

The Influence of Block-Chain Technology in Chinese Smart Logistics

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Abstract. Block-chain technology is an advanced database mechanism that allows information to be shared transparently within an enterprise network. The scale of Chinese logistics market is developing rapidly, whether it is e-commerce express delivery, cold chain transportation, international trade logistics and other fields, it is developing rapidly. Through an overview of block-chain and smart logistics, this paper discusses the feasibility and advantages of using block-chain in smart logistics. Including block-chain technology and the decentralization of smart logistics transaction subjects, efficient transaction mechanism, and transaction process security to discuss the important role of block-chain in smart logistics. At the same time, it analyzes the practical application of block-chain in SF Express, and analyzes the integration and development of block-chain and smart logistics. And at the end, it puts forward suggestions and prospects for the development of block-chain in smart logistics in the future.

Keywords: Block-chain technology, smart logistics, logistics enterprises.

1. Introduction

"Smart logistics" was first proposed in 2009. Compared with traditional logistics, smart logistics has realized the in-depth application of information technology in the logistics industry. It uses the Internet and Internet of Things technology to realize convenient information exchange between different items. It greatly improving the efficiency of resource allocation and the management effectiveness of logistics enterprises. And it supports multi-party participation and operation. The supply chain and portal merchants only need to use the wide area network to know the information of the enterprises and units that currently need fresh supply. After the enterprises and units place an order, they can provide them with the order status and information on the whole process of logistics and transportation. Therefore, the main operation mode of smart logistics relies on modern information technology and various intelligent technologies. Compared with traditional logistics transportation methods, it shows great advantages in transportation modes, transportation dynamic updates, and improvement of user satisfaction. These are traditional Unreachable by means of transportation. At the same time, smart logistics provides enterprise customers with the most efficient and high-quality resource allocation solutions to improve customer satisfaction with logistics services.

Block-chain technology has the characteristics of decentralization 0, which make it the basis for application in more fields [1]. To put it simply, a distributed report database can be used as an intuitive embodiment of block-chain technology, characterized by consensus algorithms, centralization, smart contracts, and immutability. At present, many fields have begun to try to integrate and apply block-chain technology, including anti-counterfeiting, education, finance, logistics and other fields. In addition, block-chain technology can permanently store data information, and information such as trader information, transaction transmission paths, and transaction records in the system are all recorded in the block-chain system. Under the protection of block-chain technology, data information can effectively avoid malicious damage, human tampering and other problems, and then improve the security of data information while achieving the purpose of smooth transactions through information traceability [2].

Therefore, it is particularly necessary to conduct research on the application of block-chain in smart logistics. This article aims at the advantages of block-chain in smart logistics, firstly, it is analyzed how it conforms to the current market environment. Secondly, the analysis shows that its

high-efficiency characteristics also meet the needs of the current rapid development of smart logistics. Finally, its powerful security features are also in line with the security requirements of smart logistics. The purpose of this article is to summarize the development status of block-chain smart logistics in China and make suggestions for the future development of smart logistics by analyzing the advantages of block-chain in smart logistics and the construction of SF Express block-chain logistics.

2. The advantages of block-chain technology in smart logistics

2.1. Block-chain technology and the decentralization of transaction subjects of smart logistics

At present, Chinese smart logistics is still in the early stages of development. Although it has developed rapidly in the past two years, the government has also introduced some supporting measures. But from the current point of view, no logistics company has reached the height of super-large-scale development, and competition among multiple companies is still the mainstream. On the one hand, in Chinese logistics market, whether it is the self-built logistics e-commerce companies Alibaba and JD, or the leading third-party logistics companies “Three Links and One Express”, SF Express, and EMS, they all face fierce competition from each other [3]. With the rapid growth of Chinese express delivery industry in recent years, express service companies have differentiated in terms of business volume, market share, assets, and profitability. Top express delivery companies such as SF Express and JD have built a cost advantage by virtue of economies of scale, some small and medium-sized express delivery companies gradually withdraw from the market, and the market concentration has increased. Therefore, Chinese express logistics industry still maintains the status quo of fragmented market and sufficient competition. No company can monopolize the market, and no logistics company can play the role of logistics center. This kind of market is scattered and competition is relatively sufficient. It meets the requirements of decentralization of block-chain technology [4].

At the same time, the characteristics of decentralization mean that in the smart logistics industry, the identities of all participants are equal, and the information is open and transparent throughout the process, which helps to maintain a fair market environment and reduce information exchange costs. Suppliers, logistics companies and users form a smart logistics transaction system, and the information interaction between each other follows strict rules, which can easily cause information barriers. In the smart logistics system under the block-chain technology, suppliers, customers, logistics supply chains, and government and other third-party supervisory agencies are based on the block-chain information platform to build a complete logistics ecosystem. The information content is completely consistent, and follows the consensus mechanism, the transaction mechanism is transparent and reduces human intervention, it is easier to achieve fair transactions, improve the irregular and loose situation in the logistics market. These help reduce contradictions in the logistics process and establish a good market environment [5].

