Research on the Three-in-One Model of Agricultural Products E-commerce Logistics under the Combination of Resource Saving and Blockchain Technology

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Abstract. Under the policy of the Belt and Road Initiative, global logistics development has entered a hot state. The policy calls for the state to promote agricultural reform has driven the development of agricultural e-commerce logistics. Building a resource-saving society needs to seize this favorable opportunity and make full use of favorable technologies and information to develop agricultural e-commerce logistics to achieve rapid economic transformation, thereby ensuring the sustainable and healthy development of the agricultural product economy. As a decentralized and de-trusted distributed shared data technology, blockchain itself is a kind of Internet protocol, which is valued by the logistics industry because of its multiple advantages such as cost saving, resource saving and information security. Based on this, the paper starts with the analysis of the relationship between blockchain technology and the sustainable development of resource-conserving society. It points out that there are problems and reasons in the integration of agricultural products e-commerce logistics, and finally put forward reasonable suggestions.

1. Research background
A resource-conserving society refers to a kind of development that meets the needs of the contemporary people while ensuring that future generations need to be satisfied. The connection between sustainable development and a resource-saving society means that while the society makes full use of its own resources to seek current development, it also considers the process of resource consumption and the continued development after depletion. In order to achieve sustainable development, a resource-conserving society must focus on the sustainable development of society and economy; aim at the rational and efficient use of resources; at the same time take into account the protection of the environment; and strive to promote the overall progress of society. If we analyze sustainable development from the perspective of logistics, it is to make today’s commodity production, circulation and consumption not affect the environment and resource conditions for future commodity production, circulation and consumption. From a long-term perspective, the application of logistics information blockchain technology and the goal of sustainable development of resource-saving society are basically the same [1,3].
The sustainable development of resource-conserving societies emphasizes the intensive use of resources. Information is a resource for social development. When it comes to resources, material resources and energy resources, such as land resources, forest resources, water resources, and mineral resources, are first reflected in people's minds. But in addition to physical and energy resources, real resources include information resources. Information resources are of particular importance compared to other resources; information resources are tools by which people can effectively manage other resources. In the logistics activities, the realization of logistics informationization, with the development and utilization of logistics information resources to achieve effective access, effective distribution and effective use of human resources. Therefore, realizing the informatization of logistics and giving play to the important role of logistics information resources can promote the sustainable development of social economy and promote the progress of human society. The blockchain technology is an effective way to realize the informationization of agricultural products e-commerce logistics and the integration of three streams. Logistics informatization provides new vitality for the sustainable development of resource-saving society. Logistics informatization is based on high and new technology. It transforms the traditional logistics industry through high and new technology, realizes the optimization and upgrading of the resource-saving social industrial structure, and enhances the core competitiveness of traditional industries. The introduction of blockchain technology in agricultural products e-commerce logistics has transformed the traditional logistics industry from labor-intensive to capital-intensive and technology-intensive, providing a new impetus for the resource-saving society to change towards sustainable development.

2. Blockchain technology principles and characteristics

2.1. Blockchain principle

Bitcoin is a source code based on point-to-point and decentralized networks. As a low-level technology of bitcoin, blockchain is a new distributed architecture and computational paradigm for encrypting data information transmission and access using cryptography. Innovatively solve the double payment problem and the Byzantine general problem in the Bitcoin system [1]: The double payment problem refers to the use of the digital characteristics of money to complete multiple transactions by paying "the same fund"; the Byzantine general problem refers to the lack of It is difficult to establish a mutual trust consensus mechanism in the case of third-party trusted institutions. Blockchain technology builds a trusted decentralized system through distributed consensus algorithms and digital encryption mechanisms, synchronously completes information transmission and value transfer, reaches consensus and establishes a mutual trust mechanism for distributed nodes. Application of SaaS, PaaS, IaaS and other cloud services and Security Keeper (information security port), integration of intelligent government and think tanks and other information resources to provide a relatively neutral game platform for blockchain members, enhance the transparency of data transmission [2], play the role of government regulation and social supervision functions to achieve the diversity of access to information resources.

