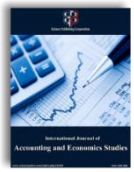
International Journal of Accounting and Economics Studies, 12 (8) (2025) 426-437

International Journal of Accounting and Economics Studies

Website: www.sciencepubco.com/index.php/IJAES
https://doi.org/10.14419/em49a627
Research paper



The Role of Blockchain Technology in Strengthening Zakat Disclosure and Muzakki Trust: A Post-Adoption Perspective

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Received: October 28, 2025, Accepted: December 8, 2025, Published: December 14, 2025

Abstract

This study explores how blockchain technology enhances transparency, accountability, and muzakki trust in zakat management, grounded in Institutional Trust Theory, Legitimacy Theory, and Technology Governance Theory. Focusing on the post-adoption stage, the research positions zakat disclosure as a mediator and sharia compliance as a moderator. Data from 200 muzakki in five East Java regions were analyzed using PLS-SEM. Results reveal that blockchain capability significantly improves zakat disclosure but does not directly influence muzakki trust. Instead, disclosure mediates the relationship, showing transparency as the key driver of trust. Moreover, sharia compliance strengthens the blockchain–trust link, emphasizing the role of religious legitimacy in digital zakat governance. The model demonstrated good fit (SRMR = 0.061; $R^2 = 0.365$; $Q^2 > 0$), indicating robustness and predictive relevance. The study contributes theoretically to Islamic social finance governance and offers practical guidance for developing transparent, auditable, and sharia-compliant zakat systems.

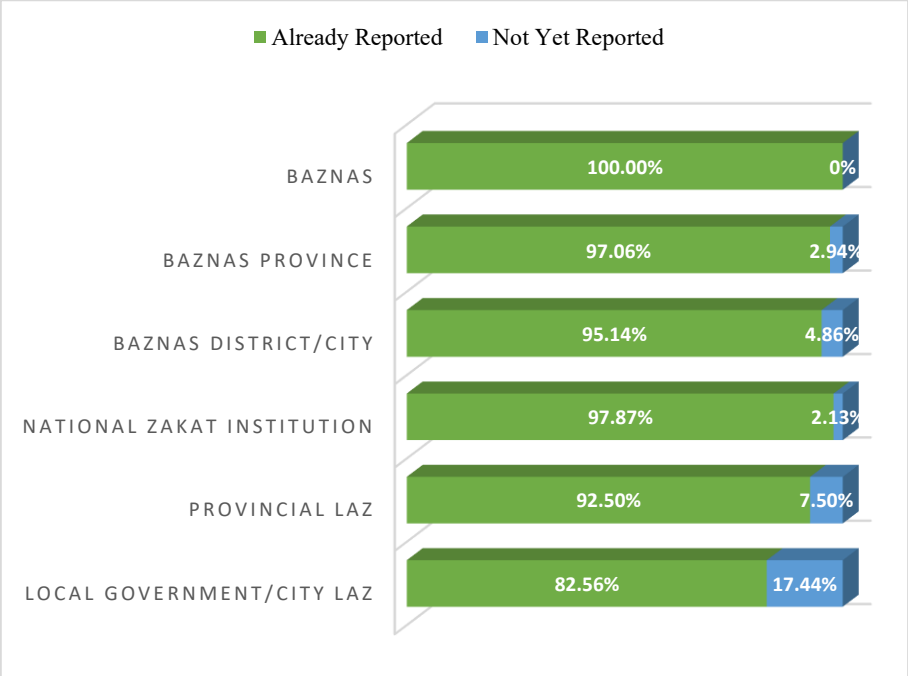
Keywords: *Blockchain; Sharia Compliance; Zakat Disclosure; Zakat Giver Trust; Zakat Governance.*

1. Introduction

Zakat is an important social Islamic finance instrument of redistribution and poverty eradication. It is, however, limited by a lack of accountability, low transparency, and low public trust (Adnan & Bakar, 2009; Al-Bawwab, 2023). Although research is increasing, the current research is still disjointed, and that is why an integrated governance framework is necessary (Alshater et al., 2021).

Digital transformation is commonly perceived as the means to increase credibility, and blockchain is often discussed as a technical solution that can provide transparency, immutability, traceability, and automated distribution using smart contracts. Evidence in the field of finance and logistics indicates that blockchain can enhance reliability and decrease information asymmetry and coordination costs (Difrancesco et al., 2023; Nanduri & Bonsignore, 2023). Research on blockchain-based zakat and charitable management in Malaysia and other Muslim-majority nations also states that such systems may empower the zakat management and increase the confidence of donors (Mohamed et al., 2023; Nazeri et al., 2023; Omar & Khairi, 2021).

Most of the contributions, however, are conceptual or prototype-based and highly technology-based, and many of them believe that technical transparency will automatically result in good governance and trust. The existing studies on early implementation in the context of donations and zakat report positive outcomes in terms of traceability and perceived professionalism (I. Ahmed et al., 2023; Khairi et al., 2025; Rangone & Busolli, 2021; Sahithi, Varsha, Dhanya, & Pv, 2025), but these are mostly limited to small-scale pilot studies, short observation periods, or even single-institution studies. Consequently, the data on whether blockchain can achieve long-term returns in the quality of disclosure and trust are inconclusive and partial. As a matter of fact, national evidence in Indonesia still shows a high level of governance gaps. Although central BAZNAS reports 100 percent compliance, in national reporting, district and city LAZ continue to report 17.44 percent noncompliance, as summarized in Graph 1 (Nasional, 2024).



Graph 1: Zakat Reporting Graph for 2024 by Zakat Management Type.

Source: National Zakat Agency (2024).

As graph 1 illustrates, the reporting performance is very well concentrated on the national level because compliance with local zakat management bodies, particularly at the district level and city LAZ, is also a problem. This mismatch implies that digitalization and regulation cannot eliminate the capacity vulnerabilities of organizations, reporting discipline, and supervision. The literature on zakat participation also repeatedly provides that muzakki behavior is primarily motivated by trust, transparency, and accountability (Bin-Nashwan et al., 2021; Hudaefi et al., 2022), and SDG-related debates discuss that the flows of zakat should be tracked and audited (M. A. Aziz, 2020). However, most of these studies consider transparency at a very high normative level and pay little regard to particular reporting architectures and technology governance structures, including blockchain-based ledgers and smart contracts, which may or may not solve the real issues of reporting illustrated in Graph 1. This puts a strain on positive expectations regarding digital zakat and continuing indicators of unequal adherence and weak faith in local institutions.

