Accounting and Corporate Management (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/acccm.2025.070217
ISSN 2523-5788 Vol. 7 Num. 2

# *Research on the Application of Blockchain Technology in Accounting Information Storage and Sharing*

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***Keywords:*** Blockchain Technology; Accounting Information; Storage; Sharing

***Abstract:*** In recent years, the rapid growth of the digital economy has driven the widespread application of blockchain technology in the field of accounting information storage and sharing. This article analyzes in depth the application examples of blockchain technology in the accounting field based on its characteristics of decentralization, immutability, security, transparency, and automation. Corresponding strategies are proposed to address challenges such as insufficient technological maturity, inconsistent regulatory policies, and high energy consumption.

## 1. Introduction

In 2008, Satoshi Nakamoto first proposed the concept of blockchain, and since then the technology has been rapidly developing in several fields with unique advantages as an important part of the digital economy[1]. However, the application of this technology in the field of accounting is still in its infancy and faces many challenges. Therefore, this paper hopes to analyze the current situation and challenges of the application of this technology in accounting information storage and sharing, and propose targeted strategies to provide useful reference for its application in accounting information storage and sharing.

## 2. Dverview of blockchain technology

### 2.1. Definition of blockchain technology

In 2008, Satoshi Nakamoto explicitly stated in his article "Bitcoin: A Peer to Peer Electronic Cash System" that blockchain is a series of interconnected data blocks generated using cryptographic methods, and its essence is a decentralized distributed ledger database[2].Specifically, blockchain has a public ledger for all accounts to use, and each node can share this set of information and maintain it[3]. When information is transmitted between any two nodes, all other nodes can verify the authenticity and feasibility of the transaction, update the information in a timely manner, and obtain a new ledger. The blockchain gradually forms a distributed ledger that

stores ultra large capacity information through continuous repeated transactions[4]. With core advantages such as decentralized storage, automatic execution of smart contracts, and data transparency, it has broad application prospects in the storage and sharing of accounting information.

### 2.2. Characteristics of blockchain technology

Firstly, decentralization. Given that traditional systems adopt a centralized structure, resulting in data storage and processing being centralized on a central server or institution, while blockchain networks are a decentralized form jointly maintained by multiple nodes, without a single control node, making the system less susceptible to single point failures. Additionally, due to its open nature, anyone can grasp all information in the system, thereby strengthening trust awareness of the system and achieving decentralization.

Second, non-tamperability. When storing information in the blockchain system, the chain structure is used to record the relevant records in thousands of nodes with equal status, and relying on the consensus algorithm to keep the information consistent, each node can store the information separately[5]. Once the transaction information to complete the record, it will be forever saved in the blockchain, and then through the encrypted pathway connected to the previous block, if you need to tamper with the information, the attacker must change the data of all the relevant blocks at the same time, which is almost impossible to achieve.

Third, security. Blockchain participant's identity by the encrypted public key and private key common protection, the encryption technology obviously strengthens the security of the transaction, each participant through a unique private key to sign the transaction, and then use the public key to verify that the transaction is legitimate or not, the mechanism to ensure that each user can only access and manipulate their own assets, to prevent unauthorized users from tampering with it.

Fourth, transparency. The entire blockchain system can be seen as a public accounting system, in which all personal data is recorded in this public ledger, and everyone is given the right to jointly manage the ledger data. Each account in the system not only has the permission to view its own account balance details, but also can view the transaction changes of any other account in the network system. This is conducive to building trust, preventing fraud, and making the blockchain network smoother in auditing and supervision.

Fifth, automation. This is mainly achieved through smart contracts, which are programs stored on the blockchain that can be automatically executed. When both parties create a contract, the relevant terms are encoded into the code, and if the preset conditions are met, they will be automatically executed. These contracts can be put into various automated transactions, such as payments, loans, asset swaps, etc., without the need for any intermediaries to intervene, greatly reducing human errors and transaction lag, and driving transaction efficiency growth.

## 3. Application of blockchain technology

### 3.1. Application of blockchain technology in accounting information storage

Blockchain technology, with its distributed ledger and encryption technology, builds a safe and tamper-proof storage environment for accounting information storage, ensuring that once the data is entered into the system, it can't be changed or cleared, thus greatly improving the safety and reliability of accounting information. Blockchain technology replicates data in multiple nodes, achieving the effect of decentralized storage, and even if a node is out of order, the operation of the whole system will not be interfered with, which improves the stability and security of data. Blockchain's transparent and non-tamperable attributes simplify auditing, allowing auditors to

easily track transaction history and increase auditing efficiency.

### 3.2. Application of blockchain technology in accounting information sharing

The application of blockchain technology in accounting information sharing hinges on its capacity to break information silos. By adopting a peer-to-peer communication model, it enhances data transparency and update efficiency among multiple parties. Blockchain makes data at each node openly accessible, enabling participants to share information and quickly grasp all business details.[6]. This mechanism resolves system incompatibility issues and promotes information sharing and communication among accounting staff, enterprises, and banks. Blockchain technology boosts information transparency, enabling seamless information exchange and sharing so that enterprises can access all relevant business data. By leveraging smart contracts, blockchain can automatically execute and validate contract terms, eliminating the need for third - party intermediaries. It sets data access rules and permissions, automates data exchange, and enhances data - sharing efficiency.

