

Analysis on cold Chain Logistics Informatization Construction of Blockchain Technology

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Abstract: Against the background of the later epidemic era, this paper analyzes the current development situation of China's cold chain logistics market and the pain points of the food cold chain logistics information traceability system, and finds and summarizes the problems of the current China's food cold chain logistics traceability system. Based on the blockchain technology, the construction and research of the food cold chain logistics traceability system can be carried out, and the improvement of the global positioning system of cold chain logistics, intelligent temperature control and the construction of the Internet of Things can be achieved from the three aspects of the setting of participants, so as to better implement the rural cold chain logistics. The research shows that based on the "first kilometer" and "last kilometer" issues under the current rural cold chain logistics background, the combination of cold chain logistics and blockchain technology will bring about the deep integration of models and technologies. Finally, based on the current blockchain technology, the paper puts forward suggestions and management implications for the development of rural cold chain logistics.

Keywords: Cold chain; logistics informatization; blockchain

1. INTRODUCTION

The main reason for the case of cold chain food virus import in Longgang District of Shenzhen is that the logistics and transportation of imported cold chain food is not standardized and the food quality supervision is insufficient, which leads to the easy contact with the virus in the logistics process of imported cold chain food and thus forms chain transmission. At present, China's logistics shows the following trends: First, the scale of infrastructure is expanded. From the perspective of the national cold chain logistics, the total capacity of cold storage, the number of refrigerated cars and insulated cars are increasing. Third-party cold chain logistics enterprises continue to grow, showing the development trend of scale and networking.

The trend and trend of market segmentation, cross-border competition and global layout show an upward trend. At present, China's fresh food cold chain logistics industry is far from developed countries. In terms of profit margin, China's cold-chain profit margin is about three times that of developed countries, only 8%. In terms of market share, the proportion of enterprise income is low, compared with 70% of the top five cold storage enterprises in the United States, and less than 10% of the top 100 enterprises in China. The reasons are as follows: firstly, the concentration of China's cold chain logistics market is low. The import and export process of cold chain logistics containers is divided into seven parts: before cargo packing, before consignor packing, before container loading, loading and transportation, container unloading, cargo unloading and after cargo unloading. The pre-loading process of containers includes the following processes: the cargo owner orders the shipping space, informs the shipping party of the shipping location, the type and quantity of goods loaded, and empty the container

Shipper packing refers to the cargo packing operation after the cargo owner picks up the empty container. The non-corresponding key technology is used in the blockchain technology, which greatly improves the security of

information. Third, it has repeatedly verified performance. The blockchain is equipped with timestamp technology, which can be relied on to conduct real-time search and search for user information at different time nodes. And under the system control of timestamp technology, user information is difficult to be maliciously modified and stolen.

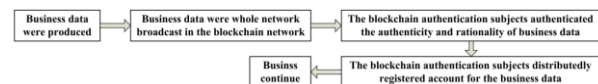


Figure. 1 The blockchain work principle.

2. THE PROPOSED METHODOLOGY

2.1 Construction of cold chain logistics mode of agricultural products under blockchain technology

In addition, because the Internet of Things technology currently used mostly follows the framework from user to cloud and then to the background, the imported cold-chain food can only be traced from customs entry to domestic sales, but it does not cover the whole process of information management of imported cold-chain food in the production, processing, cold-chain storage, logistics transportation and sales of the country of origin, and it is difficult to ensure the quality and safety of cold-chain food from the source of production. And the existing national cold chain food traceability management platform is only for imported cold chain food. The value of blockchain technology is mainly reflected in three aspects: decentralization, data tamper prevention and traceability, and node transmission mechanism. First of all, decentralization means that the database is distributed, which can realize the decentralization of data storage. Due to its own consensus mechanism, it can realize the decentralization of management system.

(1) One of the characteristics of blockchain technology is decentralization, which ensures the equality, independence and tamperability of each node in the entire supply chain. Based on this, the fresh logistics supply of each link is no longer operated in the form of single chain, but is integrated and developed in a more centralized way. Blockchain technology can help build a decentralized fresh and cold chain logistics platform that runs through producers, suppliers, wholesalers and consumers.

(2) Based on the characteristics of centralized monitoring, local distribution and overall mobility of cold chain transportation, a cold chain transportation monitoring system is designed. STM32 microprocessor is used as the main controller of the data transmission module, and the wireless module based on SX1212 chip is used to build a point-to-point network, Using GPRS module to upload data to the server, the system can monitor the temperature, humidity, battery capacity, route and other information of cold chain transportation

2.2 Management suggestions for agricultural products cold chain logistics mode under blockchain technology

Applying blockchain technology to the construction of food cold chain logistics traceability system can effectively ensure the two-way tracking of key information and information security. At present, the cold chain logistics of agricultural products also has its own weaknesses, and transformation and upgrading is the only way.

The defects of the cold chain of agricultural products are mainly reflected in the following two aspects: first, the degree of marketization of the cold chain logistics of agricultural products is not high. The cold chain market in developed countries is relatively mature, and the industry has formed outsourcing services to contract perishable agricultural products to high-quality cold chain logistics companies. With the tamper-proof characteristics of blockchain technology, RFID tags can be installed on warehouses, ports and cabs, and real-time temperature and humidity can be monitored by GPS to ensure that they are uploaded to the blockchain in a very short time, and data can be updated according to real-time changes, It ensures that all parties in the whole chain can obtain accurate time and temperature, effectively improving the efficiency of query and control of temperature conditions in cold chain operation.

This paper proposes a cold-chain logistics container monitoring platform based on blockchain technology. The purpose is to monitor the key information of each node of cold-chain logistics. At the data collection layer, the precise key data information is continuously monitored by installing sensors in the container, and is pushed to the IOT cloud platform through the real-time switch system. The IOT cloud platform stores the original data in Alibaba Cloud, Alibaba Cloud passes the filtered data to the local server Redis for storage. Relying on the information demand of the whole supply chain of cold chain food, the food cold chain logistics traceability system based on blockchain technology is divided into network layer, core layer, data layer and application layer. Based on the network layer, the raw materials, semi-finished products and finished products of cold chain food are introduced into the platform.

3. CONCLUSION

The food cold chain logistics traceability system based on blockchain technology can clearly divide the responsibilities of relevant subjects, improve the quality of cold chain food and the transparency of logistics information sharing, ensure the health and safety of cold chain food, and effectively promote cross-regional platform docking and cooperation, which can further strengthen the national epidemic prevention and control of cold chain food, and effectively reduce the possibility of "chain breaking" in the cold chain logistics industry. Thus, cold chain food information can be traced and recycled in both directions. Strengthen the establishment of mandatory standards and promote the healthy development of the industry. The government and industry leading enterprises should participate more in the formulation of standards to realize the healthy operation of the industry. In addition, in terms of cold chain logistics construction standards, industry leading enterprises should better do a good job in the overall industrial layout, establish an alliance system, and do a good job in resource distribution planning.

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