Pre-adoption views also dominate Indonesian literature about digital and blockchain-related zakat. UTAUT-based research, such as this one, emphasizes the performance expectancy, social influence, and facilitating conditions as the determinants of intention to use, and effort expectancy is less consistent (Juniati and Widiastuti, 2024). These results emphasize the significance of service quality and support of the ecosystem, albeit with a prejudice towards attitudes and intentions, but not on post-implementation events. Simultaneously, post-adoption and pilot research in the context of the wider Islamic social finance opine that the blockchain can enhance the traceability and donor assurance; nevertheless, it provides insights into constraints of scale, organizational readiness, and asymmetrical integration of current processes.

Collectively, this amount of literature leaves at least three questions about post-adoption unsatisfactorily addressed: to begin with, does the blockchain-based zakat management in fact enhance the disclosure practices in institutions with traditionally low reporting; second, to what extent do transparency and Sharia compliance translate into elevated muzakki confidence under the conditions of more than the prototype phase of digital systems implementation; and third, what governance principles would be needed to maintain this confidence (Bin-Nashwan et al., 2021). An emerging body of literature equally indicates significant risks and trade-offs of blockchain that are especially relevant to zakat governance. Researchers point to the characteristics that make transparency workable, namely, the permanence of data tracking and distributed replication, as creating privacy issues and conflict with confidentiality needs, in particular, when sensitive data about mustahik and donors is stored in-chain. According to other sources, blockchain systems are associated with implementation and maintenance costs that are not trivial, complexity, and energy usage, which can be challenging for smaller zakat institutions to afford and distract from the program activities (Polcumpally et al., 2024). User literacy and digital inclusion in most Muslim-majority settings are also unequal, increasing the chances that complex blockchain interfaces can be more beneficial to the more educated, urban muzakki and leave others behind. As a whole, these discussions indicate that blockchain cannot be viewed as a neutral and universally useful system; its effect will be determined by the integration of this concept into institutional structures, the regulation of privacy and cost-benefit, and the extent to which users are aware of the system and trust it.

This study, by placing blockchain directly against the context of these unresolved theoretical and empirical issues, does not apply blockchain as a solution but views it as a mediating mechanism and Sharia compliance as a moderating type of religious legitimacy and empirically tests its applications in the Indonesian digital zakat ecosystem. By concentrating on real muzakki users in institutions working in an environment of uneven reporting performance, we can be in a position to critically evaluate whether using blockchain-enabled disclosure, together with Sharia governance, can possibly contribute to enhanced trust and in what conditions it may fail.

There are three perspectives on which this research is based theoretically. First, as the Institutional Trust Theory states, institutional trust relies on the impression of ability, integrity, and benevolence (Lee et al., 2022; Mayer et al., 1995; Schilke et al., 2023; Sondern, 2024; Svare et al., 2019; Tomlinson et al., 2020). Transparency and accountability, operationalized in digital zakat by zakat disclosure, are thus a key principle in developing muzakki trust (Hadi et al., 2024; Khatiman et al., 2021; Riani & Rusydiana, 2022; Salat et al., 2024; Zulfikri et al., 2022). Second, the theory of legitimacy highlights that organizations benefit through the support of the people when their actions conform to the social values and norms; in zakat organizations, Sharia compliance serves as the primary source of religious legitimacy (Febriandika et al., 2023; Sawmar & Mohammed, 2021; Suchman, 1995). Third, Technology Governance Theory considers technology a governance model that can enhance transparency, accountability, and control. The concept of blockchain in this study is understood as a

technology governance implementation with the characteristics of a distributed ledger and data traceability (Liu et al., 2022; Weill & Ross, 2004).

The given research formulates and evaluates a blockchain-mediated zakat management framework whose dependent variable is muzakki trust, the mediator is zakat disclosure, and the moderator is Sharia compliance. The technological variables, such as distributed ledger, smart contracts, and traceability, help to improve transparency and accountability, whereas governance incorporates Sharia-based principles that help to guarantee religious legitimacy and compliance with regulations. In comparison to earlier blockchain-zakat studies, which are largely conceptual, prototype-related, or concerned with the intention to adopt (Ikhsan, 2023; Mohamed et al., 2023; Nazeri et al., 2023; Omar & Khairi, 2021).

There are three novelty points of this study. To begin with, it advances the lens to the post-adoption phase by looking at how blockchain prowess, as construed by the real users of muzakki in Indonesian zakat facilities, influences the experienced disclosure behaviors and trust results, as opposed to attitudes towards the potential usage. Second, to the best of our knowledge, it is the first empirical study of zakat disclosure as an intervening factor to model Sharia compliance as a source of religious legitimacy moderator of the blockchain-trust relationship in a unified PLS-SEM model. Third, it directly locates blockchain within Technology Governance Theory and combines it with Institutional Trust Theory and Legitimacy Theory, thus redefining blockchain not as a technical artifact but as a component of a larger governance framework of Islamic social finance.

In practice, this post-adoption integrated model creates design implications beyond a proposal to be more digitalized. It defines the set of technological qualities (immutability, traceability, smart contracts), disclosure characteristics, and Sharia governance frameworks, which are empirically related to increased muzakki trust, and gives specific guidance to regulators and zakat institutions on how to develop transparent, auditable, and Sharia-compliant reporting frameworks to support sustainable Islamic finance and the SDGs (Y. Aziz et al., 2020). With these gaps and debates, the following section outlines the theoretical bases and hypotheses off of which the empirical model is guided.