## 4. Challenges facing the application of blockchain technology

Despite the obvious advantages of blockchain technology in the field of accounting, it also faces a number of challenges. Lack of technological maturity and inconsistent regulatory policies are all current issues that need to be resolved, in addition, the high energy consumption of blockchain technology has attracted attention in the environmental protection field.

### 4.1. Lack of technological maturity

Blockchain technology is slow at processing data. When dealing with large amounts of stored data and frequent transactions, the current blockchain architecture can't keep up. Taking Bitcoin as an example, its network can only handle about seven transactions per second, which is a far cry from the processing capacity of traditional financial payment systems. Blockchain integrates cryptographic algorithms, peer-to-peer networks, consensus mechanisms, smart contracts and other information technologies, and the overall development of the technologies is not yet mature, resulting in blockchain in the algorithms, protocols and applications may still have loopholes[7].

### 4.2. Inconsistent regulatory policies

Regulatory policies for blockchain and cryptocurrencies vary from country to country around the world, and policy uncertainty increases market risk. In some countries and regions, the use of cryptocurrencies is constrained or prohibited, and the legal validity and compliance of smart contracts are controversial[8]. In addition, the peer-to-peer, anonymous and cross-border nature of blockchain increases the chances of risk transmission globally, making it difficult for a single country to implement regulation.

### 4.3. Higher energy consumption

The current blockchain network relies on the Proof of Work (PoW) mechanism, leading to significant energy consumption, which is contrary to global sustainability goals. The annual power consumption of the global Bitcoin network is comparable to the total electricity consumption of some medium-sized countries, and even exceeds the total electricity consumption of some small countries. With the rapid development of blockchain technology, its applications have been extended to a variety of fields such as finance, supply chain, and Internet of Things, and the issue of

energy consumption behind blockchain has gradually become a global concern.

## 5. Strategies for the Application of Blockchain Technology in Accounting Information Storage and Sharing

In response to the above challenges, this paper proposes the following strategies: first, strengthen technical research and development to improve the maturity and stability of blockchain technology; second, harmonize the regulatory framework to ensure that the application of blockchain technology complies with the legal requirements; and lastly, explore low-energy-consuming blockchain technology to reduce the impact on the environment.

### 5.1. Enhancing technical performance

To address the issue of slow processing speed in blockchain technology, the speed and throughput of transaction processing can be improved. Using sharding technology to divide the network into multiple independently operating parts, in order to enhance the overall effect. At the same time, more efficient consensus mechanisms such as Proof of Stake (PoS) or Delegated Proof of Stake (DPoS) are being adopted, which significantly improve transaction rates and address network congestion issues by reducing computational requirements[9].In addition, to cope with the complicated blockchain technology, we can actively promote the cultivation of complex talents, improve the knowledge of accounting workers on blockchain technology, so as to reduce the error rate in the actual application process[10].

### 5.2. Harmonization of regulatory framework

Given the global differences in regulatory policies for blockchain and cryptocurrency, there is an urgent need to create unified technical and regulatory standards to facilitate interconnectivity between platforms. Cross bank compliance management of smart contracts involves data sharing, risk control, and compliance auditing, which is a key area. It aims to achieve higher levels of data encryption and access control, as well as risk control rules and alarm functions. Enterprises also need to actively comply with regulatory requirements, achieve compliance control of smart contracts, ensure that transactions comply with local regulatory requirements, mitigate market risks, enhance global regulatory consistency, help blockchain technology form a healthy development pattern, and maintain investor interests and financial market stability.

### 5.3. Explore environmentally friendly consensus mechanisms

In order to deal with the high energy consumption problem faced by blockchain, it is very crucial to explore environmentally friendly consensus mechanisms. In view of the low energy consumption of mechanisms such as Proof of Stake (PoS), the research and development of new consensus algorithms, such as sharded consensus, is intended to improve performance while reducing energy consumption, which will drive the blockchain technology in the direction of a more environmentally friendly and sustainable direction.

## 6. Conclusion

Blockchain technology provides innovative solutions for the storage and sharing of accounting information, greatly improving the accuracy, transparency, and processing efficiency of accounting information. This article comprehensively analyzes the application of blockchain technology in

accounting information storage and sharing, and formulates specific strategies for the technical performance, regulatory policies, and high energy consumption challenges it encounters. By strengthening technological research and development innovation, unifying regulatory framework patterns, and exploring environmental consensus mechanisms, it can effectively assist the deep practice of blockchain technology in the accounting field. In the future, as these challenges are gradually overcome, blockchain technology is expected to play a greater role in the accounting field,providing strong technical support for building a more fair and transparent business environment.

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