

Research on Blockchain Application for Compliance Management in Import and Export Trade

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Abstract. In the face of the complex and changing international environment and severe domestic risk challenges, compliance management plays an increasingly important role in import and export trade. The article analyzes the problems of compliance management in import and export trade, and explores the necessity and feasibility of blockchain application in import and export trade based on blockchain technology. The results show that the compliance management based on blockchain technology can improve the efficiency and transparency of import and export trade, reduce the risk of compliance, and provide new ideas and methods for judicial organs to carry out compliance management in import and export trade.

Keywords: Import and export trade; Compliance Management; Blockchain

1 INTRODUCTION

With the advancement of the " Belt and Road " construction, China 's trade with countries along the route has become increasingly close and active. According to the " China Customs Statistics " issued by the General Administration of Customs, in 2018, China 's total import and export value of goods was 23.6 trillion yuan, an increase of 11.4 % over the previous year, and became the world 's largest trader of goods for 10 consecutive years. Affected by the implementation of the ' Trade Facilitation Agreement ' by countries around the world and the global pandemic of the COVID-19 pandemic, China 's foreign trade is facing new opportunities and challenges. The United Nations Global Compact is a framework system that includes various social goals and ethical norms, aiming to promote cooperation and development between business and society on a global scale. This principle holds that there are various levels of risks and uncertainties in business activities, and they are controlled through information communication, business partner selection, contract signing and performance. As part of the Global Compact principles, the United Nations Global Compact recognizes that "enterprises must comply with relevant laws, regulations and guidelines when dealing with cross-border business. ". In recent years, countries around the world have been actively promoting the construction of compliance management systems in order to strengthen their competitiveness in international trade. China also attaches great importance to

compliance management. On January 27, 2022, the State Council issued the "14th Five-Year Plan for Modernization of Market Supervision" to continuously strengthen the supervision of import and export trade and investment, requiring enterprises to establish and improve the compliance management system. Based on the above situation, this paper will focus on the problems of compliance management in the field of import and export trade and the changes brought by the application of blockchain technology in the field of import and export trade.

2 Problems in Compliance Management of China's Import and Export Trade

Owing to the complexity of international trade, the rules established in import and export trade vary from country to country, and therefore the compliance management in import and export trade also varies from country to country. In China, although the construction of the "Belt and Road" has provided new development opportunities for China's import and export trade, it has also put forward higher requirements for China's laws and regulations and international rules.

2.1 Differences in existing laws and regulations on corporate compliance management

With the increasingly close trade between countries, the supervision of import and export trade has become one of the important tasks of governments. China's import and export trade is clearly stipulated in the Customs Law, the Law on Entry and Exit of Animals and Plants and Quarantine, the Product Quality Law, the Law against Unfair Competition, the Anti-Monopoly Law and other laws and regulations, but due to the differences in the legislation of various countries, the implementation of these laws and regulations will produce different effects. For example, in the export of commodities import and export trade, countries mainly rely on the Anti-Unfair Competition Law to regulate the commodities, but in the import trade, it is mainly based on the Customs Law and the Product Quality Law, and so on. Therefore, when formulating relevant laws and regulations, the Chinese Government needs to take into account the legislative situation of each country and make adjustments and improvements in the light of the actual situation of enterprises in China.

2.2 Information asymmetry between participants leads to inefficiencies in corporate compliance management

In cross-border transactions, there are many participants involved, the transaction amount is large, the time is long, the process is complex, the participants lack mutual trust, and the information asymmetry between the participants is prominent. Although there have been many discussions on blockchain technology in law, there are no specific legal provisions and precedents on this technology so far. Therefore, there are still many difficulties in practice, which is also a non-negligible factor in the low efficiency of compliance management in import and export trade. It has the characteristics of decentralization, non-tampering, traceability and programmability. Its essence is an information technology, which is mainly used in the fields of digital asset transaction, information security and digital identity authentication.

3 Overview of blockchain technology

The blockchain is a distributed database, in which all nodes are involved in data storage and interaction. Cryptography technology is used to ensure the security of data transmission and access, and the operations in the database are automatically performed through consensus algorithms and smart contracts.

3.1 Digital Asset Trading

Each block in the blockchain has a hash value, which represents information about the block. If the hash values are the same, it is considered as one block. Since the existence of the information is not tamperable, the block can be easily distinguished from other blocks. The data in the entire system is open and transparent, so even if abnormal behavior occurs on some nodes, other nodes can quickly notice and react.