2. Theoretical Basis and Hypothesis

2.1. Relationships between variables in the research model

Based on this, the subsequent subsections will outline how the constructs should relate to each other and formulate the research hypotheses. This paper combines Technology Governance Theory (Weill & Ross, 2004), Institutional Trust Theory (Mayer et al., 1995), and Legitimacy Theory (Suchman, 1995) to show how technology, transparency, and Sharia compliance make digital zakat governance more effective. Blockchain is a governance system that improves transparency, accountability, and integrity of data; perceived power, goodwill, and integrity in blockchain applications according to Sharia grants institutional trust, which strengthens the trust of the people as it establishes religious legitimacy; and Sharia compliance offers a form of religious legitimacy, enforcing the trust of the people. The combination of these theories implies that blockchain can enhance the disclosure of zakat, which subsequently enhances muzakki trust and is reinforced by Sharia compliance.

1) Blockchain Capabilities and Zakat Disclosure

Technology Governance Theory focuses on the rights of the decisions, collective responsibility, and supervision of transparency so that the technology can serve organizational objectives. When applied to digital zakat institutions, technology thus does not only serve as a tool in the operations of the institution; it also functions as a checks-and-balances tool that promotes transparent and accountable allocation of state resources.

In this paper, blockchain is the representation of such a governance role with three primary abilities. First, immutability and auditability guarantee that it is impossible to manipulate zakat transactions and make them permanently verifiable (Almaghrabi & Alhogail, 2022; Rangone & Busolli, 2021). Second, traceability enables real-time monitoring of muzakki to mustahik flows to enhance transparency and disclose institutional data throughout the collection-distribution chain (Mohamed et al., 2023). Third, smart contracts automate the Sharia-based rules of eligibility, timing, and proportional distribution and minimize errors of discretion and human intervention (Fernández et al., 2023; Khan et al., 2021).

These strengths make blockchain a technology governance infrastructure that enables automated, responsible, and auditable decision-making based on Weill and Ross's (2004) concepts of decision rights and accountability. Blockchain is likely to improve the quality of zakat disclosure and promote institutional integrity and legitimacy by making the collection, management, and distribution of zakat funds more transparent (Tan et al., 2022). This way, it creates both social and technical advantages, which promotes the social and religious legitimacy of zakat institutions.

H1: The management of zakat using blockchain enhances the quality of zakat disclosure.

2) Zakat Disclosure and Muzakki Trust

The transparency of the institutions with regard to reporting their funds collection, management, and distribution is manifested in the form of Zakat reporting. The institutional theory maintains that normative, coercive and imitative forces induce organizations to become transparent and accountable so as to achieve social legitimacy. Disclosure is hence a practice of administration as well as a strategic tool of presenting legitimacy and trustworthiness.

Institutional Trust Theory states that trust is developed based on the perceptions of capability, goodwill, and honesty (Mayer et al., 1995). The disclosure of zakat in high quality reinforces these dimensions through the display of managerial ability, sincerity, and social responsibility. Muzakki trust and involvement are found to be elevated by transparency in zakat reporting (Shafiyyah & Fithria, 2023). On the other hand, a lack of transparency in reporting on the usage of the zakat funds is cited as the primary source of suspicion and redirection of finances outside the formal institutions (Saad & Farouk, 2018).

The accomplishment of the SDGs is also facilitated by clear and responsible zakat management, which enhances the performance and legitimacy of the Islamic social finance institutions (Md. S. Alam, 2022; Dirie et al., 2023). Previous studies find disclosure to influence various levels of trust: cognitive and rational trust based on a more positive perception of institutional performance (Mayer et al., 1995), affective trust based on the emotional relationships established by institutional openness (Zulfikri et al., 2022), and internalized trust founded on transparency and compliance with accountability laws (Ikhwandha & Hudayati, 2019). On these grounds, zakat disclosure has a twofold nature: on the normative level, as a moral and Sharia obligation; on the strategic level, as a means of acquiring legitimacy and social confidence.

H2: Intense disclosure of zakat enhances the trust of muzakki in zakat institutions.

3) The Direct Influence of Blockchain on Muzakki Trust

The suggested direct impact of blockchain on muzakki trust is due to depth issues of governance in zakat management, like lack of transparency, efficiency, and accountability (Sahithi, Varsha, Dhanya, & Pv, 2025). Trust, according to the Institutional Trust Theory, relies on perceived ability, integrity, and benevolence (Mayer et al., 1995). These dimensions can be supported with the help of blockchain through the ability to manage funds accurately (ability), unchangeable and verifiable transactions (integrity), and an increased institutional openness and social responsibility (benevolence).

Empirical data show that open and accountable administration of zakat boosts muzakki credibility, but feeble disclosure gives rise to direct gift-giving, which is a blow to the national zakat system (A. Alam et al., 2023; Dethier et al., 2023; Qu & Daniel, 2021)This is because blockchain enhances accountability and data protection by using a ledger that is resistant to tampering and verifiable transactions, which are objectives of Technology Governance Theory, as technology can be a tool of control, transparency, and accountability (Khairi et al., 2025; Weill & Ross, 2004).

Under the Legitimacy Theory, blockchain has the potential to increase the legitimacy of zakat institutions through open, equitable, and effective administration of funds congruent to Islamic values (Suchman, 1995). Research indicates that blockchain enhances operational efficiency, transparency, and institutional reputation in zakat management as a trust-building mechanism, which is a technology innovation and reduces information asymmetry (Omar & Khairi, 2021; Zulfikri et al., 2023).

H3: Zakat management implementation via blockchain leads to a direct rise in the level of trust distributed by muzakki to zakat institutions.

4) Zakat Disclosure as Mediation

It is hoped that blockchain enhances the connection between technology management and the credibility of zakat payers, mainly with the impact on disclosure. Technology Governance Theory states that blockchain can offer control and accountability through transparent, auditable, and unaltered processes, and Sharia-compliant smart contracts can increase the quality of disclosure and institutional trust (Khairi et al., 2025; Sung et al., 2023; Weill & Ross, 2004).

Institutional Trust Theory is the argument that disclosure creates trust by making the action perceived to have ability, integrity, and benevolence (Mayer et al., 1995). Quick and precise zakat reporting is an indicator of capability; unalterable records increase integrity, and access to information is an act of benevolence. Empirical data proves that digital disclosure can improve the trust of the donors in the Islamic financial institutions (Abojeib et al., 2023).

