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The Effectiveness of Blockchain Integration in Digital Payment Systems on Transparency and User Experience

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Abstract−The development of blockchain technology has created new opportunities to improve the quality of digital payment systems through greater transparency, ease of use, and transaction efficiency. These aspects are considered important factors in shaping user experience when utilizing digital payment services. Therefore, this study aims to examine the influence of perceived transparency, perceived ease of use, and transaction efficiency on user experience in blockchain-integrated digital payment systems. This study employed a quantitative approach by collecting data through an online questionnaire distributed to 407 respondents. The collected data were analyzed using multiple linear regression with the R programming language through the Kaggle platform. The results indicate that perceived transparency, perceived ease of use, and transaction efficiency have a positive and significant effect on user experience, with regression coefficients of 0.333, 0.255, and 0.205, respectively. These findings suggest that improving transparency, usability, and transaction efficiency in blockchain-based digital payment systems can enhance the overall user experience.

Keywords: Blockchain; Digital Payment System; Perceived Transparency; Perceived Ease of Use; Transaction Efficiency; User Experience

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1. INTRODUCTION

The development of digital technology has brought about many major changes across all aspects of life, particularly in the area of payments. The shift from cash transactions to digital payment systems has become an inevitable global trend. The widespread adoption of the internet and digital technology worldwide has given rise to new forms of digital payments. Kesavan & Srinivasan (2023) affirm that the increasing internet penetration and widespread use of digital technology have spurred various innovations in digital payment methods. This phenomenon is reflected in the emergence of various digital payment instruments such as digital wallets, QRIS, and electronic payment platforms that support people's lifestyles in a cashless digital economy ecosystem. Ghunaimi et al. (2025) state that mobile digital payment systems are a primary driver of the transition toward a cashless society, as evidenced by the adoption of digital wallets, QRIS, and electronic payment platforms that not only simplify transactions but also enhance financial inclusion, supported by government regulations and increasingly mature digital banking infrastructure.

The Indonesian government, through Bank Indonesia and the Financial Services Authority (OJK), continues to strengthen national digital-based payment system policies. According to the Bank Indonesia website (bi.go.id, 2024), the Indonesian Payment System Blueprint (BSPI) serves as a strategic guide directing the development of the national payment system, focusing on improving interoperability, data security, and transaction transparency, along with consolidation of the national payment industry, risk-managed innovation with consumer protection, strengthening international cooperation, and developing Digital Rupiah. In its implementation, Bank Indonesia has established working groups for data and digitalization as well as regulatory reform, licensing, and oversight to ensure that payment system integration runs safely, efficiently, and in accordance with good governance principles. This policy aligns with findings by Kasri et al. (2022) and Zhang (2024), which emphasize the critical role of digital payment systems in driving economic transformation and financial inclusion.

As digital payment systems continue to evolve, there is an increasing need for mechanisms that are not only fast and practical but also secure, transparent, and capable of enhancing user trust. Based on the Digital Threat Report for the First Semester of 2025 by awanpintar.id (2025), a surge of more than 23 times (from 0.20% to 4.66%) in Attempted Information Leak activities was recorded, along with a significant 23.11% increase in Attempted Administrator Privilege Gain. These data confirm that while digital payment systems continue to grow, cyberattacks are now shifting toward sensitive data theft and transaction fraud, indicating serious gaps in security and user trust in digital payment service providers. Research by Archibong et al. (2024) confirms that security is a key factor influencing trust and adoption of digital payment systems, making it critical to strengthen security aspects and user data protection to encourage broader use. This situation has driven the emergence of blockchain technology as an innovation believed to address the weaknesses of conventional digital payment systems. In addition, Gitobu & Ogetonto (2024) states that blockchain plays an important role in digital payment systems by providing transaction security, transparency, and automation through smart contracts that accelerate payment flows and reduce administrative costs. Through its decentralized nature, tamper-resistant transaction records, and ability to reduce costs and accelerate processes, blockchain is considered effective in maintaining data integrity while improving transaction efficiency through lower operational costs and real-time settlement mechanisms.

