Research on Credit System Construction of Guangdong-Hong Kong-Macao Greater Bay Area Based on Blockchain Technology

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Abstract. The establishment of credit system based on blockchain technology in Guangdong-Hong Kong-Macao Greater Bay Area (GHMGBA) is a modern and new digital co-governance credit model under the mode of social co-governance. Under the impact of global fintech innovation, the economic and social development needs to establish a new co-governance credit model to replace the traditional indirect credit model. In this paper, distributed security authentication technology, artificial intelligence technology, security of cloud storage technology and big data processing technology are effectively combined with blockchain technology, to establish a distributed and co-governance credit system, and to realize the credit records, credit investigation, credit collection, credit evaluation, and to realize automation and intelligent of the whole management of credit system, to realize the advantages of high distribution, high availability, tamper-proof, verifiability, high scalability, openness and sharability of credit information, to provide innovation and development paths for green, inclusive and intelligent financial services.

Introduction

The credit system construction of Guangdong-Hong Kong-Macao Greater Bay Area (GHMGBA) based on blockchain technology is the cornerstone of the economic integration and social integration development strategy of GHMGBA.

Using of artificial intelligence technology, cloud computing, big data, establish a distributed and co-governance credit system based on blockchain in GHMGBA to realize the credit records, credit investigation, credit collection, credit evaluation, and to realize automation and intelligent of the whole management of credit system for the government, financial service enterprise and individuals. Blockchain technology is the basic technical framework for reshaping the global credit system and a powerful engine for facilitating international financial services and product innovation. It can greatly improve the operational efficiency of the financial service system and reshape the modern credit transfer and exchange mechanism \cite{1,2}.

Blockchain is the underlying security service platform providing data trust mechanism and access control mechanism in the cloud environment. Therefore, blockchain technology has the potential to change the infrastructure of Internet credit system. Blockchain technology can build an autonomous trust system without credit intermediaries and authoritative central institutions. The credit system based on blockchain technology has many advantages, such as high operation efficiency and high credibility. It will have a broad application prospect in building the credit system of GHMGBA and digital inclusive credit field, and will certainly drive the innovation and development of credit industry \cite{3,4}.
From the perspective of the world economic layout, economic globalization and regional economic integration have become the inevitable trend of modern economic development, and the development strategy of regional economic integration has become an important strategic orientation of major countries in the construction of the world economic order. The future economic competition is not only the competition between countries and cities, but also the competition between regional economy and regional economy [5,6].

From the perspective of China's regional economic layout, the most competitive and potential region to take the lead in becoming a world-class new economic region is the GHMGBA. Therefore, the construction of the credit system of the GHMGBA based on the blockchain technology can accelerate the economic integration construction of the GHMGBA, form a world-class free economic and trade zone, and realize the rapid agglomeration and development of economy. Blockchain technology is a distributed data security and service technology integrating information security, artificial intelligence, distributed cloud storage and big data analysis. Blockchain technology can be applied in many fields such as electronic currency, international settlement, equity transaction, insurance service, digital copyright, fintech and electronic payment.

For fraud risk, credit risk, market risk and the center institutions risk of traditional market, the future innovation and the development direction of credit system based on blockchain in GHMGBA is blockchain technology combined with distributed security authentication technology, artificial intelligence technology and security cloud storage technology efficiently.

**Basic Model and Component Technology of Blockchain System**

The distributed storage of the blockchain can realize the tamper-proof and traceability of the data on chain, and the trusted network constructed by the blockchain intelligent contract technology can realize the automation and intelligent circulation of digital assets in multiple scenarios. The basic model of the blockchain is mainly composed of a data layer, a network layer, a consensus layer, an incentive layer, a contract layer, and an application layer, as shown in Figure 1.

**Advantages of Applying Blockchain in Credit System**

The advantages of blockchain technology lie in the optimization of the business process of credit investigation system, the reduction of operating costs and the improvement of collaborative
Blockchain technology is mainly applied to the financial services, supply chain management, culture and entertainment, intellectual property, intelligent manufacturing, social public welfare, culture and education and other fields that need the support of credit system. Especially in the field of financial services, blockchain technology is widely used in supply chain finance, trade finance (letter of credit, guarantee, forfaiting, factoring, and bill), credit investigation, transaction clearing, point sharing, insurance, securities and other financial scenarios.

The integration of the credit system, inclusive credit investigation and blockchain technology can innovate the business model, service scenarios and business processes of international financial services, and thus cause the innovation and great change of international financial products, financial services, financial markets, financial institutions and financial formats. Therefore, the credit service system based on blockchain technology can be applied to digital currency, cross-border payment and settlement, supply chain finance, securities issuance and transaction, customer credit investigation and other fields. At the same time, the credit service system based on blockchain technology can store the transaction data of various digital financial assets, such as stocks, options, bonds, bills and funds, into the distributed cloud ledger based on blockchain, and automatically complete the storage of transaction data and transfer of financial assets on the blockchain.

Credit service system based on the technology of blockchain using the public key encryption and authentication technology to realize data tamper-proof and traceability, do not need to financial intermediation and credit investigation, any trading entity can be quickly through blockchain security authentication, credit assessment and security trading, significantly improve the efficiency of financial services, reduce the cost of the business process, to provide innovation and development paths for green, inclusive and intelligent financial services.

The distributed storage of blockchain can realize the tamper-proof and traceability of the data on the chain. The constructed trusted network can realize the automation and intellectualization of credit investigation under multiple scenarios by using the smart contract technology of blockchain. The credit investigation system based on blockchain technology has high availability, high reliability and high autonomy.

