



Review Paper

The Role of Blockchain Technology in Accounting and Auditing^{1,2}

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1. Introduction

Blockchain technology, as a transformative innovation in various fields, especially in accounting and financial reporting, has high potential for improving transparency, operational efficiency, process security, and the ability to record immutable information. This system, due to its unique features, can help reduce information asymmetry and increase trust in the ecosystem. The aim of this article is to explain the role of blockchain technology in accounting and financial reporting. This article examines the concepts and structure of blockchain and its impact on accounting. The use of smart contracts in accounting and auditing is discussed, and the benefits resulting from the use of blockchain-based financial reporting are highlighted. Blockchain can improve transparency and reduce financial reporting costs, but it also requires initial investments and compliance with legal and regulatory requirements. This article suggests that integrating blockchain with existing systems can lead to significant improvements in accounting and

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auditing. This article clearly shows that blockchain technology can act as a transformative factor in accounting and auditing, helping to create a more transparent and efficient financial ecosystem.

2. THEORETICAL FOUNDATIONS OF THE RESEARCH

Blockchain technology is a decentralized and encrypted security system that enables the development of new digital applications and services using this evolving technology. Blockchain is a distributed database that stores transaction records (blocks) in a time-sequenced and ordered (chain) manner. Each transaction is verified by consensus among participants in the network (nodes), and once confirmed, the transaction is added to the chain and becomes immutable (i.e., it cannot be altered or deleted). Although blockchain is predominantly used for digital and commercial transaction data, this technology can enable the storage of any type of information. What distinguishes blockchain from other ledgers with databases are three main features: first, it does not require an intermediary; second, due to its decentralized nature, payments are not easily manipulable; and third, the information stored in blocks is linked using hashes (i.e., cryptographic units) that create an immutable record (Lereis, 2018). A hash is a digital fingerprint of the data in each block. When a new block is created, it includes the hash of the previous block. If any information in a block is changed, that hash and all subsequent block hashes will change. This makes data manipulation in a blockchain extremely difficult (Dean et al., 2018).

By implementing blockchain in an accounting information system, a secure structure can be created for the accounting system, reducing the likelihood of fraud. The primary reason for this is that all data recorded in a blockchain-based accounting system is reviewed and verified by all workstations in the network based on a set of pre-embedded internal controls (Fazel Bakhsh, 2021). Accounting and auditing can be considered professions that blockchain has the potential to fundamentally transform, bringing both significant benefits and risks. There is a concern that if these professions fail to update and adapt to emerging business trends, the standing of accounting and auditing could be adversely affected (Nasiri et al., 2022).



Figure 1 illustrates the peer-to-peer network of blockchain.

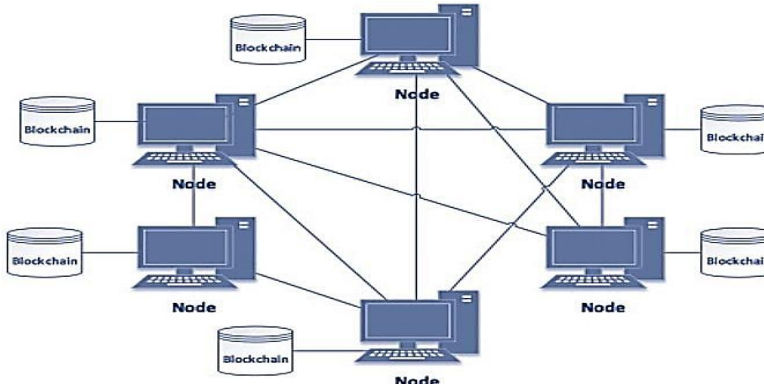


Figure 1. Blockchain Peer-to-Peer Network (P2P) (Albana and Athla, 2021)

Auditing with Smart Contracts

The Sarbanes-Oxley Act of 2002 was enacted in response to a series of high-profile corporate and accounting scandals, such as those involving Enron and WorldCom, to restore public trust in financial markets by enforcing enhanced standards for all corporate boards, executive management, and public accounting firms in the United States (Xia et al., 2014).

These new regulations are designed to promote greater transparency, accountability, and corporate governance in the business world. The Sarbanes-Oxley Act requires that the auditor's opinion on financial statements be accompanied by a detailed report of the auditor's findings. These measures promote the role of auditing as a third-party control mechanism and can serve as tools to reduce fraud and errors in corporate disclosures. However, these measures do not guarantee the prevention or detection of all fraud and errors (Jaouhari et al., 2023).

Typically, companies do not disclose the accounting processes used to prepare reports and only provide standard financial statements to external users. By doing so, companies can keep their information confidential; however, this practice comes with several drawbacks. One issue is that whether a company uses a paper-based or electronic ledger, there is a risk of manipulation and damage to transactions. Another concern is that controlling managers or



shareholders may create fake accounts and manipulate accounts for personal gain. As a result, identifying problems with potential anomalies for external stakeholders, including investors and regulatory bodies, has become increasingly difficult due to the complexity of traditional accounting processes. The introduction of blockchain technology can reduce errors in accounting. Additionally, blockchain technology can be used to create a digital ledger system that tracks all transactions conducted on a specific network. This has the potential to revolutionize the way financial statements are prepared, as all transaction data will be easily accessible and up-to-date. Blockchain-based systems provide greater transparency because they are resistant to manipulation due to stringent security protocols: the use of blockchain in financial accounting ensures that once recorded on a public blockchain, thousands of backup copies will be available, and all transactions will be transparent to all network members (Kaiyo, 2011; Yeriyak, 2017).

