Research on Blockchain Technology in Promoting Environmental Protection Development of Agricultural Products E-commerce Model in Jilin Province

Hui Zhan*, Xing Lv* and Dan Xu*
School of Economics and Trade, Jilin Engineering Normal University, Changchun 130000, China

*Corresponding author e-mail: 728604791@qq.com, jan2567@aliyun.com, 2364146255@qq.com.

Abstract. With the continuous maturity of its technology and philosophy, the blockchain has officially entered the 3.0 phase, which is characterized by a programmable society. That is, the blockchain will gradually penetrate from the virtual world to all aspects of real life, and the agricultural product e-commerce is now the stage connects real and virtual best opportunities. Blockchain is another wave of information technology revolution after the Internet, mobile Internet, and cloud computing and big data platform. Blockchain technology has decentralized, de-intermediary trust, security and confidentiality functions, which have been applied in banks. Securities, insurance, payment, agricultural products exchange and other fields. Jilin Province is a major province for the production and export of agricultural products. How to promote the development of agricultural products e-commerce in the region towards a more environmentally friendly and energy-saving direction is a problem that scholars in the field should ponder. Based on this, this paper expounds the characteristics and application of blockchain, discusses the application of blockchain technology in the agricultural product e-commerce industry in Jilin Province, and combines the characteristics of C2M mode to give a blockchain decentralization and Design case for trust and security mechanisms.

1. Introduction
In the late 1990s, with the rise of electronic data exchange technology, agriculture developed rapidly, and agricultural products e-commerce officially set sail in China. However, while the e-commerce user groups of agricultural products and agricultural products are facing market expansion, problems such as imperfect support facilities [1], regional development imbalance [2], and unfair trading system have gradually surfaced. In response to these problems, scholars are also actively exploring corresponding solutions. For example, the literature [3] believes that the establishment of a sound platform internal supervision and vending service system can effectively improve the security and fairness of cross-border e-commerce transactions. Literature [4] analyzes the characteristics of China's agricultural product e-commerce development, and proposes a powerful means to expand the scope of network consumption and improve the convenience of network consumption is to support the development of agricultural products e-commerce in the field of agricultural products. Literature [5] suggested applying emerging
technologies such as big data to improve the supporting facilities of agricultural products e-commerce platform to ensure continuity and reliability in operation management. Although the above research proposals can achieve better feedback in the short to medium term, they cannot fundamentally eliminate the problem and eliminate the negative impact. Blockchain technology fits well with the needs of e-commerce transformation of agricultural products. First of all, the blockchain technology and the agricultural product e-commerce market are all decentralized. The intelligent contract characteristics of the blockchain can ensure that the e-commerce users of agricultural products can trade freely anytime and anywhere. Secondly, the e-commerce market of agricultural products needs to be jointly maintained by all users, and the blockchain each block in the technology can achieve efficient collaborative autonomy; again, there is no need for third-party trust mechanisms in the blockchain to satisfy the diversified development of the agricultural product e-commerce market. Based on this, the paper conducts research on the e-commerce model of agricultural products in the agricultural province of Jilin Province, and explores the application of blockchain technology in the environmental protection development of cross-border e-commerce of agricultural products.

2. The characteristics of blockchain technology
The evolution of blockchain technology, from the origin of technology, "blockchain 1.0" to "blockchain 2.0", now the concept of "blockchain 3.0" is also proposed. The evolution of blockchain technology [6] is shown in Figure 1.

2.1. Distributed ledger
The blockchain system avoids the possibility of tampering with the centralization system. At the same time, more than a thousand nodes participate in accounting, data backup is enough, to prevent data loss, and ensure the security of account data [6].

2.2. Encryption and decryption algorithm
The hash algorithm transforms an input of arbitrary length into a fixed-length output, which is a mapping that can be interpreted as a "fingerprint information" for a given piece of data. In the asymmetric encryption algorithm, the public key is public and the private key is held by the individual. Only the public key needs to be exchanged before data transmission, even if the public key is leaked, it does not affect security.