The traditional credit investigation mode is a centralized authoritative credit investigation institution relying on a large number of financial intermediary institutions to collect, process and release personal and enterprise credit information. The credit investigation system has high maintenance cost, long transmission chain, slow information update and high data conflict rate. Centralized authority agency failure or attack is easy to form online credit services business center bottlenecks, centralized business processing mode has low efficiency, high cost and poor safety, defects such as center bottlenecks, and traditional credit model is difficult to cover hundreds of millions of inclusive users, to protect the privacy of data of individuals and businesses and so on.

**Application of Blockchain in Credit System Construction of GHMGBA**

The establishment of a credit system based on blockchain technology in the GHMGBA can guarantee the security of credit data and prevent the leakage of credit privacy and tampering of credit data. Credit system based on blockchain using public key encryption and authentication technology store data of the authority agency or the credit center in a distributed books on blockchain, personal and corporate credit performance, such as default record data will be completely stored in the blockchain, constitute a tamper-proof data chain. Using public key encryption technology and identity authentication technology, all data blocks on the blockchain are anti-attack, verifiable, tamper-proof, traceable and highly redundant. Attackers cannot destroy all credit information storage devices, and tamper and delete credit information of any entity.

The establishment of a credit system based on blockchain in the GHMGBA can shorten the credit investigation business chain and improve the credit investigation efficiency. The traditional credit investigation mode is that the credit investigation branch injects the credit information of individuals and enterprises into the credit investigation database, and then regularly uploads and updates it to the
data center of the credit investigation center. The credit inquiry personnel can download the credit investigation report or credit rating report through the credit investigation data center. The whole process of uploading, summarizing and downloading in the traditional credit investigation mode is time-consuming and laborious, and the probability of data conflicts is relatively high. The credit system based on the blockchain established in the GHMGBA can automatically record the credit information of individuals and enterprises by using cryptography, consensus mechanism and intelligent contract technology, which can be stored on the customer credit information blockchain and realize real-time collection, real-time upload, real-time query and real-time update. Credit system based on blockchain can upload, process and query credit information anytime and anywhere through the distributed and decentralized characteristics of blockchain, which can effectively shorten the whole credit business chain, reduce the time delay of information generation and improve the execution efficiency of the credit system.

The establishment of credit system based on blockchain in GHMGBA can reduce the risk of credit default and optimize the credit environment. Automation and intelligence of international trade, financial transactions and bookkeeping system based on blockchain can be achieved credit service without the third party certification, using a digital signature and authentication technology authenticate all transaction data and financial assets. And blockchain can implement mortgage, freeze, hosting, guarantees, executing and unlock, greatly reduce the credit dispute and default risk of loss. Credit system based on blockchain may realize borrowing safely and efficiently, using cryptography, consensus mechanism, intelligent contract both sides can convenient accessibility to build mutual trust chain and efficiently complete the money lending, set up green and inclusive social credit environment, the systematic credit risk to a minimum.

To establish credit system based on blockchain can eliminate centralized Internet giant monopoly on personal credit information, change the centralized, isolated, exclusive and unshared the situation, because the Internet giant is now can be according to the records of consumption and social networking through using the large data analysis and data mining technology to network users credit evaluation data.

The establishment of credit system based on blockchain in GHMGBA can use public key encryption technology and authentication technology to realize the sharing, co-governance and co-construction of credit resources on the blockchain, and build a green and inclusive credit system covering all individuals and enterprises. Through establishing the credit system based on blockchain to solve the moral risk and credit risk, the credit information and authentication information can be add to data block on chain, and build a global high credible credit network for international trade and financial service.

The establishment of a credit system based on blockchain in the GHMGBA can achieve the advantages of high distribution, high availability, tamper-proof, verifiability, high expansibility, openness and shareability of credit information. The establishment of trust relationship does not need the help of centralized intermediary agencies or authoritative centers. To establish credit system based on blockchain can achieve inclusive and share social credit system, build a trans-regional, cross-industry credit blockchain, promoting the construction of credit system in China, from the viewpoint of function, credit system based on blockchain can be applied to medicine and health care, labor employment, education, scientific research, intellectual property, environmental protection and energy saving, Internet applications and services, and many other fields.

The establishment of credit system based on blockchain in GHMGBA is a modern new digital co-governance credit model adapted to the social co-governance model. Under the impact of global financial technology innovation, economic and social development needs to establish a new co-governance credit model to replace the traditional indirect credit model.

The co-governance mode of the credit system based on blockchain in the GHMGBA is a comprehensive financial innovation dominated by financial technologies such as artificial intelligence, cloud computing and big data, realizing information sharing, clustering and standardized application.
Financial technologies such as artificial intelligence, blockchain, cloud computing and big data are used to realize credit data sharing, to standardize and normalize the credit investigation system of Banks and the third-party credit investigation system, and to realize the automation and intelligence of credit collection, evaluation and circulation system covering the whole network.

**Conclusion**

The blockchain technology studied in this paper is the basic technical framework to reshape the global credit system and the cornerstone to realize the economic integration and social integration development strategy of GHMGBA.

The establishment of a credit system based on blockchain in GHMGBA can guarantee the security of credit investigation data, prevent the leakage of credit investigation privacy and the tampering of credit investigation data; it can shorten the chain of credit investigation and improve the efficiency of credit investigation; It can reduce the risk of credit default and optimize the credit environment; it can realize the standardization and normalization of the bank's credit investigation system and the third-party credit investigation system; it can realize credit resource sharing, co-governance and co-construction on blockchain.

In GHMGBA to establish the credit system based on blockchain can realize high distribution, high availability and tamper-proof, verifiability, high scalability, openness and sharability of credit information, can be applied to financial services, supply chain management, culture, entertainment, intellectual property rights, intelligent manufacturing, social, and cultural education, etc.

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