As per the Legitimacy Theory, zakat disclosure will also act as a mechanism of religious legitimacy since the continuity of Sharia-based reporting will indicate that it abides by social and religious norms and enhance the acceptance of digital zakat systems among the population (Suchman, 1995), and (Riani & Rusydiana, 2022). The records that blockchain has to offer cannot be changed, which makes the information given by this cryptographic tool look more authentic and credible.

It has been demonstrated that blockchain-based disclosure decreases the information asymmetry and increases the trust of the population by allowing the donor to trace funds collected to their distribution (Fernández et al., 2023; Rangone & Busolli, 2021). More transparency, accuracy, and traceability should hence indirectly create trust by increasing the quality of disclosure, which would raise muzakki confidence in zakat institutions.

H4: Blockchain application positively influences the trust of muzakki in terms of zakat disclosure.

5) Sharia Compliance as a Moderator

Indirectly, higher levels of transparency, accuracy, and traceability are consequently likely to create trust and increase muzakki confidence in zakat institutions (Mayer et al., 1995) and (Ikhsan, 2023; Zulfikri, 2021).

In terms of the Legitimacy Theory, Sharia compliance is the form of religious legitimacy that occurs when zakat institutions are oriented to Islamic norms. The introduction of blockchain that is not associated with the observance of Sharia can consequently generate an atmosphere of mistrust, as muzakki consider not only the technological effectiveness but also the adherence to Sharia. The empirical studies have revealed that Sharia compliance plays a significant role in determining donor trust and behavioral intentions in Islamic finance and zakat (Firdaus et al., 2024; Khan et al., 2021). Under the Technology Governance Theory, sound technology governance in zakat should be based on Sharia principles of intent, process, and purpose. Blockchain provides operational control, whereas Sharia compliance provides ethical and religious legitimacy, which together form cognitive trust based on transparency and affective trust based on religious alignment (Jadoon & Hasan, 2023).

According to the recent studies, the technological transparency coupled with the Sharia compliance is stronger in producing trust than each individual aspect. Islamic philanthropy systems, which are based on blockchains, have a higher degree of trust when they are certified in accordance with Sharia, and an increased degree of Sharia compliance is observed to enhance the connection between institutional transparency and muzakki loyalty (Firdaus et al., 2024). Therefore, Sharia compliance serves as one of the moderating variables that enhance the positive effect of blockchain on muzakki trust.

H5: Sharia compliance enhances the positive effect of blockchain application on muzakki trust.

Having established the theoretical model and hypotheses, the next section describes the research methodology used to test these relationships.

3. Research Methodology

In this quantitative research, the researchers applied a field survey to investigate the impact of blockchain-based zakat management on muzakki trust, with a mediator variable of zakat disclosure and the moderator of Shariah compliance. The target group was comprised of muzakki and zakat managers who made transparent, secure, and efficient transactions involving the zakat using blockchain. The sample was selected based on the five regional coordination offices in East Java, namely Jember, Surabaya, Malang, Kediri, and Madiun, which were chosen due to their relatively high levels of digital zakat and presence of active zakat management bodies. SEM-PLS sampling of 10 times was applied to determine the number of respondents (Hair et al., 2022).

The 200 respondents were the final sample that was in line with SEM-PLS guidelines. According to (Hair et al., 2022), the number of needed respondents to estimate a model with fewer than seven items is sufficient (100-200), and (Wong, 2013) suggests that the number of indicators identified within a construct should not be less than ten. (Kock & Hadaya, 2018) also indicate that a sample of about 200 respondents would contribute to the stability and accuracy of the estimates of models that entail mediation and moderation. Table 1 presents the distribution of the respondents in the five regions.

Table 1: Sample Distribution Table

No	Regional Coordination Agency	Region	Population Size	Sample Size
1	Regional Coordination Agency 1 Madiun	Madiun City/District	55	20
2	Regional Coordination Agency 2 Bojonegoro	Kediri City/District	68	40
3	Regional Coordination Agency 3 Malang	Malang City/District	115	60
4	Regional Coordination Agency 4 Pamekasan	Surabaya City	130	50
5	Regional Coordination Agency of Jember	Jember Regency	80	30
Amount				200

Source: Data processed by the author.

Questionnaires were distributed via FGDs with enumerators (zakat officers) across five East Java regional offices, where discussions covered blockchain-based zakat management, zakat disclosure, Sharia compliance, and muzakki trust.
Data were collected via a 5-point Likert scale questionnaire, validated through expert review and pilot testing, and analyzed using SmartPLS 4 with PLS-SEM. Data sources included literature reviews, questionnaires, interviews, and FGDs, with variable relationships shown in the research model below.

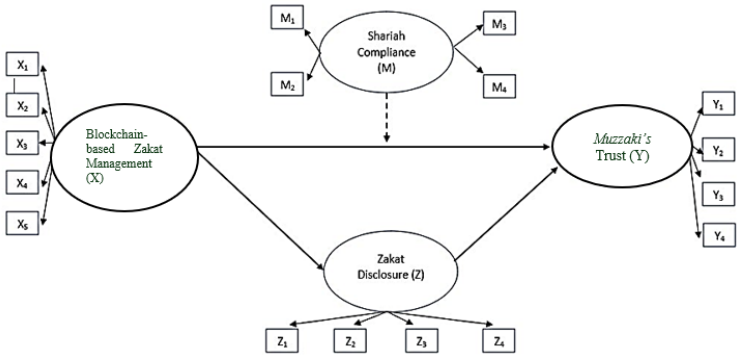


Fig. 1: Research Conceptual Framework.

Source: Data processed by the author.

Figure 1 presents the conceptual framework of this study. Blockchain-based zakat management (X) is specified as the exogenous construct that influences both zakat disclosure (Z) and muzakki trust (Y). Zakat disclosure (Z) functions as a mediating mechanism, transmitting the effect of blockchain capability on muzakki trust, while Shariah compliance (M) moderates the direct path from X to Y, such that the relationship between blockchain-based zakat management and muzakki trust becomes stronger (or weaker) depending on the perceived level of Shariah adherence. All relationships depicted in Figure 1 are subsequently tested simultaneously using PLS-SEM.