Challenges and Opportunities of Smart Auditing

One issue is that current blockchain technology cannot manage the vast amounts of accounting data of a company, and implementing blockchain requires significant financial investment. Another concern is the unauthorized access and use of information due to the transparent nature of the technical framework, which could lead to significant losses for companies that need to protect trade secrets (Sernia et al., 2022).

The use of smart contracts also automates many tasks currently performed manually, such as issuing invoices and payments, leading to reduced time and processing costs. Additionally, auditing processes can become more automated and efficient through the use of smart contracts that verify transactions against pre-set conditions before execution. The technical features of blockchain, such as enhanced transparency, easy traceability, and resistance to manipulation, offer an attractive solution for companies seeking to reduce the information gap between themselves and their investors. By using blockchain in the short term, businesses can selectively disclose profitability information that is not legally required, such as revenue forecasts and corporate social responsibility initiatives. This proactive sharing of information allows investors to make better



decisions and gain a deeper understanding of the organization in question (Sernia et al., 2022).

Given that financial reporting in all fields is created by specialized and experienced individuals, the proper use of this language will reduce the time required to prepare information for financial reporting. In this language, since the primary work is done by machines and performed using artificial intelligence, it is largely free from human errors and mistakes during the process, thereby increasing the reliability and accuracy of the information (Amini Mehr and Nabavi Nejad, 2017). The use of blockchain technology in the field of accounting and auditing, in turn, brings benefits such as improved efficiency, accuracy, and transparency of financial reports, which increases user trust in the reports. Additionally, reliance on intermediaries is reduced, and security is enhanced due to the immutability of the ledgers. The implementation of blockchain technology can significantly reduce or even eliminate fraudulent activities, as every transaction is recorded and visible to all network participants. This leads to cost savings for organizations, as there is no longer a need for expensive audits to detect and investigate fraud (Bermak, 2017).

By carefully evaluating the advantages and disadvantages of such integrations, businesses can make informed decisions about the information they wish to share. In this process, they not only demonstrate their commitment to transparency and ethical practices but also foster stronger relationships with investors, who value additional insights into the company's operations and financial status. Considering cost savings, the use of blockchain can lead to reduced costs for auditors and accountants, as their services may not be regularly required if records are maintained on a secure and immutable ledger. The time required to prepare financial statements can also be significantly reduced due to automation (Kai, 2021). Additionally, companies should share common content, including social responsibility reports, profit forecasts, and short-term initiatives, on the blockchain. The frequency of disclosure should be determined by the company's discretion, and companies that wish to make a positive impact on the market will be motivated to disclose non-confidential information in a timely manner (Chardehri et al., 2023).



3. CONCLUSION

Blockchain-based financial reporting systems represent a significant step toward innovation in financial reporting and liquidity management. The implementation and proof of concept of blockchain demonstrate its potential and effectiveness in improving transparency, accountability, and operational efficiency in the financial ecosystem. However, there are still many gaps to be addressed before the full potential of blockchain-based financial reporting systems can be realized, and the challenges encountered during development must be resolved. Blockchain-based financial reporting systems have the potential to be applied to a wide range of use cases beyond traditional financial reporting and liquidity management. Future research could explore the application of blockchain-based financial systems in areas such as supply chain financing, trade financing, and cross-border payments. By leveraging the transparency, immutability, and efficiency of blockchain technology, financial reporting systems can simplify and automate many complex and time-consuming processes, thereby reducing costs and improving overall efficiency.

Ultimately, research analysis suggests that the accounting and auditing professions could greatly benefit from blockchain technology, and the current paradigm of this field may largely shift to the role and impact of this emerging technology. Although accounting research has primarily focused on the application of blockchain in accounting and auditing, the discussion of blockchain can be expanded beyond its current focus to include further research on the impact of blockchain technology in other areas such as corporate governance, stock markets, and taxation. Based on the findings of this research, it is recommended that more studies be conducted to evaluate and review the existing literature in the field of accounting and auditing more precisely, and it is also suggested that similar research be conducted on the impact of other emerging technologies such as artificial intelligence and cloud technology on accounting. Given the changes that blockchain technology will bring to the accounting and auditing professions, there is a need for a different approach to establishing educational and professional platforms in the country.



One area for future research is the examination of the economic and regulatory implications of implementing blockchain-based financial reporting systems in various domains. This adoption could lead to significant economic benefits, such as increased transparency, reduced fraud, and improved efficiency in financial reporting and liquidity management. However, it also presents numerous challenges and regulatory considerations. From an economic perspective, the adoption of blockchain-based financial reporting systems may require significant initial investment in infrastructure, training, and integration with existing systems. The benefits of implementing blockchain-based financial reporting systems may vary across different domains and be influenced by factors such as the size of the economy, the complexity of financial markets, and the level of technological readiness.

Another area for future research is the optimization of scalability and performance of blockchain-based financial reporting systems. While current implementations have demonstrated the ability to process financial transactions in real-time, further research is needed to ensure that the system can manage high transaction volumes produced by the financial system. Scalability is a critical aspect of blockchain-based financial reporting systems that requires further investigation, as it faces challenges such as processing complex smart contracts, synchronizing large datasets, and efficient network management. Another important direction for future research is the integration of blockchain-based financial reporting systems with existing financial infrastructure and systems, ensuring compatibility with a wide range of data usage opportunities in the financial industry.

Keywords: Technology, Blockchain, Accounting

JEL classification: M15, M40, M41.

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