2.2. Efficient trading mechanism of block-chain technology and smart logistics

Smart logistics is the product of information in the new era. Based on the development of traditional logistics, it integrates a series of modern information technologies such as the Internet, big data, cloud computing, and the Internet of Things. Under the traditional business model, limited by time and space, people's consumption behavior has significant regional characteristics. With the rise of the Internet and e-commerce, people's consumption behavior begins to break through the constraints of time and space. Customers can receive services and products from all over the country or even the world at home. Smart logistics is stimulating people's potential consumption demand, and the scale of Chinese online retail trade has reached a relatively high level in just over ten years.

At the same time, on the basis of e-commerce logistics, the smart logistics that has emerged and developed rapidly in recent years is to meet consumers' consumption needs that break through the constraints of time and space. Judging from the actual situation, in the field of logistics in China, the problem of "the last mile of logistics" is very prominent. At present, only JD Logistics and Cainiao

Alliance can solve this problem well. The main reason is that Chinese smart logistics originated from traditional logistics. The real service characteristics have not been fully brought into play, and more logistics companies are still facing this problem. In the field of cross-border logistics, the efficiency of logistics and the quality assurance of goods are also problems that all logistics companies must solve. Although some companies have carried out overseas warehouses, first shipped and then placed orders, etc., to shorten the global delivery time as much as possible, due to There are still huge gaps between customs and domestic logistics due to various reasons such as the one-month logistics time of long-distance transportation [6].

Introducing block-chain technology to record the information of each subject in the chain ledger in real time and realize real-time sharing can greatly improve transparency and credibility, thereby improving logistics efficiency. Specifically, the first is to realize the combination of block-chain technology and artificial intelligence. Smart warehousing in smart logistics, a large number of radio frequency technologies, voice and video, barcode technologies, etc., enrich the Internet of Things and also realize the positioning, identification, automatic sorting and whole-process supervision of warehousing and distribution goods, especially through Beidou satellite related It can also provide services such as high-precision positioning and navigation for logistics, and then provide support for various logistics activities. The distributed accounting of the block-chain ensures that the storage data will not be tampered with to the greatest extent. Even for consumers of smart logistics, their consumption rationality will be improved with the help of an accurate recommendation system.

Information plays an important role in the entire smart logistics and is the basis for the operation of smart logistics. The higher the level of information, the more the characteristics of smart logistics will be reflected. Combining block-chain with smart logistics, it is necessary to give full play to its features that help ensure the security of logistics information. Whether it is the transparency of the shared ledger in the block-chain, or the non-tamperable nature of information and the ability to access multiple parties, it can help smart logistics to track changes in commodity flows, thereby better ensuring logistics efficiency and coordinating the behavior of various entities Attribute disputes make it possible to improve the level of collaboration in smart logistics.

Traditional logistics is to form a chain-like whole by connecting node enterprises in series, and the introduction of block-chain technology to build a smart logistics system integrating point-chain-network can technically realize the whole from point to chain and then to network, so that all logistics entities can Realize zero-sum game, so as to avoid a series of problems caused by information asymmetry. From series connection to parallel connection, it can not only reduce the opportunity cost of smart logistics entities but also greatly improve transaction efficiency. Especially in the parallel mode, problems such as untimely information sharing and unequal benefit distribution that are easy to occur in the division of labor and cooperation can be easily resolved.

2.3. Block-chain technology and smart logistics transaction process security

With the transition of logistics from traditional logistics to smart logistics, the requirements for logistics security are getting higher and higher, and the security risks are becoming more and more prominent. First of all, in the process of logistics distribution, there is always the risk of loss of goods. From the factory to the consumer, a piece of goods needs to cross multiple regions, go through different entities, and go through multiple links, and safety problems may arise in each link. Especially in the e-commerce environment, the frequency of transactions and the area crossed by the goods are greater than those in the traditional business environment, and the risks will also increase exponentially [7]. The promise of such as 7-day free replacement has brought about a significant increase in the frequency of returns and exchanges, greatly increasing the risk of lost goods. Secondly, the unsound credit reporting system brings moral hazard, and customer information is easily leaked. In the smart logistics environment, there are not only big data generated from cargo information but also big data from customer information. With smart logistics tracking the whole process of goods, criminals can even locate customers according to the flow of goods. Once customer information is leaked, it may cause personal injury to customers, and logistics companies will also face claims. The

frequent online frauds in recent years also reflect the current network environment. It provides an opportunity for customer information leakage. The frequent occurrence of buying and selling express delivery customer information on the Internet is a reminder of the seriousness of this risk. Therefore, there must be a safe smart logistics environment in order to provide guarantee for the development of smart logistics. At the same time, since electronic payment faces greater risks and since the rise of online shopping on the Internet, third-party Internet payment has increasingly become the choice of people. But third-party payment always faces huge risks. Especially with the development of smart logistics in the international market, many countries have not yet formed a mature payment technology and payment environment, and the loopholes in the payment system used are a more realistic problem. Judging from the financial crime cases in recent years, there are more and more international financial hackers attacking the payment system, and it is easy to lose the funds of consumers because the processing of funds payment is out of sync with the original instructions, or because of fraudulent behavior. In some cross-border logistics, similar problems are more prominent. Therefore, the security of the payment environment will affect people's confidence in smart logistics [8].