4. Result

4.1. Descriptive statistics

Table 2 shows that all respondents are muzakki whose monthly income is above the kifayah threshold (Rp3 million), indicating that they are financially able to pay zakat. Most respondents are men (54%), with women making up 46%. The largest age groups are 26–35 years (35%) and 36–45 years (30%), followed by 18–25 years (20%) and above 45 years (15%).
In terms of education, respondents mostly hold a bachelor's degree (45%), followed by high school or equivalent (30%), master's degrees (20%), and doctoral degrees (5%). Their income is mainly in the Rp3–5 million (38%) and Rp5–10 million (40%) brackets, with 22% earning more than Rp10 million per month. Geographically, respondents are concentrated in Surabaya (30%), Malang (25%), Jember (18%), Kediri (15%), and Madiun (12%). Overall, they are productive, relatively well-educated, upper-middle-income zakat payers who are representative of the five Regional Coordination Boards in East Java. Respondent characteristics by gender, age, education, income, and domicile are summarized in Table 2.

Table 2: Respondent Characteristics

Variable	Category	N	%
Gender	Male	108	54
	Female	92	46
Age	18-25	40	20
	26-35	70	35
	36-45	60	30
	>45	30	15
Education	High School/Equivalent	60	30
	S1	90	45
	S2	40	20
	S3	10	5
Monthly income	Rp 3-5 million	76	38
	Rp 5-10 million	80	40
	>Rp 10 million	44	22
	Jember	36	18
	Surabaya	60	30
Domicile	Malang	50	25
	Kediri	30	15
	Madiun	24	12

Source: Data processed by the author.

4.2. Analysis of the measurement model (outer model)

The study's measurement model was tested for convergent validity, discriminant validity, and construct reliability using PLS-SEM (Hair et al., 2022). Indicators were adapted from prior research: Muzakki Trust (Y) from (Mayer et al., 1995) and (McKnight et al., 2000); Blockchain-Based Zakat Management (X) from (Tan et al., 2022) and (Beik et al., 2023); the indicators for fer to (Ibrahim & Mahmod, 2023); and Shariah Compliance (M) from (Haniffa & Hudaib, 2007) and (Nazeri et al., 2023).

1) Convergent Validity and Construct Reliability

The convergence test shows all indicators have outer loadings above 0.70, and all AVE values exceed 0.50, indicating that constructs explain over half of their indicator variance (Hair et al., 2022). Table 3 also shows CR and Cronbach's Alpha above 0.70, confirming strong internal reliability. Thus, all variables meet the standards for convergent validity and construct reliability. Table 3 summarizes the outer loadings, AVE, composite reliability, and Cronbach's alpha for each construct.

Table 3: Results of Reliability and Convergent Validity Tests

Variable	Loading	AVE	Composite Reability	Cronbach's Alpha
Muzzaki's Trust (Y)		0,690	0,853	0,850
My zakat is distributed with integrity (Y1)	0,810			
The digital zakat system prevents fraud (Y2)	0,805			
Transparency of zakat institutions (Y3)	0,879			
Willingness to pay zakat through this system (Y4)	0,824			
Blockchain-based Zakat Management (X)		0,648	0,864	0,858
The zakat system uses digital blockchain-based recording (X1)	0,743			
Zakat transactions are transparent and cannot be manipulated (X2)	0,790			
Use of smart contracts in zakat distribution (X3)	0,824			
Zakat funds can be traced by the muzakki (X4)	0,796			
The blockchain-based zakat system minimizes intermediaries (X5)	0,828			
Zakat Disclosure (Mediation) (Z)		0,650	0,781	0,789
Zakat institutions provide open financial reports (Z1)	0,808			
Reports on zakat fund distribution are publicly accessible (Z2)	0,798			
Mustahik information is clearly available (Z3)	0,756			
Zakat distribution performance is reported periodically (Z4)	0,746			
Shariah Compliance (Moderation, M)		0,625	0,833	0,825
The digital zakat system complies with the DSN-MUI fatwa (M1)	0,782			
Zakat distribution is based on maqashid syariah (M2)	0,826			
The mustahik validation process follows shariah principles (M3)	0,787			
Shariah audits are conducted periodically (M4)	0,827			

Source: Author's analysis.

2) Discriminant Validity

Discriminant validity was confirmed using the Fornell–Larcker criterion and HTMT. The square root of each construct's AVE exceeds its correlations with other constructs, and all HTMT values are below 0.90 (Henseler et al., 2015), indicating that each construct is distinct and suitable for structural analysis.

Table 4: Fornell–Larcker Criterion

Construct	X (Blockchain)	Z (Disclosure)	Y (Trust)	M (Shariah Compliance)
X (Blockchain)	0.930			
Z (Disclosure)	0.683	0.884		
Y (Trust)	0.601	0.702	0.923	
M (Shariah Compliance)	0.458	0.521	0.635	0.912

Source: Author's Analysis.

Table 4 shows that the diagonal values (square root of AVE) exceed inter-construct correlations, confirming that the Fornell–Larcker criterion is satisfied (Hair et al., 2022).

Table 5: Heterotrait-Monotrait Ratio (HTMT)

Inter-Construct Relationships: HTMT	
X ↔ Z	0.786
X ↔ Y	0.672
Z ↔ Y	0.711
X ↔ M	0.608
Z ↔ M	0.688
Y ↔ M	0.741

Source: Author's Analysis.

As shown in Table 5, all HTMT values are below the 0.90 threshold. (Henseler et al., 2015), indicating that discriminant validity has been met for all constructs.

3) Conclusion of the Measurement Model

The measurement model results confirm that all constructs meet PLS-SEM validity and reliability standards, ensuring the research instrument reliably measures the blockchain-based zakat model relationships. (Hair et al., 2022).

4.3. Structural model analysis (inner model)

After confirming validity and reliability, the structural model was tested to assess relationships between constructs, including R^2, adjusted R^2, effect size (f^2), predictive relevance (Q^2), collinearity (VIF), and model fit (SRMR), following (Hair et al., 2022).

1) Coefficient of Determination (R^2 and Adjusted R^2)

The R^2 values indicate that 36.5% of the variance in muzakki trust (Y) and 34.4% of the variance in zakat disclosure (Z) are explained by the model constructs, reflecting the explanatory power of blockchain and related factors. The adjusted R^2 values of 0.356 (Y) and 0.342 (Z) indicate a stable level of predictive accuracy after taking into account the number of predictors. Based on Cohen's (1988) interpretation, R^2 values between 0.33 and 0.67 indicate moderate explanatory power, suggesting that this model has adequate strength.