2.3. Consensus mechanism
The consensus mechanism is one of the core components of blockchain technology. The following is a common consensus mechanism for children. The proof of the workload is based on the completion of
mathematical operations. The disadvantage is that it faces the risk of computational attack and needs to wait for the subsequent multiple blocks to be generated before final confirmation. The proof of equity means that the node billing rights are related to the equity held by the node. The share authorization certificate means that the node elects several agent nodes, and the agent node participates in accounting. The disadvantage is the addition of the process of selecting a proxy node. Practical Byzantine fault tolerance, the fault tolerance is controlled within 1/3, as long as the nodes of the system 2/3 are normal, the entire system can be maintained.

2.4. Smart Contract
A smart contract is a digital commitment and agreement. If the burst condition of the state machine is met, the contract is automatically executed according to the preset information.

3. Development of China's agricultural products e-commerce
Agricultural industrialization is an important part of the transformation of the primary industry from tradition to modernity. Agricultural products e-commerce is strongly supported as an important means of agricultural modernization in China. For example, "Taobao Village" has received frequent attention. Under the traditional agricultural product sales and trading mode, agricultural products often adopt passive random sales, no brand and quality identification models. This lack of standardized sales methods not only makes it difficult to obtain reasonable evaluation of high-quality specialty agricultural products, but also makes consumers there is a lack of trust in the safety and reliability of agricultural products. In more cases, traditional agricultural products are limited to small areas within the production area, and customers and markets cannot be actively developed. The production, quality supervision, sales and follow-up services are severely separated, and a complete supply chain cannot be formed. This traditional trading model has caused many difficulties for farmers to increase their income, government quality supervision, consumer procurement, construction of brand value of agricultural products enterprises and even adjustment of the country's agricultural structure.

Based on the current situation of commercial development of traditional agricultural products in Jilin Province, e-commerce of agricultural products as an emerging format provides an unprecedented opportunity to promote the innovative development of agricultural products trading mode. In the future, there is still huge room for development of agricultural informationization in Jilin Province. How to better create conditions to promote the healthy development of agricultural products e-commerce, the government, agricultural products e-commerce platform, enterprises have great articles to do. At present, the third-party agricultural products e-commerce platform is gradually becoming the core driving force for the development of agricultural products e-commerce. Third-party platforms continue to innovate high-quality and low-cost service products, develop customized services for e-commerce needs of rural agricultural products, and help agricultural products e-commerce reduce business. The cost has greatly promoted the rapid development of agricultural products e-commerce in Jilin Province. However, there is still room for further optimization in the third-party platform to improve the transparency of the transaction process, simplify transaction procedures, and reduce intermediary fees and service costs. In 2016, well-known agricultural products e-commerce companies have laid out service system layouts in rural areas. At present, the market has formed a pattern of "two super-multi-strong-minority". The "two supers" refers to the two major agricultural products e-commerce giants represented by Alibaba and Jingdong; "multi-strong" refers to the preference of SF Express. "Xiaozhong" refers to a group of e-commerce platforms with special agricultural products with long-term growth potential, such as Fujiang, Tiantian Orchard and Yiguo. Net and so on. The fresh produce agricultural products in the e-commerce of agricultural products is recognized by the industry as a broad "blue sea" in the field of agricultural products e-commerce. Among them, the "two supers" led by Alibaba and Jingdong occupy the main market of agricultural products e-commerce in Jilin Province, and some e-commerce of growth agricultural products are constantly striving for financing and developing characteristic market segments.
Figure 2 shows the structure of agricultural products in Jilin Province, and Figure 3 shows the business model of agricultural products in Jilin Province.

Figure 2. Structure of agricultural products e-commerce in Jilin Province

Figure 3. Jilin Province Agricultural Products Business Model

4. Construction of C2M Environmental Protection Mode of Agricultural Products E-Commerce in Jilin Province Based on Blockchain Technology

By using the characteristics of decentralization, de-informatization and security and confidentiality of blockchain technology, combined with the e-commerce C2M model for distributors and brand owners, and reducing the advantages of agricultural product cost, this paper designs a blockchain. The process of C2M application. Specifically, the following five steps are included:

Step 1: The producer of the agricultural product uses his private key to sign a digital signature for the previous transaction and the next customer, and attach the signature to the end of the currency to make a transaction order.

Step 2: The agricultural product manufacturer broadcasts the transaction order to the whole network, and the agricultural product is sent to the customer. Each node will receive the transaction information into a block.

Step 3: Each transaction process generates a new block by generating a digital signature, and strives to get a transaction generation order.