3.2 Information Security

Blockchain has the characteristics of decentralization and non-tampering. It realizes distributed storage and distributed data processing through cryptography technology, which can effectively prevent information from being tampered with and attacked.

Specifically, all nodes participating in the network operation jointly maintain a distributed database, and only one key bits in the database is used to record data information and operation records, and other participating nodes cannot modify the data content and operation records in this database. Granovetter believes that trust can be used as a social control mechanism. [1]Through this social control network, the state can manage society, thereby reducing management costs. The decentralized network is like a credit node in the ' mesh '. It can replace the traditional high-cost control center, reduce the overall transaction cost of the society. Blockchain technology makes the transaction process more transparent, and the precise storage and trading platform on which the smart contract is based. It can not only allow physical property to trade safely directly on the blockchain, but also allow the Smart Contract to interact with the real world across the network.

3.3 Traceability

The use of cryptography in the blockchain ensures that data information and operation records can be traced back to the original data records without being tampered with and deleted. Data information and operation records on the blockchain form an unforgeable and irrevocable distributed ledger through cryptography technology, thereby achieving traceability.

3.4 Regulateability

The Smart Contract is also supervisory. When the number of nodes involved in the system reaches a certain number, it will trigger the corresponding trigger conditions and automatically perform the corresponding operations. Any node participating in the system operation can realize real-time supervision and management of data information and operation records in the

database through the smart contract to ensure that the data information and operation records will not be tampered with or deleted.

4 The Necessity of Blockchain Application for Compliance Management in Impt and Expt Trade

From the perspective of compliance management, blockchain technology can break the data closure of a single node through the participation of multiple nodes, realize the complete storage and sharing of data, and solve the problems of opaque data sharing, information asymmetry, and high transaction costs.

The application of blockchain technology in the field of international trade mainly focuses on the field of cross-border payment. The payment and settlement of international trade is characterized by large single transaction amount, multiple transaction subjects, high transaction frequency, etc. Blockchain technology can automatically settle cross-border payments through smart contracts and other means, and solve the problem of delayed arrival of funds at a very low cost. In addition, blockchain technology can also effectively solve the problems of time cost, logistics cost and credit cost in traditional international trade. [2]Based on the above advantages, blockchain technology can play a great role in import and export trade and provide new ideas and methods for enterprise compliance management.

5 Design and Implementation of Compliance Management Platform Based on Blockchain Technology

The compliance management platform based on blockchain technology mainly includes five modules: identity authentication, data storage, information sharing, business management and smart contract. Among them, identity authentication refers to the user registration and identity confirmation by the platform.; data storage refers to the platform to store the data generated by the user and encrypt the user information; information sharing refers to the sharing of internal information about the enterprise to the relevant enterprise or other external institutions ; business management refers to the supervision and audit of the involved enterprises, and the results are fed back to the enterprises ; smart contract refers to the smart contract used to record and perform related operations. [3]The compliance management platform based on blockchain technology is developed using Java language and uses Ether as the underlying protocol, and its main flow is shown in **Figure 1**.

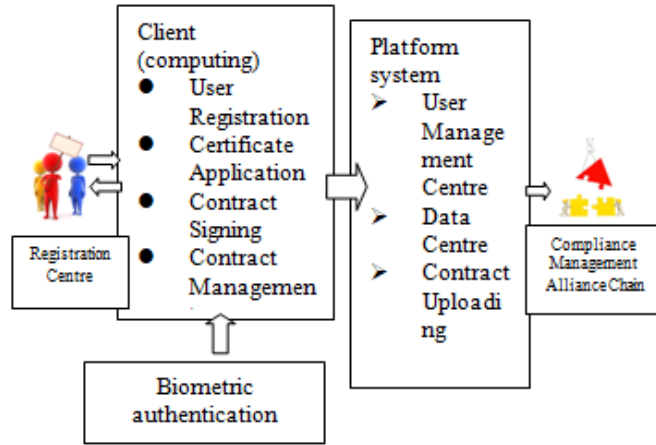


Fig.1. Compliance management platform process based on

Firstly, the user registers account and provides relevant personal information. Secondly, the user ID is entered in the identity authentication module and the identity verification is completed in the Smart Contract. Thirdly, the verified user information is stored in the database. Fourthly, different business function modules are invoked according to the business requirements in different scenarios. And the last step, the involved enterprises are regulated and audited. Its main process is shown in **Figure 2**.