2.2. Blockchain Infrastructure Model

The blockchain transforms "digital currency " into " smart contract " and enters blockchain 2.0, adding the advantages of supporting multiple consensus algorithms, easy distributed application programming, and fast transaction speed. The infrastructure mainly consists of four levels: first, the basic awareness data layer, including data blocks, chain structure, time stamp, hash function, Merkel tree and asymmetric encryption; secondly, the virtual awareness network layer. Including P2P network and communication mechanism; again, core awareness consensus layer, supporting multiple consensus algorithms such as PoW, PoS and DPoS; finally, the reality-aware application layer, involving blockchain finance and block supply chain.
2.3. Characteristics of blockchain technology

The characteristics of blockchain technology itself provide technical conditions for its application in the field of agricultural products e-commerce logistics. First of all, it is "high transparency ", and blockchain technology is open to the whole world, that is to say, all partners in the chain Data can be queried through the public port, and all information data is shared, thus determining the high transparency of the entire system and ensuring the openness and reliability of the agricultural product e-commerce logistics system. Secondly, it is "decentralization ". Decentralization is the basic feature of blockchain technology. Each node in the cold chain supply chain is equal [2]. It does not require centralized management institutions, making blockchain technology No need to rely on third parties, independent self-verification, which will improve the efficiency of the entire agricultural e-commerce logistics system and reduce operating costs. Furthermore, "data traceability", a large amount of data is stored in the blockchain system, and the data information recorded in the system can be accessed by all members in the system at any time, which ensures the agricultural product e-commerce logistics system. The preservation of internal historical data can provide more convenient information inquiry services for the government, related enterprises and consumers; finally, it is "encryption ", data can be shared, but the premise is that you are willing to share with it, and the blockchain technology guarantees the sharing of data also ensures the personal rights of members of the supply chain.

3. Study on the Necessity of Introducing Blockchain of Agricultural Products E-commerce Logistics

3.1. High cost of agricultural products logistics

Agricultural product logistics is a centralized functional network structure model driven by core enterprises. Due to the large number of participants involved in the supply chain, the fragmentation of node enterprises, and the poor communication of information, the lack of trust in the supply chain makes it difficult for supply chain members to collaborate. First, the lack of trust leads to the inability of supply chain partners to fully share and interact with information, resulting in information asymmetry, which slows down the efficiency of the entire supply chain. Second, the lack of credit leads to imbalances in supply chain capital flows. Being stretched has caused a tight flow of funds, which has seriously restricted the orderly promotion of supply chain operations and the improvement of overall economic efficiency [4].
3.2. Agricultural products e-commerce logistics inefficiency
In recent years, although China’s agricultural products e-commerce logistics industry has grown rapidly, problems such as low operational efficiency, frequent loss of goods, information leakage, and quality and safety are still outstanding. Overall, the traditional logistics model is weak and the industry is inefficient, resulting in high costs. In order to improve the efficiency of the logistics industry and reduce logistics costs, it is necessary to optimize resource utilization, shorten the e-commerce logistics transaction chain of agricultural products, reduce intermediate links, optimize and upgrade in terms of payment, settlement, contract execution, etc., and achieve a reduction in the cost of agricultural products e-commerce logistics. Only by improving efficiency, logistics companies can survive better, and cost reduction and efficiency are still an eternal topic in the logistics industry.

4. Research on the integration of resource conservation and blockchain agricultural product e-commerce logistics, capital flow and information flow technology

4.1. Analysis of the Three-in-One Mode of Agricultural Products E-commerce Logistics
“Three streams” refers to the deep integration of capital flow, information flow and logistics. (as shown in picture 2). Logistics is the foundation, covering goods warehousing, physical flow and capital payment; capital flow is the blood of economic activities; and information flow is the nerve center of the entire economic activity. The collection and arrangement of information determines the flow direction and flow strategy of materials and funds. The important basis of supply chain finance is the collection and organization of information. The information determines the investment strategy and risk management methods of financial institutions. The development of e-commerce platform has accumulated a large amount of data on transaction process, logistics and capital flow. Logistics has professional experience in supervising transaction movable assets and bills. Therefore, under the supply chain financial model, financial institutions combine large-scale logistics enterprises and e-commerce to form a financing platform, combine original mortgage lending services (such as customer loan) and settlement services to provide movable property for SME clusters. Mortgage, bill pledge or financing services [5].

