Study on Construction of Logistics Industry System Based on Blockchain Technology

Xuhui Wang
School of Economics and Management BUPT China
wxuhui@126.com

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Abstract. Blockchain technology and applications are in the fast-developing stage, considered important engine of the fourth industrial revolution and the core technologies with the greatest potential to trigger the wave of the fifth disruptive revolution. Blockchain technology has the characteristics of decentralization, distributed sharing, and self-trust. It can realize secure transactions without trust. It is a revolutionary application of the Internet of value. Based on this, this article starts from the blockchain technology and addresses the outstanding problems in the development of traditional logistics to build a modern logistics industry system, improve the liquidity of information data, improve the overall operating efficiency of the logistics industry, and expand its profit space to solve the difficulties and bottlenecks in the development of traditional logistics.

1 Introduction

In recent years, with the continuous development of e-commerce and the popularization of the Internet in China, more and more consumers shopping online. Logistics transportation, as a service industry developing with e-commerce, is also receiving more and more social attention. The market demand continues to rise. As the basic industry of the country's economic development, the transformation and upgrading of the logistics industry will help to transform the growth mode China's economic and create new economic growth points. The development of modern logistics industry is the general trend.

2 Impact of Blockchain Technology on Logistics Industrial Innovation

Blockchain is a new type of distributed architecture and computing paradigm using cryptographic principles to encrypt information transmission and access. This system has problems of double payments and Byzantine failures. The double payment problem refers to conduct multiple transactions with a single asset through the money natural. The Byzantine failures refers to the condition that establishing mutual trust between the two sides is difficult. In the absence of third-party trusts, blockchain technology establishes a digital encryption mechanism through cryptography and builds a decentralized system with a high degree of security, so that can transfer information and value at the same time, which is convenient for establishing trust mechanism. The self-trust characteristics of the blockchain system can transform the industrial chain management and truly realize the upgrade. The value of this characteristic mainly manifested as follows. Firstly, it can break down the information barriers between nodes and improve the information transfer rate. Secondly, it can get rid of the constraints of third party intermediaries, achieve transaction decentralization, reduce transaction costs between nodes, and establish a new trust mechanism. Thirdly, each node in the blockchain system is fair and equal, so that if one node or several nodes are attacked or suffer losses, other nodes inside the same system will not be involved. From the perspective of industrial chain management, under the traditional industrial chain model, resources such as information flow, capital flow, and logistics have to pass through all entities in the entire industrial chain, but there is no trust mechanism between the trans-department entities except for
transactions between upstream and downstream companies. Therefore, there is a serious information island problem in the traditional industry chain system, which severely restricts the industrial scale development. In the blockchain system, all data information will be reliably recorded and shared by the entire system and a single node cannot change data without authorization. This ensuring the authenticity and security of the information and data and establishing a cost-free trust mechanism, so that entities can liberate productivity and reduce operating costs, improve the efficiency of industrial investment conversion, and promote industrial scale development.

3 Construction Path of Logistics Supply Chain System Based on Blockchain Technology

The core that restricting the development of the traditional logistics industry lies in the inability to establish an industry trust mechanism. The logistics companies are independent and lack effective communication, which results in low operating efficiency, low industrial profitability, and high industry competition. Therefore, it is necessary to make full use of the self-trust mechanism characteristics of the blockchain system, rely on the difficulty of tampering and the traceability of transactions of the blockchain system to solve the trust disputes that may exist during the operation of the logistics supply chain system. Achieve easy proof and accountability, and conduct a shared trust mechanism system between subjects. At the same time, the blockchain system can allow each logistics company to participate in the construction of the logistics supply chain system, and then establish an ecological network system with transmission value, expand the profit model and boundary of the logistics industry, and improve the overall revenue of the logistics industry. The specific construction idea is to use the blockchain technology to build a logistics supply chain network management system, which will carry out the information and data in the supply chain system through the Internet platform and specific logistics business operations, and then maximize the use of data value. At the same time, a side chain with smart contract functions is created for different nodes that are logistics companies to help each other improve management efficiency and reduce logistics operation costs, as it could be seen in Figure 1.

Figure 1. Construction Plan of Logistics Supply Chain System Based on Blockchain Technology.

The construction plan of the logistics supply chain system based on the blockchain technology reflects the following aspects. Firstly, the information resource integration implementation plan builds a shared cloud platform that integrates the supply chain system and the blockchain system based on the Internet network, organically combining the advantages of traditional supply chain and blockchain technology to provide a fully services for upstream and downstream participants, using
technology to drive innovation and reduce costs. This internet-connected platform can provide customers with all services in the logistics supply chain, including order initiation, loading, transportation, delivery, payment, and evaluation services. Secondly, side chain construction expands the application of blockchain technology scope and innovation space. There are two specific implementation schemes. One is using a two-way anchoring method. Sending digital assets to a single custodian of the main chain at first, when the custodian receives the message, the digital assets are activated on the side chain, But this method is too centralization. The second method is to use the SPV (Simplified Payment Verification), which sends the digital assets in the main chain to a special address to lock the digital assets in the main chain. When the transaction is completed, an SPV certificate will create and sent to the side chain, which can open the main chain digital information in the side chain to ensure data security. Thirdly, the implementation of blockchain technology in the logistics transportation process is that companies can sends the products provided to the cloud platform through enterprise resource planning (ERP), and the dealer can directly order online and track the order on the cloud platform. Tracking and processing the goods through the traceability technology of the blockchain technology can ensure the efficient transportation of goods. Blockchain technology can also help suppliers manage inventory, check the status of goods automatically, and process orders efficiently. In terms of payment, logistics companies can produce bills from within the ERP system, and view and confirm orders through the cloud platform, and then reduce reconciliation costs and speed up capital flow. In terms of product packaging, logistics companies can use barcodes and other methods to uniformly package goods. By scanning the barcode, customers can query all the data from the production to the transportation of the goods. This ensure the safety of the origin and the quality of the goods, and help improve the service quality of the logistics supply chain system.

4 Conclusion

The application of blockchain in the logistics and express delivery industry cannot solve all problems. If you want to promote a new technology in an industry only at the technical level, without people who understand the business and technology help to promote and choose the right business group, then the new technologies can hardly really help an industry transform. Most of China's express delivery companies are small and medium-sized. Without sufficient order volume, it is difficult to recover the cost by using blockchain technology alone. Once a large number of small and medium-sized express delivery companies form alliance chains, sharing information and risks, but being independent of each other, it can greatly improve the financing and lending situations of SMEs, and ultimately improve the efficiency of operation management. In general, the blockchain is very suitable for the logistics and express delivery industry to apply, but any enterprise and individual should not use blockchain blindly. For example, before using blockchain technology in real scenario, we must consider whether it can be solved or easier to solve by traditional IT technology. Because traditional IT often means more mature, lower cost, and lower risks for customers. So in the future, when applying blockchain, it will still be the case. It is necessary to avoid simply using the blockchain in order to use it.

References


