain for a long time. Some merchants blindly pursue personal interests, lower upstream prices and raise downstream prices, and refuse to share product information, which leads to unsmooth information transmission among the subjects of the supply chain, information asymmetry in each link, and improper competition behaviors such as false quotation and hierarchical price increase [7].

4. Intransparency leads to difficult to guarantee quality. Due to the high cost, fresh storage management actually use 0–10° of standard preservation enterprises are very few, the added value of most fresh products is small, so most enterprises choose to store and transport through human management. However, because the fresh products have a low price, short shelf life, high loss characteristics, the non-standardized processing process not only leads to the serious loss of fresh food, but also affects the safety of fresh food. And when consumers buy products in the fresh e-commerce platform, browse the commodity details and other buyers evaluation information can be controlled by the business, the commodity information is not true, not transparent, easy to mislead or even deceive consumers. Not only that, the current fresh electricity business enterprises are mostly to improve the transaction volume and obtain more economic benefits as the primary goal, the quality of fresh goods control is insufficient. However, the government regulatory departments can not be real-time and comprehensive detection of fresh goods, can only spend a lot of manpower and material resources in a certain link of fresh products quality sampling survey, not only the supervision cost is large, but also low efficiency (Fig. 1).
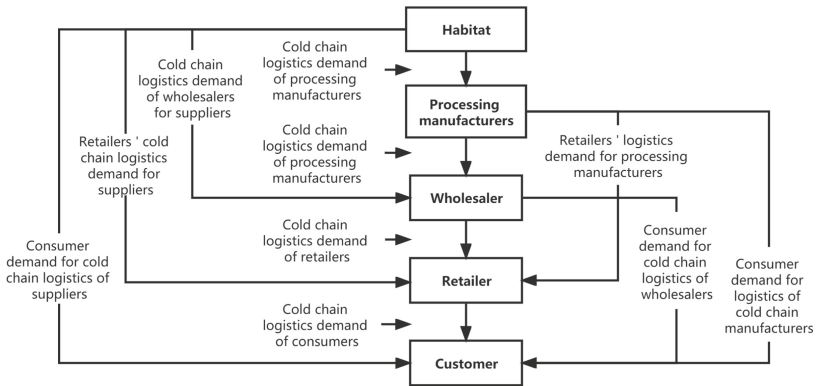
Fig. 1. Demand analysis of cold chain logistics at each node of the supply chain (Self-drawn)

3   Advantages of Fresh E-Commerce Supply Chain Under Blockchain Technology

1. To achieve commodity traceability, fully transparent information, barrier-free communication. At present, the domestic cold chain logistics mode to transport fresh goods. In this mode, with the help of block chain technology to build cold chain logistics supply chain system, only fresh electricity platform release logistics distribution information, network block can record logistics distribution information, each member has the right to query relevant information, when distribution is completed, block distribution information synchronization to block chain, verified on complete chain, due to its tamper-proof can improve the trust of commodity information, so as to realize decentralized logistics information management [8].

    In view of the imported food under the normalization of the epidemic, the blockchain technology can use the ledger to ensure the authenticity of the data, and prevent individuals from tampering or forging for personal gain, forming a supervision mode that everyone can prevent counterfeiting and always supervise [9]. At the same time, relying on the high transparency and traceability correctness of blockchain technology, the problems in cold chain logistics can also be found and handled in the shortest time.

2. Reduce credit cost, improve enterprise cooperation and trust and work efficiency. In the supply chain, the uncertainty affects the cooperation strength of enterprises and hinders the smooth operation of the supply chain. Transactions between enterprises must be conducted through a large number of human audit and third-party entities, increasing additional costs and delays. Trading through blockchain technology, according to its dedistribution and traceability, can not only simplify the value transfer procedure, but also greatly reduce the intermediate links, effectively avoid the "data fraud problem" in the transaction [10], and guarantee the timeliness and low cost of fresh business trading funds.

3. Help to rationalize pricing and maximize multi-party interests. Fresh companies should not lose "quality" because of "price", nor can they squeeze the pursuit of low cost. In order to maximize the benefits of suppliers, fresh companies and consumers,

quality and price should be considered as overall consideration. Therefore, companies should extensively collect and analyze relevant information, and negotiate with suppliers about rising costs. Blockchain can collect and analyze the details of all processes, attribution analyze the problems in the supply chain, reduce the price and negotiation costs of both parties, and finally feedback to the actual purchase price and quality of consumers.