![Three-stream fusion diagram](image)

**Fig. 2** "Three-stream" fusion diagram

4.2. Realization of Blockchain Technology of Agricultural Products E-commerce Logistics Based on Three-in-One
As shown in Figure 3, the core of the model lies in the "blocky" bank. The bank monitors the movable property and bills with the logistics company, obtains information through cooperation with the Internet e-commerce, discovers and cuts into the customer base, and expands the business space.
Banks dominate the flow of funds, Internet e-commerce dominates the flow of information, and logistics companies dominate the real logistics. A virtual cash pool is set up in the SME cluster to maximize the cash flow among members of the cluster and improve the efficiency of capital use. The increased cash flow required in the industrial cluster is integrated with the "three streams" of the entire enterprise cluster.

![Blockchain technology in the three-in-one operation of agricultural products e-commerce logistics](image)

5. Risk management and control and resource cost savings under the support of 5 blockchain technology

5.1. Risk Control
In the agricultural product e-commerce logistics information ecosystem, each information subject has a clear role boundary and interdependence and transformation. Among them, customers and suppliers play the role of information generators, which is the starting point of information flow, mainly releasing demand information and supply information; customers and upstream suppliers play the role of information users, which is the end of information flow, such as active search. To obtain supply information and demand information; an electronic business transaction platform plays the role of information disseminator, transmits and shares various types of information, is the transmission channel of supply chain logistics information; all information subjects play the role of information decomposers, The role is to organize and decompose the expired, scattered or false information in the supply chain logistics system, create a good environment for the supply chain logistics information ecosystem, and ensure the information ecological balance.

In addition to the information interaction between the subjects, the information subject is always affected by the internal and external environment of the information, especially the communication with the external environment, which makes the supply chain logistics information system face a series of security problems. Considering the decentralization of the blockchain, the blockchain is used as the bottom layer of the supply chain logistics information ecosystem. At the data layer, system nodes are linked into a network structure to form redundant data paths. Even if an attacker blocks part of the data path in the network topology, information can still be transmitted through other data paths. At the network layer, only the authorized node can get the public key of other nodes and sensors, and the attacker without the public key will not be able to decrypt the data information transmitted by the network. In the consensus layer, each sensor has its own private key. Each time data information is distributed to the whole network, a digital signature encrypted with a private key is added at the end of the data packet, which increases the difficulty for the attacker to forge sensor data to spoof other nodes in the network. At the application layer, the personal information of all users in the blockchain system
has absolute privacy and eliminates privacy leaks. It can be seen that the blockchain-based supply chain logistics information ecosystem has the characteristics of anti-aggression, data confidentiality, self-repairing toughness and operational ecology, which can promote the occurrence, formation and stability of the supply chain information ecosystem [5], and even Realize the ecological harmony of supply chain logistics information and control the trading risk of e-commerce logistics.

5.2. Realization of resource cost savings

The sustainable development of resource-saving cities emphasizes improving economic efficiency and reducing logistics costs. The agricultural product e-commerce logistics is to use the blockchain network technology to meet the timeliness and safety requirements of logistics services, and to maximize the seven elements of logistics: transportation, warehousing, packaging, loading and unloading. The information flow, logistics and capital flow related to processing, distribution and information are integrated to solve the "beneficial reversal" phenomenon between the various elements as much as possible, and to meet the needs of the society for logistics as a whole. Through the blockchain technology, the information related to the e-commerce logistics of agricultural products is processed to realize the effective control and management of logistics, and provide strategic and operational decision support for logistics managers and other enterprise managers, and then improve with the help of logistics information system. Logistics operation efficiency and reduce total logistics cost.

The blockchain technology is proposed to meet the needs of resource-saving society to emphasize environmental protection. Protecting the environment and controlling pollution are the common goals of all countries in the world and the goal of sustainable development of resource-saving cities. At present, although China's logistics has promoted economic development, the development of logistics will also have adverse effects on the environment, such as noise of transportation vehicles, pollution emissions, and blockage of traffic, all of which are not related to logistics. There is a great relationship to the realization of Informa ionization. If logistics information is realized, logistics enterprises can use blockchain technology to understand logistics transportation and transportation at any time, avoid blocked road sections, and select roads with smooth roads to operate, which can deliver goods quickly and timely, and reduce the impact on urban areas. Environmental pollution.

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