Step 4: When an agricultural product transaction is realized, it broadcasts all the time stamped transactions recorded in the block to the entire network, and is checked by other nodes of the whole network.
Step 5: The other nodes of the whole network check the correctness of the accounting of the block. After no error, they will compete for the next block after the legal block, thus forming a blockchain of legal accounting.

Figure 4. Technical structure of agricultural product e-commerce blockchain in Jilin Province

4.1. Circulation system

Through blockchain technology, information on each circulation of agricultural products is distributed to each corresponding block, and any generated information is permanently recorded and cannot be tampered with, thus replacing the traditional detection and tracking system and avoiding circulation. The redundancy and inaccuracy of the link record realizes the automatic automation and digital detection and tracking of the agricultural products from the supplier to the online store and finally to the user. Among them, transaction and logistics are the key to connecting the e-commerce circulation of agricultural products. The e-commerce platform of agricultural products is integrated with the product/cooperation Internet of Things to realize the automatic transmission and block storage of important information.

Applying the mode of blockchain alliance interoperability to the logistics link of the circulation system can ensure the traceability of agricultural products in the logistics process, and at the same time, the accuracy of information in each link can be ensured by updating the logistics distribution materials in real time. And transforming the logistics field through a weakly centralized model can effectively strengthen supervision and improve the efficiency of logistics services. Since key information such as user information, product information, and logistics information are recorded in each block, they cannot be cancelled and falsified, thereby realizing traceability and accuracy of information. In the process of logistics and transportation, it is able to track the position of goods and reduce labor costs, and promote the transformation and upgrading of e-commerce logistics mode.

4.2. Payment System

In the blockchain 2.0 stage, which is characterized by a programmable digital cryptocurrency system, the generation and use of bitcoin has had a major impact on the traditional payment field. Nowadays, the blockchain has developed into the 3.0 stage with the programmable society as the main feature [8]. Its application in the agricultural product e-commerce payment system should also be extended from the simple digital currency payment method to the supporting technology behind Bitcoin. Blockchain
technology. The blockchain-based agricultural product e-commerce payment system can be regarded as a distributed accounting system, and payment information is stored in the system in the form of smart contracts. By combining real-time location technology of the Internet of Things, you can view the progress of the transaction and the corresponding agricultural product information at any time. Since the traditional business transaction system pays more attention to the data itself, the whole payment process takes a long time, and the payment system using the blockchain technology can automatically trigger the delivery of the smart contract effective clause when the designated agricultural product arrives at the destination, so that the payment is made. Mode credibility and efficiency are higher than traditional payment methods. The decentralization of the blockchain technology and the traceability of the Internet of Things technology can be well applied to the cross-border payment settlement scenario, effectively solving the long payment time, high transaction cost and intermediate links caused by cross-border. Redundancy and other issues. At the same time, intelligent contract technology based on automated execution can eliminate cross-border legal risks caused by different laws and regulations of various countries, especially litigation risk and execution risk, and the global characteristics of Bitcoin make it a medium for e-commerce payment in various countries.

Figure 5. Decentralized payment system architecture

4.3. Credit System
The trust system for e-commerce enterprises is mainly used to record and maintain asset data. At present, e-commerce companies generally deal with asset data in two ways: one is to authorize an authority to register all asset data. The trust system has higher cost of establishment, and the risk is more concentrated, which is easy to generate moral hazard. The other is that each participant in the process registers and maintains the asset data on its own, and the competent enterprise regularly reviews and verifies it. The trust system in this way has higher maintenance cost. And the data management process is complex and easy to generate redundancy. In order to minimize the negative impacts of the asset transfer process,
blockchain technology can be used to establish a trust system that is shared, difficult to tamper, and cannot be controlled independently.

5. Conclusion
This paper systematically introduces the characteristics of blockchain technology and its application in e-commerce C2M mode, which is an exploration of the current application theory of blockchain technology. At present, the basic theory and research of blockchain technology are also in the stage of practical exploration. Although there are some applications in the banking, securities, insurance and payment industries, they still face many problems. To solve these problems, researchers need to make constant use of them. Blockchain technology combines business models for innovation.

Acknowledgments
This work was financially supported by School-level scientific research projects of Jilin Engineering Normal University, Project number: XZD201808; Supported by Program for Innovative Research Team of Jilin Engineering Normal University.

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