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A Survey on User Experience of Blockchain Transactions: Security and Adaptability Issues

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Abstract

Blockchain technology has become a major focus of digital change in recent years. Initially known as the infrastructure that supports digital currencies, blockchain now has enormous potential in improving user experience across a wide range of sectors. The application of this technology is capable of addressing a variety of issues that exist in the industry, including issues of trust, transparency, security, and reliability of data processing. In this paper, we will explore various applications of blockchain technology that aim to improve user experience in transactions. We will explain the concept of blockchain technology, analyze its advantages and disadvantages, and identify factors that affect its success or obstacles that may arise during implementation. By understanding the potential of blockchain technology and its applications that can improve user experience in transactions, we can pave the way for further progress in providing more secure, efficient, and transparent solutions for transaction activities in the future. The methodology employed in this study involves conducting a survey through online questionnaires that were distributed to individuals knowledgeable about the concept of blockchain technology with a total sample size of 96 people. The analysis approach used is Smart PLS. Thus, this research is expected to provide a deeper insight into the application of blockchain technology to improve user experience in transactions.

Keywords*: Blockchain, User Exerience, Transaction Security System, Adaptability.*

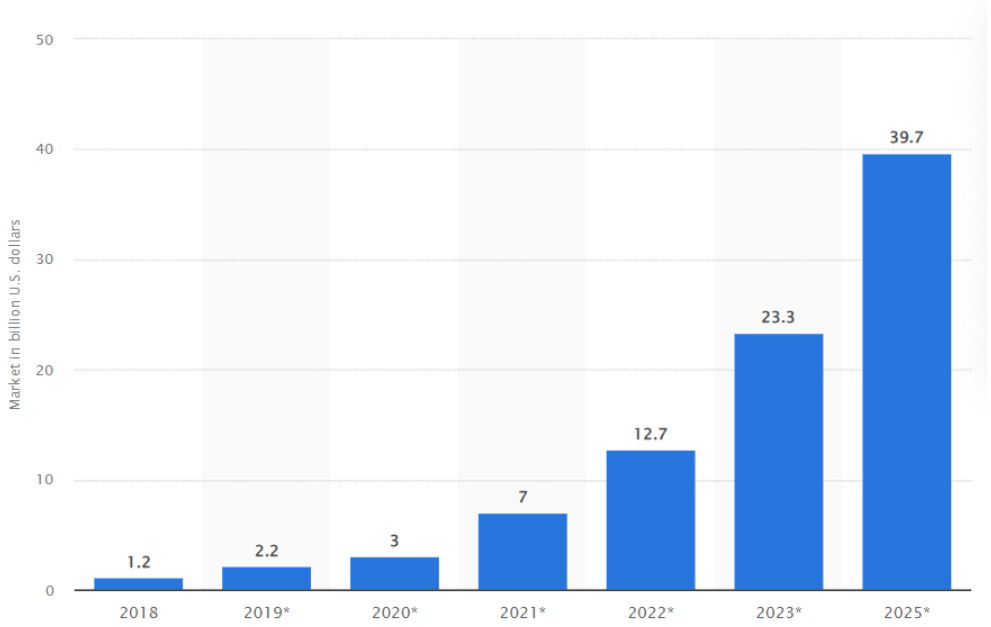
1. Introduction

Technology is a term that refers to the application of science and inventions to create tools, systems and methods to solve problems and fulfill human needs. In addition, technology serves as the necessary means and facilities for a sustainable and comfortable human life[1]. With the rapid development of technology today, people can utilize it to make payments through mobile phones. Although transactions still use conventional currencies, there is also a currency called are completely dependent on technology, specifically, referring to digital currencies commonly recognized as cryptocurrencies[2]. Cryptocurrencies first appeared in the 1990s, and in 2009, the first digital currency known as bitcoin emerged.