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Blockchain technology is currently being utilized widely, not only for cryptocurrencies as digital payment instruments between users such as Bitcoin and Ethereum, but also across various other sectors with real-world applications. In the payment and cross-border transfer sector, blockchain is also deployed through networks such as Ripple, which enables faster and more efficient transactions compared to traditional banking systems. The application of blockchain is becoming increasingly relevant as user demands for transparency, speed, and security in digital services grow, alongside the need for organizations to reduce reliance on intermediaries, cut operational costs, and build trust in digital business ecosystems, particularly in payment systems involving multiple parties and high transaction volumes. Consistent with this, findings by Nussir et al. (2025) show that blockchain integration in financial and banking systems can improve service performance through more efficient and effective transaction processes, while also strengthening transparency as an important factor in building user trust in digital payment systems.

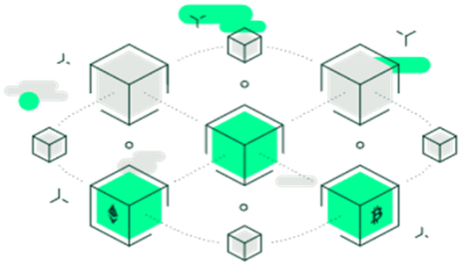


Figure 1. Blockchain Decentralization
Source: (Bitstamp, 2022)

Research by Kukman & Gričar (2025) states that blockchain has a strong connection to transparency through its permanent, open, real-time, and tamper-resistant transaction records. Blockchain technology strengthens accountability, facilitates auditing, and builds trust among parties compared to centralized systems that tend to be opaque. Tang et al. (2023) add that blockchain's distinctive characteristics, such as decentralization, openness, transparency, and resistance to falsification, address the limitations of traditional payment systems. Technically, blockchain functions as a distributed digital ledger in which every transaction is permanently recorded and verified by the network, making data difficult to manipulate and transparently accessible to authorized parties.

The increased transparency (perceived transparency) produced by blockchain technology is believed to strengthen user trust in digital payment systems, thus creating a safer, easier, and more efficient user experience. According to Tan & Saraniemi (2022), user trust in digital payment systems is built through immutable data transparency, intermediary-free transaction efficiency, and smart contract automation that improves ease and convenience. With increased trust and convenience, the user experience of digital payment systems becomes increasingly positive, ultimately driving higher satisfaction and adoption rates of blockchain-based payment services among the public.

The success of blockchain integration depends not only on its technological superiority but also on its ability to provide comfort, ease of use, and added value for users so that the technology can be widely accepted. Research by Martinez et al. (2024) suggests that blockchain implementation has the potential to enhance security through immutable data, prevent fraud, ensure full transparency and traceability, reduce costs by eliminating intermediaries, accelerate transaction verification and smart contract execution, and support sustainable development goals. The varied digital literacy levels among the public remain a challenge for adopting new technologies such as blockchain. Perceptions of system complexity often hinder the user experience and reduce interest in switching to blockchain-based digital payment platforms. This aligns with research by Norbu et al. (2025), which notes that ease of use is an important factor in driving blockchain adoption, as systems that are easy to understand and operate can increase trust and users' willingness to switch to the technology.

On the other hand, perceived ease of use is an important element that complements blockchain's technical advantages and determines the success of its integration into the digital payment ecosystem. The simpler and more intuitive a system is to use, the higher the adoption rate and user satisfaction. Research by Domashenko et al. (2023) notes that blockchain offers a distributed recording system that helps reduce dependence on third parties, lowers transaction costs, and improves data security. However, research by Hundekari et al. (2025) warns that the adoption of electronic payments may also have negative consequences, such as exposing users' personal and financial data, increasing the risk of identity theft, and damaging trust, which could threaten the stability of digital payment systems.

