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IMPLEMENTATION OF A MANAGEMENT INFORMATION SYSTEM BASED ON BLOCKCHAIN TECHNOLOGY

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ABSTRACT

This research aims to investigate the application of management information systems based on blockchain technology in the context of modern organizations. By observing the global paradigm shift in data and information management, blockchain technology has emerged as a potential solution to address issues of security, transparency and data integrity. This research uses a qualitative approach to analyze the effect of implementing a blockchain-based management information system on operational efficiency, risk management and information security in an organization. This research method involves surveys, interviews, and documentation analysis to understand the impact of blockchain technology implementation on organizational management processes. The research results show that the application of blockchain technology in Management Information Systems (MIS) has great potential in improving operational efficiency and security in various sectors. Key benefits identified include increased data transparency, more decentralized financial management, and fairer copyright protection in the entertainment and media industries. Nonetheless, challenges such as high initial costs and differences in regulations across countries remain obstacles that need to be overcome to ensure broader and coordinated adoption of blockchain technology. Collaboration between government, industry and relevant stakeholders will be key in developing a framework that supports and overcomes these barriers, thereby enabling broader and more effective use of blockchain technology in the management of Management Information Systems in the future.

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1. INTRODUCTION

Management Information Systems (MIS) are systems that play a central role in managing information in various industrial sectors. MIS not only facilitates operational functions such as data security, transaction auditing and reporting, but also provides a solid foundation for strategic decision making (Muslihudin, 2016). With centralized policies and application connectivity provided by MIS, organizations can optimize their operational efficiency and overcome various challenges related to data management (Wijoyo, 2021). In particular, in the context of high complexity projects, MIS has proven to be of key importance in effective process management. Its ability to integrate various aspects of an organization, including people, processes, and information technology, allows MIS to deliver holistic and integrated solutions (Rigin & Reja, 2022).

With the advent of automated MIS, organizations can improve their performance significantly. MIS automation systems allow companies to reduce dependence on human factors in daily operations, especially in the e-commerce sector which requires 24-hour service availability (Sugiyanto et al, 2022). With automated MIS, managers can focus their attention on making more complex strategic decisions, while routine tasks can be automated to increase efficiency. MIS also has a crucial role in reformulating the modern e-commerce landscape (Suprihadi, 2020). With careful integration of people, processes, and information technology, MIS drives transformation and innovation across industries. Its ability to provide accurate and timely information to decision makers, both within the organization and at the individual level, makes MIS a vital strategic instrument in facing increasingly fierce business competition (Fadila, 2021).

Along with advances in technology, management information systems (MIS) have developed into a

vital element in supporting efficient business operations and making the right decisions (Sunarya, 2022). The application of blockchain technology as a foundation for management information systems has attracted widespread attention as a promising solution to meet demands for security, transparency and data integrity (Rahardja et al, 2020). Although blockchain was originally known as a technology associated with digital currencies, such as Bitcoin, over time, blockchain has developed and is used in many applications outside the financial field. One of them is a management information system (SIM) (Nugraha, 2020). In other words, blockchain is not only used for financial transactions, but has also been applied in the context of information management for a wider range of purposes.

Blockchain is an advanced database technology that allows open exchange of information within business networks. In the blockchain database structure, information is stored in blocks that are connected together in a series (Sutandi, 2018). The specialty of this technology lies in the chronological infinity of data, which cannot be deleted or changed without the mutual consent of the entire network. As a result, blockchain can be used to create a ledger that cannot be manipulated or changed, which is useful for tracking orders, payments, accounts, and other transactions (Ahmad & Dirgahayu, 2023). The system also comes with built-in mechanisms to prevent unauthorized entry of transactions and ensure consistency in the shared display of these transactions.

Conventional database systems often face challenges when recording financial transactions, as can be seen in the case of property sales. For example, after payment is made, ownership of the property is transferred to the buyer (Prihartanto, 2017). Although buyers and sellers may record these transactions individually, the lack of reliable data sources is a major issue. Sellers can easily claim that they have not received payment, while buyers can argue otherwise. In order to avoid potential legal conflicts, a trusted third party is often required to monitor and validate transactions. However, the existence of this kind of central authority not only complicates the transaction process, but also creates a point of weakness (Lase et al, 2021). If the central database is compromised, both sellers and buyers can suffer losses (Harahap et al, 2023).

Blockchain mitigates these problems by creating a decentralized and tamper-proof system for recording transactions. In a property transaction scenario, blockchain creates ledgers, one each for buyers and sellers (Pratiwi, 2022). All transactions must be approved by both parties and automatically updated in both ledgers in real time. Any change in historical transactions will corrupt the entire ledger. This blockchain property has been used in various sectors, including the creation of digital currencies such as Bitcoin (Dwicaksana, 2019). This research aims to comprehensively investigate the impact of implementing a management information system based on blockchain technology. By thoroughly understanding the contributions and potential obstacles to implementing blockchain technology in management information systems, this research is expected to provide valuable guidance for organizations in planning and implementing effective and innovative solutions in the context of modern and complex information management.