Table 6: R-Square Analysis

	R-square	R-square adjusted
Satisfaction of Muzakki (Y)	0,365	0,356
Zakat Disclosure (Z, Mediation)	0,344	0,342

Source: Author's Analysis.

2) Collinearity Test and Model Fit

All VIF values below 5 indicate no multicollinearity between constructs (Hair et al., 2022). An SRMR value below 0.08 and an NFI above 0.90 indicate that the model has a good level of fit and that the structure of relationships between variables is consistent with the empirical data. (Henseler et al., 2015).

Table 7: Collinearity Test and Model Fit Results

Construct	Indicator	VIF	Description
X → Z	Blockchain Capability on Zakat Disclosure	1.892	There is no multicollinearity.
Z → Y	Zakat Disclosure on Muzakki Trust	2.314	There is no multicollinearity.
M × X → Y	Interaction of Shariah Compliance × Blockchain Capability on Muzakki Trust	2.556	There is no multicollinearity.

Source: Author's Analysis.

SRMR (Standardized Root Mean Square Residual) = 0.061

NFI (Normed Fit Index) = 0.913

d ULS = 0.211, d G = 0.189.

All VIF values < 5 indicate no multicollinearity between constructs. (Hair et al., 2022). SRMR values < 0.08 and NFI > 0.90 indicate that the model has a good level of fit and the structure of relationships between variables is consistent with the empirical data.

3) Effect Size (f^2)

Effect size testing (f^2) was conducted to assess the magnitude of the relative influence of each exogenous construct on the endogenous construct.

Table 8: Effect Size (f^2) between Constructs

Construct	F^2 value	Category
X → Z	0.36	Large
Z → Y	0.18	Moderate
M × X → Y	0.12	Small-Medium

Source: Author's Analysis.

Based on the test results, the Blockchain-Based Zakat Management variable (X) has a significant impact on Zakat Disclosure (Z) ($f^2 = 0.36$, large category), while Zakat Disclosure (Z) has a moderate impact on Muzakki Trust (Y) ($f^2 = 0.18$, moderate category).

Meanwhile, the interaction of Shariah compliance (M) strengthens the relationship between blockchain capability (X) and muzakki trust (Y) with a small-to-moderate effect ($f^2 = 0.12$). Based on Cohen's (1988) criteria, these results indicate that the relationships between constructs are substantive and practically relevant.

4) Predictive Relevance (Q^2) and Model Robustness Test

Predictive relevance (Q^2) testing was conducted through a blindfolding procedure to assess the model's ability to predict systematically omitted data.

Table 9: Predictive Relevance (Q^2) Value and Model Robustness

Endogenous Variable	Q^2 Value	Description
Muzakki's Trust (Y)	0.254	Good Predictive Relevance
Zakat Disclosure (Z)	0.236	Good Predictive Relevance

Source: Author's Analysis.

A Q^2 value greater than 0 indicates that the model has good predictive relevance and is robust to data variations. (Hair et al., 2022). The results of the blindfolding procedure also demonstrate the model's ability to predict systematically omitted data with stable accuracy.

As an additional test, bootstrapping resampling was performed on 5,000 subsamples, and a blindfolding test with an omission distance of 7. The results show that the distribution of coefficients across paths is stable and there are no significant differences between subsamples, indicating that the model is empirically robust and consistent.

Table 10 reports the bootstrapping results for all structural paths, providing the basis for hypothesis testing presented in Figure 2.

Table 10: Bootstrapping Results (5,000 Subsamples)

Relationships Between Constructs	Original Sample	Standard Error	T-Statistik	P-Value	Description
X → Y	0.085	0.079	1.082	0.279	Not Significant
X → Z	0.586	0.052	11.172	0.000	Significant
Z → Y	0.303	0.075	4.067	0.000	Significant
X → Z → Y	0.178	0.046	3.858	0.000	Significant (Full Mediation)
M × X → Y	-0.092	0.027	3.350	0.001	Significant (Negative Moderation)

Source: Author's Analysis.

5) Conclusion of the Structural Model
Overall, the structural model demonstrates good fit and predictive power, with R^2 and f^2 indicating moderate to strong explanatory strength, and SRMR and Q^2 confirming validity and robustness.
Hence, the research model is suitable for hypothesis testing, reinforcing blockchain's relevance in digital zakat by explaining zakat disclosure mechanisms and enhancing muzakki trust.

4.4. Hypothesis testing

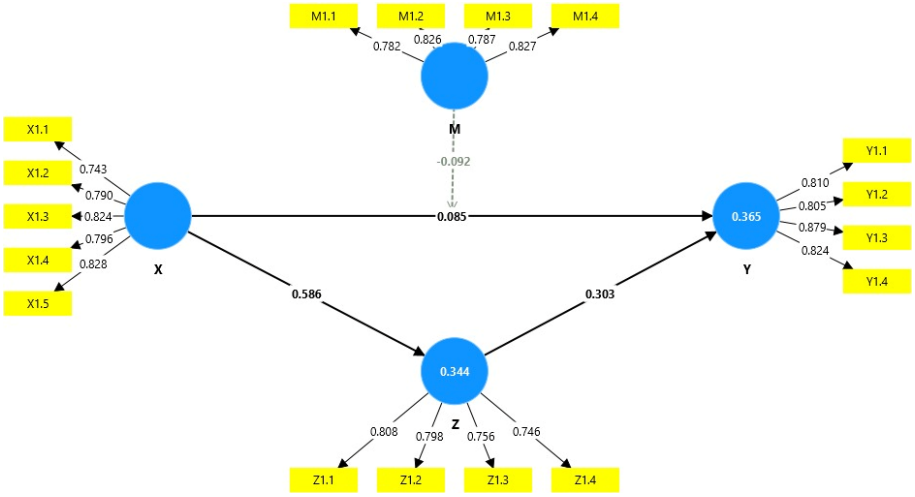


Fig. 2: PLS Path Diagram Model.

Source: Data processed by the author.