Thus, while blockchain integration in digital payment systems continues to develop, understanding of how transparency, ease of use, and transaction efficiency affect user experience remains limited. Blockchain emerges as an innovation offering decentralized mechanisms and tamper-resistant transaction records. This technology is believed to improve transaction speed, efficiency, and security while reducing fraud risks. These potentials underline the need for research exploring how this technology can provide added value for users, particularly in terms of transparency and transaction experience (Agustiana, 2024).

Blockchain is viewed as capable of improving transparency (perceived transparency), ease of use (perceived ease of use), and efficiency (transaction efficiency) in enhancing user experience in digital payment systems. Research by Tyagi & Beri (2025) highlights that blockchain technology is increasingly recognized for its ability to drive innovation

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in digital payment systems. Nevertheless, most studies remain conceptual and exploratory regarding adoption levels, without providing strong empirical evidence of the extent to which blockchain integration genuinely improves user experience. Tyagi & Beri (2025) also emphasize that empirical studies are still needed to test the effectiveness of blockchain integration, particularly regarding how this technology can genuinely improve transparency and provide optimal user experiences in digital payment systems. Therefore, this study aims to examine the effects of perceived transparency, perceived ease of use, and transaction efficiency on user experience in blockchain-integrated digital payment systems. Additional challenges arise in maintaining the balance between transparency and privacy, addressing perceptions of technological complexity, and considering the diverse digital literacy levels of the population. With the growing adoption of this technology across various sectors, research on blockchain integration in Indonesia's digital payment systems has the potential to make an important contribution to enriching global literature and providing policy input for national financial authorities. Policies supporting technological innovation will be critical in determining the success of blockchain integration in strengthening national financial infrastructure, driving digital payment system innovation, and advancing financial inclusion, while promoting financial stability and supporting adaptive regulatory policies (Norbu et al., 2025; Satoto et al., 2025).

2. RESEARCH METHODS

This study employs a quantitative approach to explore the relationships between perceived transparency, ease of use, and transaction efficiency on user experience within blockchain-based digital payment systems. Through a quantitative approach, the study produces measurable findings from numerical data and allows the researcher to test hypotheses objectively. According to Bungin (2017), quantitative methods emphasize systematic measurement processes to obtain an empirical picture of the phenomena under investigation. This research was conducted online via a digital survey platform, as online methods allow researchers to reach a wider range of respondents, save time, and simplify data distribution and collection. According to Drody et al. (2023), online research facilitates efficient and cost-effective data collection from large and geographically diverse samples, although participants' engagement in media multitasking may affect their attentiveness and, in turn, influence the reliability and interpretation of the research findings. The proposal writing began in October 2025 and continued until the research report was completed in June 2026, with all writing stages following the applicable academic schedule.

2.2 Population and Sample

The study population consists of all individuals who have used or are currently using digital payment systems, particularly those utilizing blockchain-based features such as cryptowallets, cross-border QRIS, or international transfers. The sample size was determined using the Slovin formula, with an estimated population of 130 million digital payment system users in Indonesia and a margin of error of 5%:

$$n = N / (1 + N \times e^2) = 130{,}000{,}000 / (1 + 130{,}000{,}000 \times 0.05^2) \approx 400$$

Based on this calculation, the minimum required sample is 400 respondents. This study successfully collected 407 respondents using purposive sampling with the following criteria: active users of digital payment services; having used blockchain-based features such as cryptocurrency wallets, cross-border payments, or trade finance.

2.3 Operational Definition of Variables

Table 1 shows the variables used in the study, along with their definitions.

Table 1. Operational Definition and Measurement of Research Variables

No	Variable	Definition	Indicators
1	Perceived Transparency (X1)	The ability of blockchain to present clear, validatable, immutable, and easily auditable transaction trails increases accountability, reduces corruption opportunities, and strengthens trust in digital payment systems in the public sector (Tyagi & Beri, 2025).	Transaction traceability: Blockchain-based digital payment systems provide users with the ease of clearly tracing past transaction information. Data security and immutability: The extent to which users perceive data protection and the assurance that transaction information cannot be altered.
2	Perceived Ease of Use (X2)	Users' perception that a technology is easy to operate, supported by a simple interface, smooth navigation, and low cognitive demands, which also drives blockchain acceptance (Fang et al., 2025; Norbu et al., 2025).	Navigation smoothness: Users' perception of the system's ability to provide a navigation flow where menus, features, and information can be found without confusion. Ease of completing transactions: The blockchain-based digital payment

