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# IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY ON ACCOUNTING INFORMATION SYSTEM FOR TRANSACTION SECURITY AND DATA RELIABILITY

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Abstract: This research discusses the impact of blockchain technology on accounting information systems, with a focus on transaction security and data reliability. Blockchain, as an innovation in the digital world, promises significant improvements in security, transparency, and decentralization. Despite offering potential benefits, implementation of blockchain in accounting information systems is still limited, with challenges involving high costs, lack of regulations, and data security concerns. In Indonesia, limited resources and digital literacy are key factors in overcoming these limitations. This research uses a qualitative descriptive approach because it aims to gain a deeper understanding. The qualitative approach allows researchers to analyze data, understand contexts, and formulate meaning from the information found. Data sources in this study were obtained from primary sources such as interviews and secondary data obtained from document studies. Interviews were conducted with participants knowledgeable about implementing blockchain in accounting information systems. The data collection process identified that blockchain can improve transaction security and data reliability in accounting information systems. However, scalability and integration with existing infrastructure pose challenges. Digital literacy awareness and infrastructure preparedness are identified as key factors for the successful implementation of blockchain technology in the accounting context. This research is expected to provide insights and recommendations for the development of blockchain technology and accounting information systems in the future. The implications of this research are that by implementing blockchain technology in accounting information systems, it can improve the quality of accounting information in companies and increase the long-term value of the company.

**Keywords:** Blockchain, Accounting Information Systems, Security, Data Reliability

## INTRODUCTION

In an organization, information systems play a highly significant role in ensuring the quality of provided information and supporting decision-making processes based on that data. With the rapid development of computer and information technology, the need for information systems is increasing. Accounting information systems are supported by necessary information technology programs to manage current business situations. The quality of accounting information depends on the integrity of the accounting information system related to the business domain (Alkafaji et al., 2023). The application of information technology in business units can determine the quality of the accounting information system used for accounting purposes. Qatawneh (2021) explains that accounting information systems can transform business data sources into information or data used for appropriate decision-making, enabling an organization to meet legal



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obligations as required.

In the advancing digital era, blockchain technology emerges as an innovation in information technology, transforming the digital landscape in unprecedented ways. With its capabilities in providing security, transparency, and decentralization, blockchain creates a strong foundation for significant transformations across various fields. Blockchain is a continuous chain of blocks that store user records in a distributed manner, and these records are secured with cryptography. These blocks are interconnected, distributing the entire information among them (Kumar & Sharma, 2022). In technological development, blockchain not only plays a role in recording transactions but also extends into various sectors such as economics, law, politics, business, social, and scientific fields. In the economic sector, blockchain brings innovations such as decentralized payment and exchange transactions, token trading, smart contracts, and digital assets (Sutrisno, 2018).

The use of blockchain technology in accounting information systems has been an intriguing breakthrough in recent years. Blockchain technology in accounting information systems has significant potential to enhance security, transparency, and efficiency (HM & Junianti, 2023). The implementation of blockchain technology in information security systems provides a reliable and robust solution to maintain the integrity and confidentiality of information or data. The decentralized nature of blockchain technology makes it difficult to be modified or tampered with by unauthorized parties, thus enhancing better security for users (Elan Maulani et al., 2023).

Blockchain technology offers various advantages, particularly in terms of security. It can be a powerful combination of security, transparency, and operational control by providing reliable data synchronization and protecting it from external disruptions (ALSaqa et al., 2019). Using the Zero-Knowledge Proof method, (Wang & Kogan, 2018) proposed the application of blockchain in accounting and auditing, ensuring confidentiality with a blockchain-based transaction processing system. Through the transfer process, data is recorded as blocks, and each new block has an encrypted copy of the previous block. These blocks are then equipped with authenticated signatures to create a chain of actions or transactions, distributed and tamper-resistant. Blockchain creates genuine information that is almost impossible to forge or delete, hiding any activity (ALSaqa et al., 2019).

In the context of data reliability, blockchain provides an innovative solution as information or data is stored in interconnected and encrypted blocks. There are advantages to using blockchain technology to record transactions in real-time. Data is permanently recorded with a timestamp, preventing it from being altered afterward, thus ensuring the reliability of the current accounting information system (Alles, 2018). Additionally, the use of blockchain means that anyone can review all transactions, even those that may be suspicious or related to conflicts of interest. Irreversible transactions also mean accountants cannot reverse the date of sale or report the reduction of asset value in future periods when it should be expensed immediately. As a tool for accuracy and transparency, blockchain puts pressure on accountants to justify their accounting choices (Garanina et al., 2022).