Bitcoin uses blockchain technology to process transactions. Blockchain is a technology used to create and maintain a secure and transparent record of digital transactions[3]. It is a distributed system that allows participants in the network to reach

consensus on the correctness of data in the absence of a central authority. One of the key features of blockchain is its resistance to data modification. Once a block is added to the chain, it is very difficult to change it[4].

Therefore, blockchain is considered a secure method for recording transactions, and transaction information can be accessed transparently and anonymously by everyone (Iredale, 2020). This makes blockchain a safer and more reliable option in terms of data security. The concept of blockchain was initially applies to bitcoin only, but it can be used in various other fields, not limited to digital currencies[5]. Many predictions indicate that blockchain technology will play an important role in the development of digital marketing in the future[6].



Statista provides data on the global market size of Blockchain Technology as shown in **Figure 1.**

The above-presented Figure 1 illustrates the growth of the worldwide market for blockchain technology, spanning the period from 2018 to 2025. According to the forecast, it is projected that the market for blockchain technology will attain a value of $39.7 billion by 2025. Additionally, the graph showcases the rate of adoption of blockchain technology among users[7].

Therefore, this study poses the following research questions:

RQ1: Can the use of blockchain technology significantly reduce the risk of fraud and manipulation in transactions?

RQ2: How does blockchain technology affect user experience, especially in terms of security and trust during transactions?

RQ3: To what extent do security and privacy factors influence the adoption of blockchain technology in non-financial sectors?

RQ4: Does blockchain have a positive and significant influence on future digital marketing transactions?

2. Method

This research uses a survey method with respondents who have an adequate understanding of the concepts of blockchain technology and digital marketing. The sampling technique used is purposive sampling to ensure that the selected respondents have relevant

expertise and knowledge. The questionnaire in this study consists of items covering blockchain variables, user experience, transaction security system, and adaptability. A 5-point Likert scale was used to measure the items in the questionnaire, where point 1 indicates a high level of disagreement and point 5 indicates a high level of agreement. The collected data were analyzed using the SmartPLS program using the PLS-SEM approach, which is an effective analytical method in studying the relationship between the variables in this study.

2.1 Literature Review

A. **Blockchain**

Blockchain technology has become an increasingly important and interesting topic for researchers and various sectors. This is due to blockchain technology's ability to provide a secure and transparent mechanism for recording and verifying transactions. In blockchain technology, every transaction is recorded in chronologically interconnected blocks and stored across a distributed network[8]. As such, it is difficult for unauthorized parties to manipulate transaction data or commit fraud, as any changes to a single block will impact the entire pre-existing chain. In addition, the transparency and accessibility of transaction data by all participants in the network also plays an important role in reducing the potential for fraud[9].

H1: The use of blockchain technology can significantly reduce the risk of fraud and manipulation in transactions.

B. **User Experience**

Several studies have shown that the implementation of blockchain technology has the potential to significantly improve user experience[10]. By using blockchain technology, users can experience significant changes in the way they conduct and experience transactions. Blockchain technology provides a high level of security through features such as strong encryption and distributed systems that reduce the risk of fraud and data manipulation[11][12]. In addition, with the transparency and integrity of data guaranteed by blockchain technology, users will feel more trust and confidence in their transactions, reducing concerns regarding the authenticity, validity, and security of their transactions[13]. Thus, user experience can be enhanced through the application of blockchain technology that can provide higher security, transparency, and trust in transactions.

H2: The use of blockchain technology significantly affects user experience, especially in the context of transactions.

C. **Adaptability**

In an increasingly complex and highly regulated business environment, companies need solutions that can provide strong security and maintain the privacy of their data [14] [24]. In non-financial sectors such as logistics, healthcare, and supply chain, blockchain technology can be used to protect sensitive data, manage identities, and verify transactions in a secure and reliable way[15]. Companies in these sectors are confident that blockchain can provide a high level of security and maintain the privacy of their data, so they can adopt this technology with confidence. In the context of increasingly stringent regulation and customer data protection, the demand for secure and privacy-preserving blockchain solutions is growing[16][25].