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No	Variable	Definition	Indicators
			system helps users feel that transactions can be completed in simple steps.
3	Transaction Efficiency (X3)	The system's ability to process transactions quickly, at low cost, without intermediaries, supporting real-time settlement, and maintaining efficient performance in handling large-scale service requests (Alrehaili et al., 2025; Qin, 2025).	Low cost: By eliminating intermediaries, blockchain-based digital payment systems offer more affordable transaction fees. Transaction speed: The extent to which the system can process and complete transactions quickly, smoothly, and without delays.
4	User Experience (UX) (Y)	Users' perception in evaluating a product based on direct experience, forming their views on the level of comfort, ease of understanding the interface, and interaction quality throughout the usage process (Novák et al., 2024; Yulianti & Ghina, 2025).	Satisfaction during use: The level of comfort and satisfaction users feel when interacting with the blockchain-based digital payment system. Trust in the system: The level of users' confidence in the reliability and security of the system during the transaction process.

2.4 Conceptual Framework

Figure 1 presents the conceptual framework for this study.

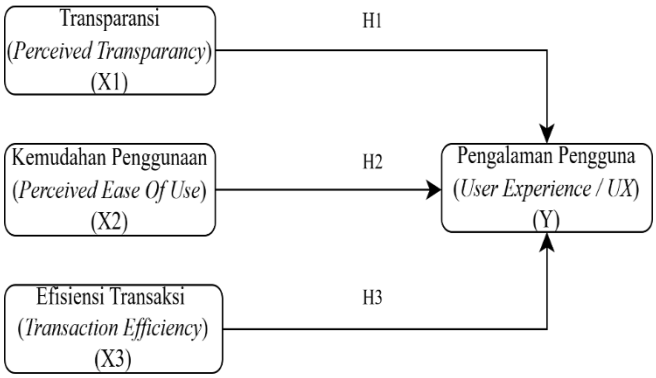


Figure 2. Research Conceptual Framework

2.5 Research Hypotheses

The research hypotheses were formulated based on theoretical review, the Technology Acceptance Model (TAM), and prior research findings indicating that transparency, ease of use, and transaction efficiency are related to user experience in the use of blockchain-based digital payment technology.
The hypotheses proposed in this study are:
H1: Perceived Transparency has a significant effect on User Experience (UX).
H2: Perceived Ease of Use has a significant effect on User Experience (UX).
H3: Transaction Efficiency has a significant effect on User Experience (UX).

2.6 Analysis and Testing Techniques

Data analysis was carried out in three stages: instrument testing, comprising validity testing (item-total correlation with p-value < 0.05) and reliability testing (Cronbach's Alpha ≥ 0.70); descriptive analysis, to describe respondent characteristics and variable distribution; and inferential analysis, comprising classical assumption tests (normality, multicollinearity, heteroscedasticity) and multiple linear regression with the model: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e$. To address heteroscedasticity, the robust standard error approach (White, 1980) was employed.

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Respondent Characteristics

This study involved 407 respondents with the following characteristics: by gender, 53.8% female and 46.2% male; by frequency of use, 39.1% use digital payment systems daily and 40.5% frequently (4–6 times/week); by application type,

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49.9% use crypto wallets, 35.4% mobile banking, 33.2% cross-border QRIS, and 30.0% e-wallets. The respondent composition indicates that the majority are accustomed to using blockchain-based digital payment systems in their daily activities.