2. METHOD

This research is a qualitative study with a focus on descriptive analysis, which aims to analyze the key role of digital leadership in the era of blockchain technology. The research approach uses secondary data obtained from various related literature sources. This research adopts a literature review method to identify and analyze key concepts about digital leadership that are relevant to the context of blockchain technology. Google was used as the main tool in data collection, with keywords such as "digital leadership," "blockchain," "digital transformation," and "technology" to direct the search for appropriate information (Moleong, 2014).

All information obtained from trusted sources on the internet is used to analyze the main characteristics and capabilities possessed by digital leaders, with a special focus on the context of blockchain technology. Data collected from various sources was thoroughly reviewed, synthesized and analyzed in depth to develop a comprehensive model regarding the role of digital leadership in implementing and utilizing blockchain technology in today's digital era.

3. RESULTS AND DISCUSSION

Essentially, a blockchain is a decentralized, secure, and transparent digital ledger. That is, information is stored on the network and recorded in interconnected "blocks". Every transaction entered into the blockchain is verified and encrypted, and once verified, the transaction cannot be changed. This

makes it a very safe and reliable tool for tracking and storing data. In Management Information Systems, Blockchain technology has benefits, including:

a) Transparency and Accountability

Blockchain offers an incredible level of transparency in the world of business and finance. Every transaction that occurs is recorded permanently and openly in a digital ledger that can be accessed by all parties involved. This capability not only increases the level of accountability within the organization, but also opens a window for more effective oversight of various stakeholders. With the ability to track and verify every transaction in real-time, blockchain reduces the possibility of errors or data manipulation, which in turn strengthens trust and reliability in complex business ecosystems.

The clarity of information provided by blockchain also results in additional benefits in terms of regulatory compliance. With high transparency, authorities can easily verify every transaction and ensure that business activities are carried out in accordance with the applicable legal framework. This helps organizations to strengthen their position in the face of increasingly complex regulatory requirements and enhances their credibility in the eyes of external stakeholders. By eliminating the uncertainty often associated with business transactions, blockchain encourages the creation of a more open, fair and integrity business environment, ultimately supporting long-term growth and stability.

b) Fast Transaction Process

One of the main advantages of blockchain technology is its ability to facilitate fast transaction processing without the need for third party or intermediary intervention. By utilizing a decentralized distribution mechanism, blockchain allows transactions to be processed directly between the parties involved, without any additional delays or bureaucracy. This not only reduces operational costs associated with business transactions, but also saves time previously required to complete the transaction process through conventional channels. This ability to execute transactions efficiently and quickly not only optimizes the organization's operational performance, but also increases customer satisfaction by ensuring a smooth and responsive transaction experience.

By eliminating the need for third parties, blockchain also opens the door to direct collaboration opportunities between various business entities. This facilitates the formation of more efficient partnerships and speeds up the decision-making process, which can ultimately drive innovation and growth in various industries. With lower transaction costs and more efficient processes, organizations can allocate their resources more intelligently to develop new products and services, expand market reach, or improve the quality of customer service. As a result, blockchain not only speeds up the transaction process, but also unlocks the potential for transformation in traditional ways of doing business.

c) Decentralization

Traditional Management Information Systems (MIS) generally rely on centrally storing data on corporate servers, which is vulnerable to the risk of single server failure or cyber attacks that can result in complete data loss. On the other hand, in the context of blockchain-based SIM, data is stored in a decentralized manner on a distributed network, thereby reducing the risk of single server failure and increasing overall data availability and resilience. By replicating data across various network nodes, blockchain systems are able to ensure data integrity and security, even in the face of emergency situations or unexpected technical disruptions.

In a blockchain-based SIM model, not relying on a single server also results in increased efficiency and speed in data access. By eliminating single points of failure, blockchain networks allow users to access data in real-time without experiencing bottlenecks or delays caused by system failures. Additionally, because data is stored in a decentralized manner, users can also verify the authenticity and validity of information more easily, strengthening trust and transparency in business processes. Thus, blockchain-based SIM not only provides a more robust layer of security against the risk of server failure, but also improves overall operational efficiency through faster and more reliable data access.

The potential use of blockchain technology in Management Information Systems (MIS) offers the possibility to increase data security, reduce the risk of server failure, and speed up information access in an efficient and decentralized manner. By providing a transparent and verifiable platform, blockchain can strengthen the reliability of MIS in managing critical information in various aspects of an organization's operations. Next is the potential use of blockchain in SIM

a) Electronic Health Records (HER) Management.

The implementation of blockchain in the storage of patients' electronic health records has attracted attention as a potential solution to address security and privacy concerns in the healthcare sector. By

using blockchain technology, health records can be stored securely and decentralized, ensuring that sensitive patient data remains protected from unauthorized access or manipulation. The transparent and verifiable nature of blockchain also enables secure and controlled access for authorized healthcare providers, allowing them to efficiently track a patient's medical history without compromising individual privacy.