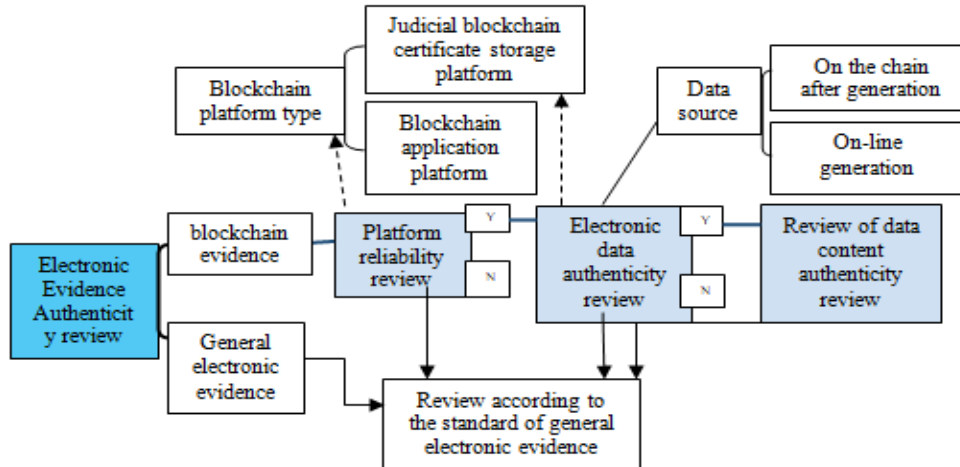


Fig.2. Electronic evidence audit process

Therefore, on the compliance management platform built up by blockchain, the whole process management and monitoring of the information flow are carried out in real time, including warehousing, transportation, customs clearance, settlement, insurance, tariff and other links, as well as the key data such as category, quantity, value, weight and form generated by the accompanying documents in each link, so as to realize the whole process of real and efficient

transaction. [4]These links organically constitute the compliance supervision of the whole process of import and export.

6 Feasibility Analysis of Impt and Expt Trade Compliance Management Based on Blockchain Platforms

A compliance management platform built using blockchain technology enables comprehensive monitoring and management of the roles of the companies involved, the regulators and the supervisory authorities. Compliance management based on the blockchain platform includes the following:

6.1 Establishing a robust compliance management system on the platform.

Relevant laws, regulations and policy documents can be written into the blockchain platform and modified and updated according to their requirements. [5]In this process, neither the laws and regulations will be tampered with, nor the policy documents will be changed, which effectively guarantees the authenticity and integrity of the laws and regulations and policy documents.

6.2 Monitoring and recording of the entire process of impt and expt trade

It is required that every subject related to import and export trade needs to fill out relevant forms and upload relevant materials in the process of import and export trade. The blockchain system encrypts all data and stores them in a distributed database. When there is a violation, the violation and its results can be recorded in the blockchain system by technical means.

6.3 Realisation of information sharing and transmission in the whole process of impt and expt trade

For example, relevant subjects need to upload documents such as licenses, documents and customs declarations related to import and export trade to the platform; the customs department can supervise and manage the whole process of import and export trade through this platform. The Market Supervision and Administration Bureau can effectively supervise through this platform.

6.4 Realisation of the interface between the compliance management system and the enterprise ERP system

Compliance management based on blockchain technology requires enterprises to upload relevant compliance materials to the blockchain system for storage and management ; the enterprise ERP system can store and process the relevant data through the platform ; the customs department can extract and statistically analyze the relevant data through the platform ; the Market Supervision and Administration Bureau can effectively supervise the import and export commodities through this platform.

7 Conclusions and recommendations

In import and export trade, the importance of compliance management has been paid more and more attention. The guidelines for compliance supervision of blockchain platforms should be flexible and tolerant standards and comprehensive and dynamic considerations to promote the deep integration of rule of law supervision and science and technology supervision. In addition, it is suggested that the administrative supervision department should integrate relevant resources, monitor, mine and analyze the blockchain data, form a blockchain information database, establish an online comparison and sharing mechanism between departments, and build a collaborative governance mechanism for blockchain anti-monopoly supervision.

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