3.1.2 Instrument Test Results

3.1.2.1 Validity Test

Table 2. Validity Test Results

Indicator	R_Count	R_Table	P_Value	Criteria
Y (UX)	0.849	0.097	0.000	Valid
X1 (Perceived Transparency)	0.826	0.097	0.000	Valid
X2 (Perceived Ease of Use)	0.822	0.097	0.000	Valid
X3 (Transaction Efficiency)	0.799	0.097	0.000	Valid

Based on the validity test results, all research variables meet the validity criteria. Table 2 shown by the correlation values (r_count) of each variable exceeding the r_table value of 0.097. The User Experience (Y) variable obtained an r_count of 0.849, while Perceived Transparency (X1), Perceived Ease of Use (X2), and Transaction Efficiency (X3) obtained values of 0.826, 0.822, and 0.799, respectively. All variables also show significance values (p-value) of 0.000, which is less than 0.05. These results indicate that every indicator used can accurately measure the research construct and is suitable for subsequent analysis stages.

3.1.2.2 Reliability Test

Based on the reliability test results, the research instrument obtained a Cronbach's Alpha value of 0.840. This value exceeds the minimum reliability threshold of 0.70, indicating that the research instrument is reliable. The results show that the indicators for Perceived Transparency (X1), Perceived Ease of Use (X2), Transaction Efficiency (X3), and User Experience (Y) demonstrate good consistency in measuring the research constructs. Therefore, the research instrument is declared suitable for subsequent analysis stages.

3.1.3 Inferential Statistical Analysis

3.1.3.1 Partial Test (t-test)

Table 3. Partial Test (t-test) Results

Variable	Regression Coefficient	t-value	p-value	Result
(Intercept)	4.528	6.050	0.000	Significant
Perceived Transparency (X1)	0.333	8.009	0.000	Significant
Perceived Ease of Use (X2)	0.255	7.489	0.000	Significant
Transaction Efficiency (X3)	0.205	5.054	0.000	Significant

The Table 3 t-test was conducted to determine whether each independent variable has a significant partial effect on the dependent variable. Based on the results, all independent variables show a significant effect on User Experience (UX). Perceived Transparency (X1) obtained a coefficient of 0.333 with a t-value of 8.009 and p-value of 0.000, indicating that perceived transparency has a positive and significant effect on user experience. Perceived Ease of Use (X2) has a coefficient of 0.255 with a t-value of 7.489 and p-value of 0.000, showing that ease of use significantly improves user experience. Transaction Efficiency (X3) obtained a coefficient of 0.205 with a t-value of 5.054 and p-value of 0.000, indicating that transaction efficiency also has a positive and significant effect on user experience. Thus, all partial hypotheses in this study are accepted, as each variable has a p-value < 0.05.

3.1.3.2 Simultaneous Test (F-test)

Table 4. Simultaneous Test (F-test) Results

Description	Value
F-value	158.134
df	(3; 403)
p-value	0.000
Criteria	Significant

The simultaneous F-test was conducted to determine whether all independent variables, namely Perceived Transparency, Perceived Ease of Use, and Transaction Efficiency, jointly have a significant effect on the dependent variable, User Experience (UX). Based on the results, an F-value of 158.134 was obtained with a significance value (p-value) of 0.000, which is less than 0.05. This indicates that the regression model is significant, so Perceived Transparency (X1), Perceived Ease of Use (X2), and Transaction Efficiency (X3) jointly influence User Experience (UX). The research model is deemed suitable for explaining the relationships between variables, and the simultaneous hypothesis is accepted.

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3.1.3.3 Coefficient of Determination (R^2)

Table 5. Coefficient of Determination (R^2) Results

Indicator	Value
R Square (R^2)	0.541
Adjusted R Square	0.537
Percentage of Influence	54.10%

The coefficient of determination test (R^2) was used to determine the extent to which the independent variables, namely Perceived Transparency, Perceived Ease of Use, and Transaction Efficiency, explain the dependent variable, User Experience (UX). The results show an R Square (R^2) value of 0.541, or equivalent to 54.1%. This indicates that Perceived Transparency (X1), Perceived Ease of Use (X2), and Transaction Efficiency (X3) can explain 54.1% of the variation in User Experience (UX), while the remaining 45.9% is influenced by other factors outside the research model. The Adjusted R Square value of 0.537 indicates that, after adjustment for the number of independent variables used, the research model still retains a reasonably good explanatory capacity for the dependent variable.