Despite the many advantages offered by blockchain technology, its implementation in accounting information systems is still limited. Wira Eka Suryawijaya (2023) explains that some companies are still hesitant to adopt blockchain technology due to potential challenges and risks, such as high implementation costs, lack of clear regulations, and



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concerns about data security. Therefore, qualitative research titled "The Influence of Blockchain Technology on Accounting Information Systems in Terms of Transaction Security and Data Reliability" aims to delve deeper into the impact of blockchain technology on accounting information systems, particularly in terms of transaction security and data reliability. Additionally, this research also aims to identify challenges and risks that may arise in the implementation of blockchain technology in accounting information systems. This study is expected to provide new insights and contributions to the development of blockchain technology and accounting information systems in the future. Furthermore, this research can offer recommendations for companies in implementing blockchain technology in accounting information systems.

#### **METHODS**

This research employs a qualitative descriptive approach because its objective is to gain a deeper understanding and analyze the implementation of blockchain technology in accounting information systems, focusing on the aspects of transaction security and data reliability. Qualitative research is an approach to understanding phenomena experienced by research subjects through word descriptions in a natural context, using various suitable methods (J. Moleong, 2017). The qualitative approach allows researchers to analyze data, understand the context, and formulate meaning from the information found. Qualitative descriptive research is recognized as a suitable approach for studies emphasizing the identification of events or experiences. This approach is also relevant for gaining insights from informants about phenomena that are not well understood (Kim et al., 2017). In qualitative descriptive research, it is important to minimize subjective elements, and the most critical criterion when using this approach is integrity or neutrality (Neergaard et al., 2009).

Data sources in this research are obtained from primary sources through interviews and secondary data obtained from document studies. The goal is to obtain a comprehensive overview of this research. In qualitative research, an interview is a conversation or discussion with a purpose and begins with non-formal questions (Rachmawati, 2007). Interviews are conducted with participants knowledgeable about the implementation of blockchain in accounting information systems. The interview process will be conducted either in person or through telephone communication, depending on the availability of participants. Meanwhile, the document study technique involves collecting and recording existing data obtained through documents. Document studies involve collecting data from various relevant written sources related to the research topic (Hardani et al., 2020). In this case, the documents used include scholarly literature, previous studies, scientific articles, and other relevant documents related to blockchain technology and accounting information systems. The selected documents must contain sufficient information to support the analysis of the impact of blockchain technology on accounting information systems in terms of transaction security and data reliability. Additionally, the selected documents must have good quality and validity.

The research begins by gathering and reviewing literature related to blockchain technology and accounting information systems, as well as the benefits and challenges associated with the implementation of blockchain technology. Subsequently, the researcher conducts interviews with practitioners in the field of information systems to gain a broader understanding of the implementation of blockchain technology. The



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research findings are then analyzed and summarized into a conclusion regarding the potential and challenges of implementing blockchain technology in the context of accounting information systems.

#### **RESULTS AND DISCUSSION**

## 1. Blockchain Technology: Definition and Characteristics

In recent advancements in information technology, the innovation of blockchain has emerged, offering a different approach to the storage, handling, and processing of financial data compared to traditional electronic methods. The use of blockchain technology has sparked a significant revolution in managing financial data in the business environment (ALSaqa et al., 2019). Blockchain is a shared or distributed digital transaction ledger across a network of participating computers. Blockchain technology embeds peer-to-peer communication among participating computers, eliminating the need for network management by a centralized third party (Wunsche, 2016). In an interview, Ms. F explained her understanding of blockchain technology, stating that it is a method implemented within a system where data creation and storage occur within a distributed and encrypted network. Distributed means that anyone granted access can openly view the entire process from start to finish; everything is transparent and open, and no one can alter it. Decentralization is for everyone, and it can be accessed by individuals who have what we call tokens.