Figure 2 displays the estimated PLS path diagram, including the standardized coefficients for all structural relationships among blockchain-based zakat management (X), zakat disclosure (Z), muzakki trust (Y), and the interaction term between Shariah compliance (M) and blockchain capability (X). As shown in Figure 2, the path from blockchain-based zakat management to zakat disclosure is positive and substantial, whereas the direct path from blockchain to muzakki trust is relatively weak. Zakat disclosure exerts a positive effect on muzakki trust, and the interaction path (M × X → Y) indicates a significant moderating influence of Shariah compliance on the blockchain–trust relationship. The numerical values of these paths are summarized in Table 11.
Hypothesis testing was conducted using PLS-SEM, with t-statistics and p-values evaluated at a 5% significance level ($t > 1.96$, $p < 0.05$) to assess relationships between latent variables. (Hair et al., 2022).

Table 11: Hypothesis Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Information
X ≥ Y	0,085	0,083	0,079	1,082	0,279	Rejected
X ≥ Z	0,586	0,589	0,052	11,172	0,000	Accepted
Z ≥ Y	0,303	0,303	0,075	4,067	0,000	Accepted
X ≥ Z ≥ Y	0,178	0,178	0,046	3,858	0,000	Accepted
M ≥ X ≥ Y	-0,092	-0,089	0,027	3,350	0,001	Accepted

Source: Author's Analysis.

The results indicated that blockchain capability (X) did not directly increase muzakki trust (Y) ($t = 1.082$; $p = 0.279$; H1 rejected) but significantly improved zakat disclosure (Z) ($t = 11.172$; $p = 0.000$; H2 supported), confirming blockchain's effectiveness as a transparent and accountable record-keeping system. Zakat disclosure (Z) significantly increased muzakki trust (Y) ($t = 4.067$; $p = 0.000$; H3 supported) and mediated the effect of blockchain (X) on trust ($t = 3.858$; $p = 0.000$; H4 supported), indicating that blockchain acts as an enabler while transparency builds trust. In addition, Shariah compliance (M) significantly moderated the X → Y relationship ($t = 3.350$; $p = 0.001$; H5 supported), reinforcing justice, trust, and blessing in the digital zakat system.
Of the five hypotheses, four were supported, and one was rejected, showing that muzakki trust arises not only from blockchain adoption but also from transparent zakat disclosure and strong Sharia compliance. This confirms that blockchain is effective in zakat management when integrated with Sharia governance and public accountability, consistent with the Indonesian zakat context.
These empirical results provide the basis for a more detailed interpretation of how blockchain, disclosure, and Shariah compliance interact in practice, which is discussed in the following section.

5. Discussion

5.1. The influence of blockchain-based zakat management on muzakki trust

It was also found that the direct and significant impact of blockchain-based zakat management on the muzakki trust was not realized ($t = 1.082$; $p = 0.279$). In this way, even though blockchain is theoretically helpful in terms of promoting transparency and accountability, its use on its own was not enough to increase trust in zakat institutions in this research.
This trend is an indication of the Technology Trust Paradox, where the emerging technology will hardly boost trust when the users are not well conversant with the mechanisms and advantages of the technology (Gefen et al., 2003). The problem with the Indonesian zakat environment is that many muzakki would not be accustomed to the notions of immutability and smart contracts, and they would be so used to the institutional reputation as the source of their trust that they are not ready to trust the technology per se. In line with (Beik et al., 2023),

the notion of institutional morality and integrity seems to be more relevant to muzakki when compared to strictly technical characteristics, which means that blockchain needs to be supported by explicit communication about the benefits, which are tangible, e.g., fund traceability, speedy distribution, and data security.

The Institutional Trust Theory puts importance on the fact that trust is built on the ability, benevolence, and integrity perceptions. (Mayer et al., 1995). Perceived ability may be enhanced through blockchain by enhancing fund management, although benevolence and integrity remain primarily expressed through larger practices of Sharia-based governance. Like (Maniam, 2024), results of Islamic fintech show that trust is more likely to grow when the technological innovation is entrenched in strong Islamic governance and audit systems. This constrained direct effect of blockchain suggests the existence of muzakki trust that is multidimensional because of the joint effect of technological potential, institutional regulation, and Islamic spiritual principles, and not through digital innovation.

5.2. The influence of blockchain-based zakat management on zakat disclosure

The findings indicate that blockchain-based zakat management makes a positive and significant impact on zakat disclosure ($t = 11.172$; $p = 0.000$), which proves that blockchain implementation is the central component in enhancing transparency and accountability because of the permanent and traceable reporting and recording.

In theory, it corresponds to the perception of blockchain as an empirical and transparent distributed registry that establishes records of transactions publicly verifiable. (Sedlmeir et al., 2022). Digital verification and smart contracts minimize any errors and misappropriation opportunities, as they make sure that funds are assigned in relation to the predetermined Sharia-based policies. (Beik et al., 2023; Tan et al., 2022; Wahyuni-TD et al., 2021a). Earlier research also indicates that blockchain in Islamic financial institutions enhances disclosure through the open and auditable transaction records. (Beik et al., 2023; Tan et al., 2022).

In terms of technology governance, blockchain is a trust infrastructure that reduces the level of information asymmetry and increases institutional accountability and reputation. This is especially applicable to Indonesia, where the institutions of LAZ have been accused of poor financial and program disclosure. (Wahyuni-TD et al., 2021). Blockchain can help to mitigate these weaknesses by making information on the collection and distribution of zakat publicly available in real time.

The disclosure that is increased by blockchain is also in line with maqashid al-shariah and, in particular, hifz al-mal (protection of wealth) and the encouragement of social trust. Auditable, transparent, and equitable allocation of zakat promotes institutional legitimacy, and blockchain is not only a technical solution but also a governance tool to provide a more open, efficient, and Sharia-compliant zakat system.

5.3. The influence of zakat disclosure on muzakki trust

Based on the findings, innervation of zakat disclosure is positively significant on muzakki trust ($t = 4.067$; $p = 0.000$). Therefore, the increased level of transparency in the reporting of the collection, administration, and delivery of zakat funds relates to a higher level of trust in zakat institutions.