H3: blockchain security and privacy factors have a significant influence on the adoption of blockchain technology in non-financial sectors.

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H4: Through the use of blockchain technology, it is expected to build a high level of trust in transactions, both between individuals and institutions, due to the guarantee of high security and data integrity.

3. Findings

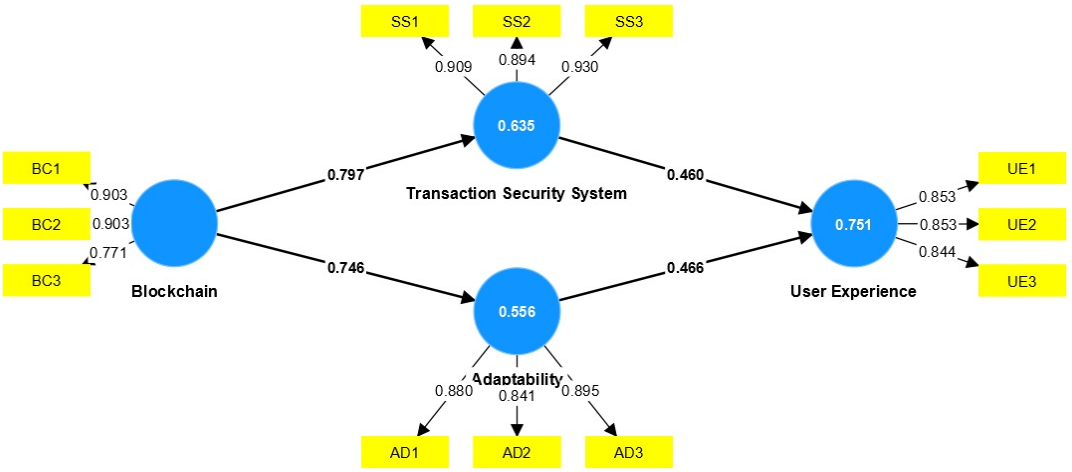

Figure.2 Conceptual model

A. Model Measurement

To evaluate the reliability of the constructs, two experiments were conducted. In this study, evaluated two types of validity, which are convergent validity and discriminant validity. Convergent validity aims to ensure that variables have a significant correlation with the objects they are related to[17][18]. Meanwhile, the discriminant validity test is used to prove that items of different variables do not show a significant relationship[19][20]. It aims to show that the data set is unique, and items of different variables are not interrelated[21].

a. Convergence validity

The researchers conducted a measurement model to assess the validity and reliability of the research model[22][23]. The Average Variance Extracted (AVE) value should exceed 0.5, while the loading factor value shouldexceed 0.7. AVE values above 0.5, outer loadings ranging from 0.4 to 0.7 can still be considered suitable for research. The composite reliability test has a minimum threshold of 0.7.

b. *Discriminant validity*

Regarding discriminant validity, the requirements outlined by Fornell and Larcker, Hetrotrait-Monotrait, and Cross loadings have been satisfied.

1. Fornell and Larcker criteria.
2. HTMT (Hetrotrait-Monotrait) analysis.
3. Cross loadings assessment.

B. Model Measurement

Tabel 1. Construct Evaluation

	Item	Outer Loading
AD1	Do you face any particular challenges or barriers in adopting blockchain technology in your organization or environment?	0.880
AD2	What is your view on the flexibility of blockchain technology in accommodating business growth and scale changes?	0.841
AD3	To what extent do you believe that blockchain technology can be adapted and applied in different types of transactions, especially in the non-financial sector?	0.895
BC1	How familiar are you with blockchain technology?	0.903
BC2	Have you used an app or platform that utilizes blockchain technology before?	0.903
BC3	To what extent do you feel comfortable using applications or platforms that utilize blockchain technology?	0.771
SS1	Are you aware that transactions using blockchain technology can provide a higher level of security compared to traditional transactions?	0.909
SS2	To what extent do you believe that blockchain technology can reduce the risk of fraud or manipulation in transactions?	0.894
SS3	To what extent do you believe that transactions using blockchain can protect the privacy and confidentiality of your data?	0.930
UE1	How much confidence do you have in the data security provided by blockchain technology?	0.853
UE2	To what extent do you feel that the use of blockchain technology increases the security and	0.853