4. Promote the cooperation and coordination among the members of the fresh e-commerce supply chain. Through blockchain, suppliers 'data is available to consumers to earn consumers' attention and preferences to suppliers, and consumer preferences are regarded as a third-party audit mechanism, as one of the performance evaluation of suppliers. Use of fresh e-commerce blockchain information platform, to achieve product quality control, logistics traceability, trust building, information sharing and reasonable distribution of interests and other goals.

In the data collection stage, the main body of the fresh electricity business supply chain will be all kinds of production, processing, logistics, transaction and other information, through the Internet of things business stack under the blockchain uploaded to the blockchain for real-time monitoring, based on this data distribution, link, analysis, the traditional trust mechanism from trust people to trust machine. In the data processing stage, the company further increases the authenticity of the data by identifying, checking and digital signing the information uploaded to the blockchain. At the same time, the asymmetric encryption, consensus mechanism and timestamp of the blockchain can provide the data on the blockchain with the data tracking ability from source to end. Finally, all verified and set protocols, accelerate the automation of supply chain and reduce data bias. After using block chain technology, the members cannot hide product freshness and fresh transportation process, reduce the damage of the fresh electric business platform and the overall performance of the supply chain, so while using the block chain information platform will bring certain application cost, but can enhance the trust between members, increase the reliability of product information, bring greater profits and overall performance (Figs. 2 and 3).
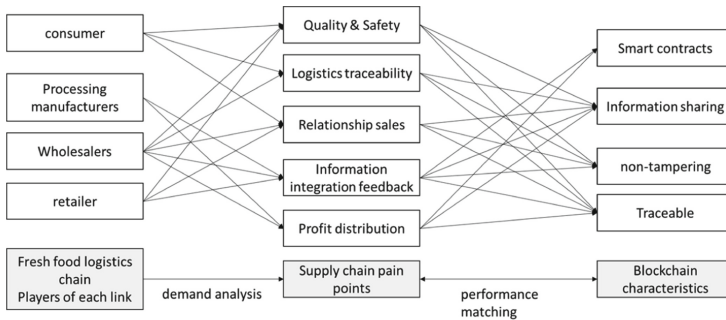
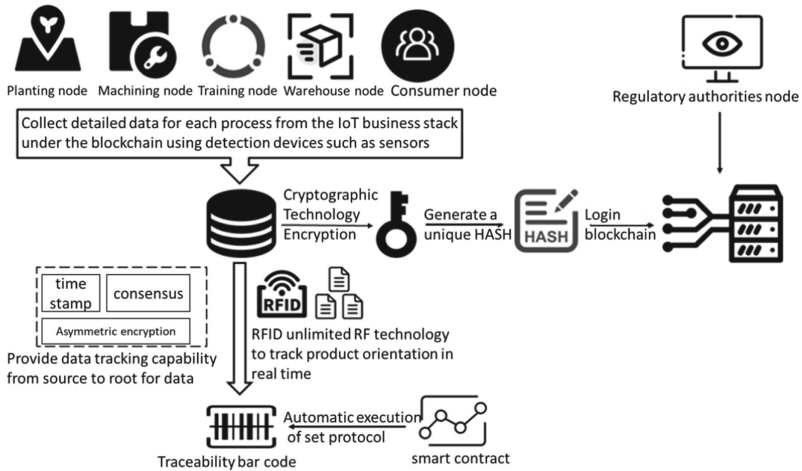**Fig. 2.** Blockchain features match users' logistics needs (Self-drawn)

Fig. 3. The whole process display of the blockchain application supply chain shows (Self-drawn)

4 Conclusion

The development of fresh electricity business supply chain is gradually moving towards a healthy, integrated and sustainable stage. Relying on the core competitiveness of price discounts and distribution services is not enough to maintain the long-term development of fresh e-commerce. With the development and maturity of information and digital technology, relying on supply chain digitalization and information will be the fresh electricity business to break the game. Although the current development process of cold chain logistics is restricted by the enterprise itself protectionism and the existing cold chain logistics technology level and other factors, but once the cold chain logistics breaks through the bottleneck, the fresh electricity business market will usher in an unprecedented great development [11]. The application research of blockchain technology in various fields is gradually being strengthened. With its decentralization, traceability, smart contracts and other characteristics, various problems encountered in the supply chain can be avoided and make the supply chain more transparent and trustworthy. Block chain technology to establish a new trust mechanism, improve supply chain partnership, optimize the supply chain collaboration and integration ability, improve the actual customer experience, and through accurate real problem analysis, effectively realize the resource integration and benefit distribution between enterprises, make the whole supply chain more sensitive, achieve sustainable development.

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