From Ms. F's statement, key terms such as "distributed" and "encrypted" emerge as the strengths of the technology. One of the main advantages of blockchain technology is its ability to store and transfer data in a decentralized manner. This indicates that data or information is not centralized in one location but distributed across the entire network. Each time there is a transaction, new information is entered into the blockchain and stored on every connected network node. Thus, the security of data stored in the blockchain is much higher than centralized data storage (Suryawijaya, 2023). Similarly, in an interview session with Ms. S, she explained blockchain technology based on her understanding that blockchain can be likened to a ledger stored on many different computers. Each computer stores the ledger and has an identical copy. Therefore, it cannot be altered or deleted. Blockchain also has several advantages, one of which is transparency. Transactions that occur in the blockchain can be viewed by all parties because of the decentralized concept.

From Ms. S's statement, it can be concluded that another advantage of blockchain is transparency, where activities can be seen by all parties due to the decentralized concept. Not only that, but blockchain technology also has a robust encryption system. New transactions entered into the blockchain are linked cryptographically. Blockchain and cryptography provide a strong level of security by ensuring that every transaction is permanently recorded in the data and cannot be manipulated by unauthorized parties (Swan, 2015). Cryptography functions to store information with encryption, allowing only stakeholders to have access to the data when it is entered.



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# 2. Implementation of Blockchain Technology in Accounting Information Systems

In the interview session with Ms. F, the researcher asked her about her opinion on the implementation of blockchain in accounting information systems. According to Ms. F. blockchain technology can be implemented in any field. She added that in accounting, the process would start from transactions, journal recording, and so on. In blockchain technology, once data is entered, it will automatically be processed until the final stage of the accounting process. Therefore, according to Ms. F, blockchain implementation can indeed be applied in accounting information systems. Similar questions were also posed to Mr. D regarding his opinion on the implementation of blockchain technology in accounting information systems. According to Mr. D. blockchain is a development in the digitalization world, and accounting information systems for large-scale companies should already be using this technology. Many accounting activities, from transactions to information presentation, are now integrated with various activities. Mr. D gave an example, explaining that many activities are now performed by customers and processed by the system. For instance, in the transportation sector, customers can enter data, book tickets, and have a platform for ticket reservations, up to making payments. These activities are not on one server but are synchronized across servers. Mr. D also added that companies using blockchain in their cloud-based database systems do not need to perform data entry. Cloud computing services themselves, such as Amazon Web Service (AWS), are examples.

Another term frequently used in the context of blockchain accounting is the World Wide Ledger (WWL). Although lacking a rigid definition, this term often appears in literature related to blockchain technology (Potekhina & Riumkin, 2017). The WWL represents the final application of a blockchain accounting system that can be verified, audited, and searched. In the WWL, international companies publish all their transactions, making them accessible to regulators, managers, and key stakeholders (Tapscott & Tapscott, 2016).

Blockchain is often used to refer to payment systems or specific accounting standards. To achieve neutrality, it is crucial to separate activity documentation from accounting storage. However, blockchain functions as a neutral database storing transaction records. This system also facilitates shareholders and auditors in gathering individual transactions and generating financial reports according to their policies (Wang & Kogan, 2017). The potential impact on the field of accounting is that companies adopting blockchain technology may have a variety of new and effective reporting tools. This will create greater transparency in overall payments, enabling monitoring and delivery of their financial status and results (Wunsche, 2016).

In Indonesia, there has been technological development with various initiatives, such as the verification and validation of educational certificates, medical data storage, and the use of cryptocurrency as a payment system (Suryawijaya, 2023). In these payment systems, blockchain is applied using tokens or cryptocurrency as a means of payment. For example, in Indonesia, the Tokocrypto platform utilizes blockchain technology. Through this platform, users can easily and securely buy and sell cryptocurrency. Additionally, the use of cryptocurrency can facilitate international trade, as transactions using cryptocurrency can be carried out quickly and securely without the need for intermediaries (Suryawijaya, 2023).



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## 3. The Use of Blockchain in Transaction Security

The use of blockchain technology has become an innovative solution to enhance transaction security in various industries. One key aspect that makes blockchain high in security is decentralization. Blockchain can be analogized as a ledger stored in multiple locations, each having an identical copy of the ledger. It serves as an excellent combination of security, transparency, and operational control by providing reliable data synchronization and protection against unauthorized changes. Through the process of transferring recorded as data blocks, each new block includes a copy of the code from the previous block. These blocks are then attached with an authenticating signature to form a sequence of actions or transactions. As a result, blockchain creates a concrete ledger of information, making it nearly impossible to forge or delete records to conceal specific activities ((ALSaqa et al., 2019). This provides higher resilience against data forgery or deletion since any changes or manipulations of data require user approval within the network.