Additionally, blockchain's ability to record every change or data access with a time-verified digital signature provides additional confidence for patients and healthcare providers. Thus, blockchain not only improves data security, but also strengthens the integrity of electronic medical records, enabling healthcare providers to provide more timely and targeted care. Through the application of blockchain in health management information systems, the overall health data management process can be significantly improved, providing important benefits to patients, healthcare providers, and the healthcare industry as a whole.

b) Supply Chain Management

The application of blockchain technology in industry has the potential to revolutionize the entire supply chain tracking and management system. By leveraging blockchain's ability to permanently and openly record every transaction, the movement of products from producer to consumer can be tracked with unprecedented transparency. Information stored in the blockchain, including production, distribution and sales details, can be accessed by all parties involved in the supply chain, ensuring that every step in the process can be accurately monitored and verified.

Additionally, blockchain also enables rapid identification and handling of product safety or quality issues in a more efficient manner. With the ability to trace the origin of each product and verify its authenticity, blockchain helps prevent product fraud or counterfeiting, as well as ensure compliance with established safety and quality standards. With greater transparency in the supply chain, consumers will also gain additional benefits in terms of confidence in the products they purchase, reducing doubts and concerns regarding authenticity and quality. Thus, blockchain provides a strong foundation for more efficient, reliable and secure supply chain management, which in turn will help improve the reputation of the industry as a whole.

c) Financial management

The application of blockchain technology in corporate financial management has shown great potential in increasing the level of transparency and security in business processes. By using blockchain to record every transaction permanently and openly, companies can ensure that financial records are carried out accurately and can be accounted for. Information stored in the blockchain can also be easily verified by authorities, enabling a more efficient and trustworthy internal audit process. Through blockchain implementation, companies can improve the integrity of their financial data, reduce the risk of fraud, and ensure compliance with applicable regulations and accounting standards.

Additionally, by leveraging blockchain's ability to track assets in real-time, companies can more effectively monitor the movement of their assets and investments. This not only strengthens security in enterprise asset management, but also enables rapid identification of any anomalies or potential risks. With its enhanced transparency and decentralized system, blockchain enables companies to run their financial operations more efficiently and reliably, paving the way for sustainable and stable business growth. With the increasing complexity in today's business environment, the use of blockchain in corporate financial management becomes an important key in overcoming challenges and optimizing overall financial performance.

d) Copyright Management

The implementation of blockchain technology in the entertainment and media industry has unlocked huge potential in ensuring copyright protection and fair royalty management for content creators. By leveraging the transparent and decentralized nature of blockchain, every use of digital content can be recorded accurately and can be monitored in real-time. This allows content creators to ensure that their work is not misused or used without permission, while also ensuring that they receive appropriate royalties for the use of their work.

Additionally, with blockchain adoption, the royalty payment process can be automated and made easier. The blockchain smart contract system enables timely and automatic payments to copyright holders, reducing the bureaucracy associated with conventional manual payment processes. Thus, blockchain not only protects copyright and intellectual property, but also improves operational efficiency in the entertainment and media industry. With stronger protections for content creators and fairer

payment mechanisms, blockchain brings significant changes to the way the industry manages copyright, providing incentives for continued innovation and creativity.

Although blockchain technology promises great potential in improving Management Information Systems (MIS) in various sectors, its implementation is still faced with several crucial challenges. One of the main challenges faced is the high initial implementation costs. The blockchain adoption process often requires significant investment in the development of specialized hardware and software, which can be a heavy financial burden for many organizations, especially those with limited resources. These high initial costs may also be a barrier to widespread blockchain adoption, especially among small and medium-sized businesses that may require a more cost-effective approach to implementing new technology.

Additionally, differences in regulations and compliance across countries also pose a significant challenge to the implementation of blockchain in MIS. Uncertainty in the global regulatory framework and differences in legal approaches between countries may hinder the standardization process and universal adoption of blockchain. This can hinder organizations' ability to seamlessly integrate blockchain technology into their operations, especially for organizations operating in different countries with different legal environments. In facing these challenges, collaboration between governments, industry and relevant stakeholders at the international level is needed to develop a consistent regulatory framework and support broader and coordinated adoption of blockchain technology. Thus, resolving cost and regulatory challenges becomes important in driving wider adoption of blockchain technology in Management Information Systems at a global level.

4. CONCLUSION

The use of blockchain technology in Management Information Systems (MIS) promises great potential in increasing transparency, security and operational efficiency in various sectors. Blockchain can provide significant benefits, including fast tracking of transactions without third party interference, decentralized financial management, as well as copyright protection and fair management of royalties in the entertainment and media industry. However, the implementation of blockchain technology is also faced with a number of challenges that need to be overcome. These challenges include high initial implementation costs, primarily related to specific hardware and software development requirements, as well as differences in regulations and compliance across countries that can slow down the universal adoption process. To optimize the potential of blockchain technology in MIS, it is important for organizations and governments to work together to address these challenges. Wider blockchain adoption requires cross-sector collaboration to develop sustainable and affordable solutions, as well as a consistent regulatory framework at a global level. By overcoming these challenges, blockchain technology can become a major engine in increasing efficiency, security and transparency in Management Information Systems in the future.

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