To realize the combination of block-chain technology and smart logistics, considering that each block is equal, and each block is all the information and data of the system within a specific time, the parallel connection will not destroy security. All the information of the system is included in each block, which can be cross-verified to ensure the authenticity of the information. One is to ensure the safe delivery of logistics through asymmetric encryption. Asymmetric encryption and decryption mechanisms and mature digital signatures can ensure the information security of goods delivery and provide protection for customer privacy. This is due to the fact that the encrypted information in the asymmetric key technology needs another key to be unlocked, and the public key is independent of the key, the public key can be made public, and the key cannot be derived. In this way, neither the logistics company nor the courier can forge the signature of the private key belonging to the customer, which avoids the common phenomenon of the courier signing on behalf of the courier and can also prevent the courier and the courier from losing items and delays by forging signatures. The existence of problems such as delivery ensures the timely, safe and accurate delivery of the express [9]. The second is to ensure data security through a secure database. Under the smart logistics mode, more and more links are withdrawn manually and replaced by information recording and automatic distribution, which can reduce the occurrence of disputes. For some payment links such as payment on behalf of the delivery, it can be completed by automatic payment. Without worrying about the safety of funds. The secure database in the block-chain ensures the authenticity of each transaction information entry between nodes, and this information is not tamperable, anonymous and does not require mutual trust, which can well avoid moral hazards [10]. In the design of logistics decision-making schemes, smart logistics companies can combine the analysis and prediction results given by big data to design the most reasonable delivery route. While customers can track the logistics information throughout the process, they can modify and optimize the transportation information according to changes in their actual situation. In this way, both logistics companies and customers can enjoy the benefits of sharing information in real time under the distributed database. This approach is also more in line with the development direction of smart logistics that can be traced and early warning, and thus better promote the development of smart logistics [11].

3. SF Express practice in the field of block-chain smart logistics

3.1. SF Trace establishes a traceability system in the medical field.

In the traditional traceability system, it is usually impossible to connect all links of the logistics chain, and some key links are missing. Therefore, it is difficult for pharmaceutical companies to fully comply with government regulatory requirements. At the same time, for traditional traceability services, many suppliers will modify bad data for their own benefit, thus making the traceability unreliable. Second, the traceability code is not universal and universal. To this end, SF Express has

created a globally recognized GS1 barcode that supports the Unique Product Identification (UPI). The first point is to comply with national standards. SF Express is committed to helping drug manufacturers and operators to properly fulfill their regulatory obligations. SF Trace ensures the traceability of medicines throughout the process, using automated technology to collect raw material sources, production processes, procurement and sales information from the production line to the hospital. The traceback code is printed in readable plain text. The meaning of each code field can be analyzed according to the GS1 coding rules without relying on any third party to ensure the independence of coding.

3.2. SF Tracking establishes an overseas shopping tracking system that complies with customs regulations

For most Chinese imports, the country of origin has not been reliably verified, and data on complete logistics routes are scarce. SF Express will be able to trace the entire process from overseas merchants to consumers through networking with the customs system. At the same time, the use of block-chain technology allows unique product identification to ensure that each product is strictly regulated by the customs. Use block-chain technology to prevent data from being tampered with, and ensure the authenticity of data through anti-tampering. Join the third-party inspection, and cooperate with CCIC and other third-party quality inspection agencies to conduct on-site verification of the qualifications of foreign manufacturers to make the results more authentic and reliable.

4. Conclusion

The integrated development of block-chain technology and the field of supply chain logistics can improve customer satisfaction with better supply chain logistics services while promoting the intelligent, modern, and integrated development of Chinese logistics field. Taking SF Express as an example, Chinese logistics companies are also constantly innovating to build a better block-chain smart logistics system.

In the construction of China's smart logistics system in the future, blockchain technology should be the mainstay, combined with artificial intelligence, Internet of Things and other technologies to build a smart logistics system that covers the entire territory, is highly intelligent, efficient and safe. At the same time, the blockchain technology is not yet fully mature, and it is easy to cause some problems such as poor system adaptability and high update costs, which also need to be solved after the technology is mature and used in the future.

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