Security is also ensured through the secure block chain structure. Any information intended to be entered into the blockchain network will be encrypted using a consensus algorithm before the information is distributed throughout the blockchain network (Adi Saputra, 2023). Each transaction block within the blockchain network is continuously linked to the previous block through cryptography. Consequently, all transactions within the blockchain are interconnected, making it challenging for any party to manipulate. This implies that every transaction entered into the blockchain network cannot be altered, deleted, and can be easily traced by parties requiring information about the transaction. This positions blockchain technology as a secure and transparent solution for data storage (Cai et al., 2018).

In an interview session with Mr. D, the researcher asked how blockchain could help secure transactions and accounting data. Mr. D explained that regarding data security, it is entrusted to the managers, such as Amazon Web Service and others whose platforms we use, ensuring their security from the perspective of security. Mr. D also explained that the government also formulates policies related to technology to prevent potential security risks. Then, Mr. D added that data security issues depend greatly on the user. Data breaches can occur due to low literacy in digitalization, such as when receiving an invitation link from an unknown number and clicking on the link without knowing the sender. User data can be exposed in such situations. Therefore, digital literacy is crucial because most data theft occurs due to user negligence. Similar to Mr. D, Ms. F also explained information security. In an interview with Ms. F, the researcher asked for her opinion on the importance of blockchain security systems to support accounting information systems in a company. When asked, Ms. F explained that regardless of the technology, whether blockchain or otherwise, the confidentiality of information must be safeguarded. Similar questions were also posed to Mr. G, and during the interview, he explained that for privacy, it is the same as other methods. In an interview with Ms. S, the researcher asked if there is a potential risk that needs to be prevented in the implementation of blockchain in the accounting context. Ms. S explained that to reduce the risk of using blockchain, companies or individuals need to understand privacy and security aspects. We need to be more aware of the data we share.

From the overall interview results, the researcher gathered information that regardless of the technology used, information confidentiality remains a top priority. To reduce this risk, companies or individuals need to have a deep understanding of privacy



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and security aspects related to the implementation of blockchain technology. Therefore, it is crucial to increase awareness of what is entered into the blockchain. High awareness of the actions and data entered can not only improve security but also ensure that the use of this technology adheres to ethical and legal standards.

## 4. The Use of Blockchain in Data Reliability

The use of blockchain technology has revolutionized data reliability. To maintain data reliability in blockchain technology, the utilization of sophisticated cryptographic techniques with guaranteed security, effective implementation of privacy policies, and stringent security measures in managing access and verifying transactions are necessary. Information stored in blockchain blocks can be encrypted, allowing only parties with the encryption key to access, read, and validate the data content (Adil, 2023). The implementation of cryptography also helps reduce the risk of data forgery due to the decentralized nature of blockchain.

In an interview session with Mrs. F, the researcher inquired about how blockchain works in securing transactions and accounting data. In response to the question, Mrs. F explained that security is ensured because only token holders or relevant parties can access the data. Additionally, there is no manipulation of information or data being processed, ensuring that the results are genuinely reflective of what has occurred and are fully integrated into the blockchain. From Mrs. F's explanation, the researcher found that it is challenging for users to make changes to data already entered into the blockchain. With a decentralized structure and robust encryption methods, blockchain ensures that every transaction or data entry made into it cannot be altered or manipulated by unauthorized parties. The results of data processing can be fully relied upon, providing certainty that the recorded information is an accurate representation of the actual events. This yields high reliability and authenticity of data, making blockchain technology a trustworthy solution for storing, managing, and presenting truly reliable information.

## 5. Challenges in Implementing Blockchain Technology

Although blockchain technology promises several advantages, it also faces several challenges that need to be addressed. One of the main challenges is scalability limitations. Scalability issues arise with an increase in the number of nodes and transactions in blockchain technology. This problem is common in public blockchain applications because each node must store data and perform computations to validate each transaction. Therefore, blockchain requires large storage space, low latency, and significant computing power (Mateen et al., 2023).