3.1.4 Classical Assumption Tests

3.1.4.1 Normality Test

Table 6. Residual Normality Test Results

Test Method	p-value	Conclusion
Shapiro-Wilk	2.152151e-07	Not Normal
Kolmogorov-Smirnov	5.847857e-12	Not Normal

Based on Table 6 the residual normality test using the Shapiro–Wilk method, the significance value (p-value) was found to be 2.152151e-07 (0.0000002152151), which is lower than 0.05. This result indicates that the residuals do not statistically satisfy the normality assumption. A similar result was obtained from the Kolmogorov–Smirnov test, which yielded a significance value of 5.847857e-12 (0.000000000005847857), suggesting that the model residuals are not normally distributed. Nevertheless, prior to conducting the analysis, this study performed an outlier identification and removal process to reduce extreme deviations that could potentially affect the residual distribution. Furthermore, based on the Normal P–P Plot, most residual points still exhibited a pattern that relatively followed the diagonal line, although deviations were observed in the tails of the distribution.

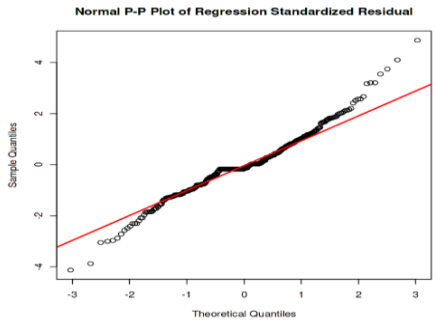


Figure 2. Normal P–P Plot of Regression Standardized Residuals

Although the normality assumption was not fully satisfied, this study employed a relatively large sample size of 407 respondents. Referring to the Central Limit Theorem (CLT), a large sample size causes the sampling distribution of parameter estimates to approximate a normal distribution, allowing regression analysis to remain suitable for inferential testing (Knief & Forstmeier, 2021). This approach is supported by the findings of Midway and White (2025), who argued that, in large samples, violations of the normality assumption generally have no substantial effect on regression estimates and statistical inference. Therefore, the regression model can still be applied for inferential analysis, considering that the parameter estimates remain sufficiently stable.

3.1.4.2 Multicollinearity Test

Table 7. Multicollinearity Test Results

Variable	VIF Value	Criteria	Conclusion
Perceived Transparency (X1)	1.683	VIF < 10	No Multicollinearity
Perceived Ease of Use (X2)	1.532	VIF < 10	No Multicollinearity
Transaction Efficiency (X3)	1.615	VIF < 10	No Multicollinearity

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Table 7 the multicollinearity test was conducted to determine the presence of high correlations among independent variables. The results show Variance Inflation Factor (VIF) values of 1.683 for Perceived Transparency (X1), 1.532 for Perceived Ease of Use (X2), and 1.615 for Transaction Efficiency (X3). All VIF values are below the maximum threshold of 10, indicating no multicollinearity in the research model. This means the independent variables do not have high correlations with each other, allowing each variable to independently explain its effect on User Experience (UX), and the regression model is suitable for further analysis.

3.1.4.3 Heteroscedasticity Test

Table 8. Heteroscedasticity Test Results (Glejser)

Variable	Coefficient	t-value	p-value	Conclusion
(Intercept)	3.551	7.088	0.000	—
Perceived Transparency (X1)	-0.069	-2.513	0.012	Heteroscedasticity Present
Perceived Ease of Use (X2)	-0.041	-1.790	0.074	No Heteroscedasticity
Transaction Efficiency (X3)	-0.024	-0.872	0.384	No Heteroscedasticity

The Glejser test results show that Perceived Transparency (X1) has a significance value of 0.012, which is less than 0.05, indicating heteroscedasticity in that variable. In contrast, Perceived Ease of Use (X2) obtained a significance value of 0.074 and Transaction Efficiency (X3) obtained 0.384, both greater than 0.05, indicating no heteroscedasticity. Therefore, robust standard errors were employed to obtain consistent statistical inference despite the presence of heteroscedasticity.