	protection of your personal data and information when conducting transactions?	
UE3	Do you feel that the use of blockchain in transactions provides a more transparent and trustworthy experience compared to conventional transaction methods?	0.844

Tabel 2. Reliability and convergent validity.

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Adaptability	0.843	0.850	0.905	0.761
Blockchain	0.825	0.853	0.895	0.742
Transaction Security System	0.898	0.898	0.936	0.830
User Experience	0.811	0.830	0.887	0.723

Tabel 3. Fornell-Larcker Discriminant Validity

	Adaptability	Blockchain	Transaction Security System	User Experience
Adaptability	0.872			
Blockchain	0.746	0.861		
Transaction Security System	0.754	0.797	0.911	
User Experience	0.812	0.828	0.811	0.850

Table 3 displays the results of evaluating discriminant validity using the Fornell-Larcker Criterion. To fulfill the criterion, the squared correlation between each latent construct must exceed the correlation between different latent constructs. The results show that the correlation between each latent construct is higher than the correlation between different latent constructs. Thus, it can be concluded that each variable in this study has a high level of accuracy and validity.

Table 4. R-Square

Construct	R-Square
Adaptability	0.556
Transaction Security System	0.780
User Experience	0.751

Table 5. Summary of the results obtained from statistical hypothesis testing.

Hypothesis	Coefficient values standard	P-value	Decision
H1: Blockchain has a significant and positive impact on the Transaction Security System.	0.797	0.000	Supported
H2: The Transaction Security System has a significant and positive influence on User Experience.	0.790	0.000	Supported
H3: Blockchain has a significant and positive impact on Adaptability.	0.746	0.000	Supported
H4: Adaptability has a positive and significant effect on User Experience	0.758	0.000	Supported

3.1 Result and discussion

The test results of H1, H2, H3, and H4 show a positive and significant impact. Statistically, with a p-value of 0.000 <0.05 at the 5% significance level, all hypotheses (H1, H2, H3, and H4) are supported. **In Table 4**, it can be seen that the R-square of Adaptability is 0.556, indicating that 55.6% of the variation in adaptability can be explained by the influence of blockchain. The R-square of Transaction Security System reaches 0.780-indicating that 78.0% of the variation in transaction security system can be explained by the influence of blockchain. Furthermore, the User Experience R-square is 0.751, indicating

that 75.1% of the variation in user experience can be explained by the influence of blockchain.

4. Conclusion

Blockchain is a new type of database that is able to overcome a number of problems in centralized systems, such as transactions without intermediaries. The advantages of this technology include transparency, reliability, the ability to record transactions in a distributed manner, and the existence of a decentralized digital ledger, making Blockchain a reliable technology.

This study aims to test the hypotheses that have been proposed previously, and the test results conclude the following:

1. Blockchain has a significant and positive impact on the Transaction Security System.
2. Transaction Security System has a significant and positive impact on User Experience, and Blockchain also has a significant and positive impact on adaptability, especially in non-financial sectors such as logistics, healthcare, and supply chain.

The conclusion of this study also shows that Blockchain technology promises a future free from fraud and cheating, thanks to the benefits offered by this technology. Thus, the results of this study illustrate that Blockchain has promising potential and has an important role to play in creating a fair, trusted, and efficient business ecosystem in the future. Therefore, developers need to spend more time applying and implementing Blockchain in existing systems, especially in key industries. This will help create honest and trustworthy businesses, as well as promote the advancement of government and logistics systems.

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