In the interview session with Mrs. F, the researcher inquired about the preventive measures that can be taken to address potential risks in implementing blockchain in accounting. Mrs. F responded by stating that risk mitigation for blockchain can be observed from the initial implementation. First, considerations should be made about whether blockchain is suitable for the conditions of the company implementing it. It is crucial to assess whether all resources involved have a strong understanding of the system or method. Mrs. F added that in Indonesia, resources for blockchain development are still limited. Thus, challenges mainly occur at the beginning since the application of blockchain, especially from the perspective of accounting information, is still relatively unfamiliar in Indonesia. Digital literacy is crucial because most data theft occurs due to user negligence rather than outdated technology. Therefore, continuous improvement of



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digital literacy is essential, and seminars with interesting concepts can be effective in achieving this goal.

The researcher then asked Mrs. F about her opinion on why Indonesia has not fully adopted blockchain technology in accounting information systems. According to Mrs. F, several factors contribute to this, such as insufficient understanding, limited resources for system development, costs associated with blockchain creation, and the difficulty companies face in system migration. Mrs. F emphasized the challenges in the initial stages and the taboos associated with the implementation of blockchain in accounting information systems.

Similar statements were made by Mr. G during the interview. When asked about the implementation of blockchain in accounting information systems, Mr. G explained that when integrating blockchain technology into an organization, it is essential to ensure that the infrastructure is ready. The conclusion drawn from the interview is that before a company decides to use a particular technology, the existing infrastructure must be thoroughly evaluated in terms of hardware, software, and system security to ensure their suitability and readiness for the upcoming changes.

In a separate interview session with Mr. D, the researcher inquired about preventive measures against potential risks in implementing blockchain in accounting. Mr. D responded that technology owners consistently perform improvements in terms of hardware, software, and the applications they use. He emphasized the need for prevention from the user's perspective as well. Improving digital literacy is crucial because most data theft occurs due to user negligence, not due to outdated technology. Mr. D highlighted that prevention efforts should be undertaken by both technology owners and users.

Similar sentiments were expressed by Mrs. S. In the interview, the researcher asked Mrs. S about the knowledge of the Indonesian public regarding blockchain technology. According to Mrs. S, the knowledge of the Indonesian public about blockchain technology is still lacking because blockchain is a relatively new technology. She suggested increasing public awareness by organizing seminars with interesting concepts to effectively convey clear and precise material.

#### 6. Suggestions and Recommendations

To overcome these challenges, it is advisable for companies to carefully consider whether blockchain technology is suitable for their specific needs. Subsequently, companies are recommended to enhance the digital literacy of employees and relevant stakeholders. Seminars with engaging concepts can serve as an effective means to improve understanding of blockchain technology. Additionally, companies considering the adoption of blockchain need to prepare thoroughly for migration or integration with existing systems. This preparation includes technical aspects, internal company socialization, and considerations for the interests of other companies. Infrastructure readiness is also key to the success of implementing new technology, and companies need to conduct a comprehensive evaluation of existing hardware, software, and system security.

To harness the maximum potential of blockchain technology in accounting information systems, several approaches can be taken. According to Mrs. F, technology companies may consider developing a platform or enterprise application system that integrates blockchain technology comprehensively. By providing an integrated solution,



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companies can enter the market as service providers for other companies requiring blockchain implementation in their accounting systems. Furthermore, Mrs. S suggests that companies can start with small projects as a foundation for understanding the concrete benefits offered by blockchain technology. Evaluating the results of these projects will provide a better understanding of how this technology can be integrated and add value. Subsequently, further steps can be taken for larger and more complex projects. Another recommendation from Mrs. S is for companies to collaborate with partners experienced in adopting blockchain technology. These partners can come from both domestic and international sources. The experience of such partners in implementing blockchain can provide valuable guidance and expedite the learning curve.

#### CONCLUSION

Blockchain represents a groundbreaking development in the world of information technology, reshaping the digital paradigm in unprecedented ways. With its ability to provide levels of security, transparency, and decentralization never seen before, this technology forms a solid foundation for significant transformations across various sectors, including the realm of accounting. Despite the numerous advantages offered by blockchain technology, its implementation in accounting information systems still faces limitations. The use of blockchain in accounting information systems holds the promise of enhanced security, transparency, and efficiency. High data reliability, resistance to tampering, and the ability to ensure transaction integrity are significant added values. However, its implementation remains limited, particularly in Indonesia, due to various challenges. These challenges include high implementation costs, a lack of understanding among the public, and the difficulty companies face in migrating or integrating from one system to a new one.

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