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The Role of Blockchain Technology in Digital Communication Transformation via E-Commerce Platforms for Transaction and Data Security: A Case Study of Shopee

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Abstrack: In the current digital era, information security is a very important thing to pay attention to. There are many methods for maintaining information security, but there are still many vulnerabilities that can be exploited by irresponsible parties. Blockchain technology provides a solution by providing a strong and reliable information security system. Blockchain technology can be used to ensure the integrity and validity of stored data. This article discusses the role of blockchain technology in the transformation of digital communications on e-commerce platforms, with a focus on transaction security and user data protection. The case study was conducted on Shopee, one of the leading e-commerce platforms in Southeast Asia. Blockchain, with its characteristics of transparency, decentralization and high security, has great potential to increase user trust and optimize e-commerce business operations.

Keywords: Era Digital, Information Security, Blockchain Technology, Shopee.

Abstrak: Dalam era digital saat ini, keamanan informasi menjadi hal yang sangat penting untuk diperhatikan. Terdapat banyak metode untuk menjaga keamanan informasi, namun masih banyak juga kerentanan yang dapat dimanfaatkan oleh pihak yang tidak bertanggung jawab. Teknologi blockchain memberikan solusi dengan menyediakan sistem keamanan informasi yang kuat dan handal. Teknologi blockchain dapat digunakan untuk memastikan integritas dan validitas data yang disimpan. Artikel ini membahas peran teknologi blockchain dalam transformasi komunikasi digital pada platform e-commerce, dengan fokus pada keamanan transaksi dan perlindungan data pengguna. Studi kasus dilakukan pada Shopee, salah satu platform e-commerce terkemuka di Asia Tenggara. Blockchain, dengan karakteristik transparansi, desentralisasi, dan keamanan yang tinggi, memiliki potensi besar untuk meningkatkan kepercayaan pengguna dan mengoptimalkan operasional bisnis e-commerce.

Kata Kunci: Era Digital, Keamanan Informasi, Teknologi Blockchain, Shopee.

Introduction

E-commerce has significantly transformed shopping habits and economic interactions in Indonesia. The sector's growth is evident in the projected transaction values, which were estimated to reach USD 86 billion in 2022, rising to USD 104 billion in 2023, and USD 121 billion in 2024. This rapid development is driven by technology adoption and increasing internet penetration in Indonesia. Data from online media indicates that platforms such as Shopee, Tokopedia, and Lazada dominate the Indonesian e-commerce market. In the first half of 2023, Shopee recorded approximately 157.9 million monthly visits, followed by Tokopedia (117 million) and Lazada (83.2 million). These figures highlight the extensive use of e-commerce among the Indonesian public. However, alongside this development, serious concerns regarding privacy and data security have emerged. Research by Puji Astuti et al. (2014) shows that consumer trust is vital in Indonesian online businesses. These fears are further reinforced by a PwC survey indicating that one in three Indonesian consumers feels highly concerned when engaging with media and social companies, with 67% of consumers actively restricting their personal information.

Major data breach incidents such as the 2020 Tokopedia breach involving 91 million user accounts and 7 million merchant accounts, alongside similar incidents at Bukalapak, Lazada, and Bhinneka in 2019 have further amplified these anxieties. According to Kotler & Armstrong (2010), consumer privacy issues represent a major challenge for the marketing industry. Napitupulu and Supriyono (2023) emphasize the critical importance of security in Indonesian e-commerce. In light of these challenges, blockchain technology emerges as a potential solution to enhance consumer trust and privacy data security within Indonesian e-commerce platforms. This study aims to examine how blockchain technology can help resolve trust and data security issues on Indonesian e-commerce platforms, with a primary focus on how it enhances transparency, security, and efficiency in transaction processes.

In today's digital age, data and information have become highly valuable assets. This encompasses various aspects, ranging from personal user data and transaction records to company operational data. One platform handling massive volumes of data and information is Shopee, a prominent e-commerce platform in Southeast Asia, including Indonesia. Shopee manages data and information from millions of users and thousands of sellers daily. This data is essential for maintaining smooth operations and ensuring a positive experience for both buyers and sellers. However, digital data remains highly vulnerable to threats such as hacking, data theft,and misuse. These threats can damage Shopee's reputation and cause significant harm to platform users and merchants.

Numerous data and information security solutions have been developed to address these issues. Yet, many conventional solutions exhibit limitations, such as a lack of transparency, susceptibility to manipulation, and minimal user control over personal data. Blockchain technology has recently gained widespread attention as a promising solution to these challenges. Blockchain enables digital transactions to be conducted in a highly transparent, secure, and tamper-resistant manner. Through blockchain, data and information can be stored and managed with far greater security and efficiency.

Therefore, this study explores how blockchain technology can be implemented within Shopee's domain to bolster data and information security. It analyzes existing security challenges at Shopee and evaluates blockchain as a potential remedy. Furthermore, it examines the inner workings, benefits, limitations, and practical applications of blockchain technology within an e-commerce framework.

By leveraging blockchain, Shopee can ensure that registered users and merchants are legitimate and trustworthy entities, thereby mitigating fraud and data misuse. Overall, implementing blockchain technology can help Shopee navigate data security challenges in the digital era by providing an integrated, robust, and reliable technological ecosystem.

Blockchain possesses the capability to manage data with greater transparency, trust, and traceability. As a large, decentralized, distributed ledger, blockchain records digital transactions in a way that guarantees security. Because it functions as a decentralized database, no single central authority owns or controls it. Once data is uploaded to a blockchain, it becomes immutable, preventing tampering or falsification.