Table 9. Partial Test (t-test) Results with Robust Standard Error

Variable	Reg. Coefficient	Std. Error	t-value	p-value	Result
(Intercept)	4.528	0.798	5.674	0.000	Significant
Perceived Transparency (X1)	0.333	0.058	5.777	0.000	Significant
Perceived Ease of Use (X2)	0.255	0.045	5.623	0.000	Significant
Transaction Efficiency (X3)	0.205	0.051	4.047	0.000	Significant

Based on the partial test (t-test) using robust standard errors, Perceived Transparency (X1) has a positive and significant effect on User Experience (UX) with a coefficient of 0.333, Perceived Ease of Use (X2) with a coefficient of 0.255, and Transaction Efficiency (X3) with a coefficient of 0.205, with all variables having significance values less than 0.05. All partial hypotheses in this study are therefore accepted.

3.1.5 Multiple Linear Regression Analysis

Multiple linear regression analysis was used to determine the influence of several independent variables on a dependent variable simultaneously and partially. In this study, multiple linear regression was used to analyze the effects of Perceived Transparency, Perceived Ease of Use, and Transaction Efficiency on User Experience (UX) in blockchain-based digital payment systems. This analysis was also used to determine the direction and magnitude of the effect of each independent variable on the dependent variable. Based on the results of the multiple linear regression analysis, the regression equation obtained is:

$$Y = 4.528 + 0.333X_1 + 0.255X_2 + 0.205X_3 + e$$

The constant value of 4.528 indicates that if Perceived Transparency (X1), Perceived Ease of Use (X2), and Transaction Efficiency (X3) are assumed constant or unchanged, then the User Experience (UX) value is 4.528. The regression coefficient for Perceived Transparency (X1) of 0.333 shows that each one-unit increase in that variable will increase User Experience (UX) by 0.333, assuming other variables remain constant. Perceived Ease of Use (X2) has a coefficient of 0.255, indicating that a one-unit increase in perceived ease of use will increase User Experience (UX) by 0.255. Transaction Efficiency (X3) has a coefficient of 0.205, indicating that an increase in transaction efficiency will increase User Experience (UX) by 0.205. Thus, all independent variables have a positive direction of influence on User Experience (UX).

3.2 Discussion

3.2.1 Effect of Perceived Transparency on User Experience (UX)

The results show that Perceived Transparency has a positive and significant effect on User Experience (UX) with a regression coefficient of 0.333 and a significance value of less than 0.05. This indicates that the higher the level of transparency perceived by users of blockchain-based digital payment systems, the better the user experience. Transparency in blockchain systems allows users to trace transaction histories, verify payment information, and strengthen trust in the security of transaction data. Perceived Transparency represents public perception of the extent to which a system can present verifiable information, ultimately triggering perceptions of system integrity and reliability in the financial ecosystem (Völter et al., 2023). Research by Norbu et al. (2024) confirms that in blockchain-based digital payment systems, perceived transparency functions as a crucial mechanism that reduces information asymmetry between

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service providers and consumers, facilitating broader technology adoption. Furthermore, the transparency and encryption features inherent in this technology have been shown to alleviate user concerns about potential data breaches or system manipulation (Munandar et al., 2025). Implicitly, these findings indicate that digital payment system developers need to balance the technical complexity of blockchain with ease of information access for general users to ensure the long-term sustainability of system adoption.

3.2.2 Effect of Perceived Ease of Use on User Experience (UX)

The results show that Perceived Ease of Use has a positive and significant effect on User Experience (UX) with a regression coefficient of 0.255 and a significance value of less than 0.05. This indicates that the easier a blockchain-based digital payment system is to use, the better the user experience. Perceived Ease of Use refers to the extent to which users perceive digital payment applications as easy to learn, understand, navigate, and use when operating digital payment services in everyday economic activities (Safira et al., 2026). Research by Ferdiansyah et al. (2024) confirms that in blockchain-based digital payment systems, perceived ease of use is the primary predictor of users' intention to switch to a new platform, where ease of navigation and interface comprehension directly contribute to transaction efficiency. Consistent with this, perceived ease of use has been shown to increase productivity and the effectiveness of payment processes, ultimately driving user satisfaction in the blockchain-based digital payment ecosystem (Pandey & Kushwaha, 2025). The implication is that blockchain-based digital payment system developers need to prioritize user-friendly interface design to ensure this complex technology can be accepted and easily used by various segments of the population without requiring deep technical expertise.

3.2.3 Effect of Transaction Efficiency on User Experience (UX)

The results show that Transaction Efficiency has a positive and significant effect on User Experience (UX) with a regression coefficient of 0.205 and a significance value of less than 0.05. This indicates that the higher the transaction efficiency in blockchain-based digital payment systems, the better the user experience. Transaction Efficiency refers to the perception of the extent to which a system can process buying and selling activities in a shorter time while minimizing bureaucratic obstacles in the financial ecosystem (Munandar et al., 2025). In the blockchain-based digital payment ecosystem, this efficiency improvement not only accelerates the transaction cycle but also directly contributes to a higher perception of functional value for users, which is a fundamental aspect of successful financial technology adoption (Pandey & Kushwaha, 2025). Implicitly, these findings suggest that digital payment system developers should continuously optimize technical infrastructure to maintain processing speed, allowing users to experience real benefits in the form of time and cost efficiency that is more competitive compared to conventional payment alternatives.

4. CONCLUSION

Based on the research results on the effectiveness of blockchain integration in digital payment systems on User Experience (UX), it can be concluded that Perceived Transparency, Perceived Ease of Use, and Transaction Efficiency have a positive and significant effect on User Experience (UX). Perceived Transparency contributes to a better user experience by enabling users to trace transaction histories, verify payment information, and perceive transaction data as secure and difficult to alter. Perceived Ease of Use also enhances UX through understandable features, smooth navigation, and straightforward transaction processes. Meanwhile, Transaction Efficiency improves the overall experience through faster processing, cost efficiency, smooth transaction completion. These findings suggest that blockchain integration can support a better user experience when digital payment systems are designed to provide transparency, usability, and efficiency. This study is limited by its focus on three variables, use of a quantitative questionnaire, respondent diversity, evolving blockchain technology, and lack of comparison with conventional digital payment systems. Future research should include respondents from diverse demographic backgrounds, regions, and levels of digital payment experience. It should also examine factors such as security, trust, privacy, reliability, and usefulness, as well as the impact of recent technological developments, including Artificial Intelligence, the Internet of Things, mobile payment innovations, and emerging blockchain applications. Qualitative or mixed-method studies could provide deeper insights into users' experiences and their responses to these technological changes, while comparisons with conventional payment systems could identify their respective strengths and limitations in shaping UX.

5. DECLARATIONS

5.1. Author Contributions

Conceptualization: E. L.;
Methodology: E. L.;
Formal Analysis: E. L.;
Investigation: E. L.;
Data Curation: E. L.;
Writing Original Draft Preparation: E. L.;

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Supervision: I. H.;
Writing Review and Editing: E. L., and I. H.;
All authors have read and agreed to the published version of the manuscript.

5.2. Data Availability

The data presented in this study are available from the corresponding author upon reasonable request.

5.3. Funding

This research received no external funding.

5.4. Institutional Review Board Statement

Not applicable.

5.5. Informed Consent Statement

Participation in this study was voluntary. Respondents were informed of the purpose of the study, and submission of the completed questionnaire was considered implied consent to participate.

5.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

5.7. Generative AI and AI-assisted Technologies in the Writing Process

Generative AI tools were used to assist with improving the clarity and language of the manuscript. The authors reviewed and edited the AI-assisted content and take full responsibility for the final publication.

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