Integrating blockchain technology into the digital communication transformation of e-commerce platforms specifically applications like Shopee brings structural improvements to transparency, security, and efficiency.Fundamentally, blockchain logs transactions in sequential, linked blocks distributed across a decentralized network. Within e-commerce, this structure delivers substantial benefits to platforms, sellers, and buyers alike.

While blockchain holds enormous potential to elevate user and merchant experiences, existing hurdles must be addressed through technological innovation, regulatory compliance, and user education to ensure successful, sustainable long-term implementation.

Blockchain relies on a decentralized system where data is distributed across global nodes rather than housed on a single central server. This structure makes data significantly harder to hack or manipulate. For Shopee,this means superior protection for personal user data and transaction histories against leaks and unauthorized exploitation.

Through blockchain, every transaction between a buyer and a seller can be tracked and verified by all participating entities. For instance, post-purchase order updates and shipping statuses can be transparently tracked via the blockchain ledger, giving users full visibility. This raises user confidence by ensuring transaction legitimacy and data immutability.

Additionally, blockchain enables cryptocurrency payments (e.g., Bitcoin or Ethereum). Although Shopee has not officially integrated cryptocurrency payments, blockchain infrastructure allows for faster, cheaper payment alternatives compared to traditional financial rails. Cryptocurrency transactions can reduce overhead fees associated with traditional credit card processing and international bank transfers.

Nevertheless, scalability remains a primary technical constraint. Handling massive transaction volumes at the speed required by major platforms like Shopee requires further blockchain infrastructure development. Furthermore, regulatory frameworks surrounding blockchain and cryptocurrency vary across regions, requiring Shopee to maintain strict compliance in every operational market. Lastly, despite growing popularity, many general consumers lack familiarity with blockchain and cryptocurrency transactions. Consequently, user education initiatives are necessary to facilitate smooth technology adoption.

Research Method

This study utilizes a qualitative method with a phenomenological approach to explore the role of blockchain technology in digital communication transformation via e-commerce platforms for transaction and data security,using Shopee as a case study. The characteristics of phenomenological research naturally align with qualitative methodology, focusing on capturing individual perceptions and the essence of phenomena through intuition, reflection, and conscious lived experiences. These insights ultimately yield genuine concepts, evaluations, and understandings (Kuswarno, 2009).

Edmund Husserl originally introduced the foundational principles of phenomenological inquiry, which involve a rigorous and detailed examination of human conscious experience. The core concept of phenomenology is "meaning" the essential content emerging from conscious experience. Identifying these essential qualities requires deep, systematic analysis. Husserl outlined methods to articulate this meaning by making implicit experiential structures explicit (Fridha & Octavianti, 2016).

Data collection methods for this study include observation, interviews, and documentation. The analytical framework originates from specific empirical observations, utilizing inductive data analysis. Inductive analysis involves drawing broad, generalized conclusions from specific underlying facts (Ayuningtyas et al., 2021).

Results and Discussion

Shopee can enhance its managed data and information security by deploying blockchain technology. For instance, storing transaction data on an immutable blockchain ledger guarantees data integrity and prevents unauthorized alterations. Moreover, transparency increases because all network participants can view and verify recorded transactions. Additionally, Shopee can utilize blockchain technology to verify that buyers and sellers on the platform are legitimate and trustworthy entities, mitigating fraud and data misuse.

1. Data and Information Security within the Shopee Domain

As a major Southeast Asian e-commerce platform, Shopee manages vast amounts of customer, transaction, and operational data. This data is highly vulnerable to cyber threats such as hacking, data theft, and unauthorized exploitation, which can damage consumer trust and corporate reputation. Blockchain technology serves as a viable solution for data security by creating a transparent, secure, and tamper-resistant system.Blockchain logs transactions in detail and enables data traceability to proactively prevent fraud.

2. Blockchain Technology as a Data and Information Security Solution

Blockchain is known as a technology that enables digital transactions to be conducted safely and transparently. Each transaction is stored in a "block" linked to the preceding block through cryptographic hashing, making it virtually impossible to manipulate. Through consensus mechanisms, data recorded on the blockchain is validated by all network participants, ensuring high transparency. This technology offers significant potential for data management, enhancing data integrity and addressing key challenges within the digital economy.

3. Implementation of Blockchain Technology in the Shopee Domain

Shopee can leverage blockchain to secure transaction data and validate user and seller identities. Blockchain ensures data is stored in secure, transparent, and tamper-proof blocks. Furthermore, this technology can power more secure authentication and login systems, shielding user accounts from threats such as broken authentication. By integrating blockchain, Shopee can deliver a safer, more transparent, and trustworthy e-commerce platform, offering an enhanced experience for both buyers and sellers.

Conclusion

Blockchain technology offers an innovative solution to data and information security challenges in the digital era. With its features of high transparency, decentralization, and robust security, blockchain enables data to be stored safely and rendered tamper-resistant. Implementing blockchain on e-commerce platforms such as Shopee can help enhance user trust by ensuring data integrity, preventing fraud, and protecting users' personal information.

Shopee can utilize blockchain to store transaction data in immutable blocks and to validate the identities of both users and sellers. This creates a more secure and trustworthy system for all involved parties. By adopting blockchain technology, Shopee can deliver a better experience to buyers and sellers while mitigating various potential cyber threats.

However, blockchain implementation still faces challenges, such as scalability issues, strict regulations, and limited user understanding. Therefore, technological innovation, user

education, and regulatory compliance are required to ensure that blockchain adoption runs successfully and delivers a sustainable positive impact.

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