This observation is in line with the Institutional Trust Theory that asserts that trust depends on the perception of abilities, goodwill, and uprightness. Consistency and transparency in reporting show managerial skill in the zakat framework, transparency in disclosing recipients and distributions shows benevolence, and Sharia-compliant reporting and audits promote integrity. Similar studies also indicate that transparency in the administration of Islamic social funds would promote better public trust and enable muzakki to measure compliance with fairness and justice in the distribution of funds. (Beik et al., 2023).

This outcome also conforms to the Islamic accountability framework, in which there is horizontal accountability to society and vertical accountability to Allah SWT. (Haniffa & Hudaib, 2007). Transparency of zakat reporting is thus a form of administrative dedication as well as spiritual principles of faithfulness and sincerity. Muzakki trust can be enhanced empirically by institutions publishing financial reports, recipient data, and program outcomes regularly, which will minimize the information asymmetry and make people more willing to participate. Within this setting, traceable disclosure and digital audits based on blockchain protocols can also contribute to the enhancement of the institutional responsibility and the moral-spiritual legitimacy of community-serving and trustworthy institutions.

5.4. The role of mediation in zakat disclosure

As the results indicate, zakat disclosure (Z) has a strong mediation effect between blockchain-based zakat management (X) and muzakki trust (Y) ($t = 3.858$; $p = 0.000$). Stated differently, blockchain has an impact on trust not through a direct impact but through the transparency and accountability it provides.

This finding corroborates the Technology-Trust-Transparency hypothesis, according to which blockchain increases institutional transparency, and disclosure passes this advantage over to trust (Tan et al., 2022). It also aligns with the idea of mediated trust, which asserts that trust is generated through technology, and indirectly, it offers clear information and sends a signal of credibility and reliability. (Gefen et al., 2003).

In the system of zakat, there is disclosure, which portrays al-Shafafiyyah (transparency) and al-Amanah (honesty). Blockchain also provides information symmetry and limits information asymmetry, as well as suspicion of misuse by reporting and verifying real fund flows in real-time. It has been empirically demonstrated that blockchain enhances the quality of zakat reporting and public trust because all the transactions can be tracked and proved in a system that cannot be tampered with, where smart contracts and traceable ledgers can be used. (Beik et al., 2023).

According to the Islamic accountability theory, zakat disclosure relates the vertical accountability to Allah SWT and the horizontal accountability to society. (Haniffa & Hudaib, 2007). It is possible to support both of these dimensions with the help of blockchain, which incorporates the ethical disclosure and Sharia observance into the reporting process. Therefore, the mediator role of zakat disclosure proves that the modern-day zakat legitimacy is not only based on religious legitimacy but also relies on effective, transparent, and Sharia-compliant funds management.

5.5. The moderating role of shariah compliance

The results show that Shariah compliance is a moderating variable between blockchain-based zakat management (X) and muzakki trust (Y) ($t = 3.350$; $p = 0.001$). Therefore, the beneficial impact of blockchain on trust is greater in case the digital zakat system is provably in harmony with Islamic concepts.

This puts Sharia compliance as a key tool of legitimacy and credibility in the Islamic financial institutions. The argument of the Legitimacy Theory asserts that organizations become trustworthy when their action is viewed as relevant to the existing values and norms (Suchman, 1995). The values in the zakat context are honesty (sidq), justice (adl), trust, and collective welfare (maslahah). The transparency and immutability of blockchain are thus not enough in themselves; they have to be placed on the foundation of Sharia-compliant goals and procedures.

Technological means (wasilah) is the subject of morality (ghayah) offered by Sharia compliance. Previous literature indicates that Sharia compliance is one of the foundations of the legitimacy of Islamic financial institutions. (Haniffa & Hudaib, 2007). In digital zakat, rational trust (based on efficiency of the systems) and spiritual trust (based on conforming values) are enhanced due to the observation of DSN-MUI fatwas, as well as frequent Sharia audits. Empirically, muzakki trust is greatest in institutions where transparency is coupled with clear Sharia rule, where technology ensures reliability, and where Sharia rule ensures moral uprightness and fair distribution.

In this respect, the Sharia compliance is an internal control mechanism in the Islamic governance system, which means that blockchain innovations do not conflict with Islamic ethics and maqashid al-shariah. It acts as an ethical and spiritual anchor that helps to strengthen the connection between transparency, blockchain-based technology, and the trust of the people, allowing a strong and value-based model of sustainable digital zakat management. Taken together, these points inform the overall conclusions, practical implications, and directions for future research, which are summarized in the next section.

6. Conclusion

This paper has analyzed the role of blockchain-managed zakat management to condition muzakki trust based on zakat disclosure and Shariah compliance in Indonesian zakat institutions. The results reveal a high and positive impact on the disclosure of zakat by blockchain capability, but no higher effect on muzakki trust. Rather, disclosure mediates the connection between blockchain and trust, which reveals that transparency in reporting is the main channel through which blockchain can help to build credibility. The blockchain-trust relationship is greatly moderated by the Shariah compliance, implying that the technological transparency should be instilled in the explicit Islamic governance to be viewed as reliable. The combination of transparent disclosure and Shariah-based legitimacy, but not technology, explains the results obtained.

The paper is valuable to the field of Islamic financial governance because it incorporates the Technology Governance Theory, Institutional Trust Theory, and Legitimacy Theory into a post-adoption model of digital zakat. It offers empirical data that blockchain is a governance infrastructure that enhances the quality of disclosure, whereas Shariah compliance is a legitimacy filter that mediates the impact of technology on trust. In practice, the results have the implication that zakat institutions ought not to view blockchain as an independent record-keeping system but rather as a stepwise transparency system. It should be implemented with a feasibility assessment (implementation and maintenance cost, training of staff and the Shariah board, and integration of user-friendly interfaces) and the design of user-friendly interfaces that will enable muzakki to see how blockchain-based disclosure enhances the equitable and responsible distribution.

To the policymakers and regulators, the findings contribute to the formulation of national standards of blockchain-based zakat reporting. These standards might specify minimum technical standards of data formats, interoperability, protection of privacy, and security; offer guidance on how sensitive mustahik data are to be separated between on-chain and off-chain treatment; and provide Shariah governing rules about smart contracts that are used in zakat collection and distribution. A permissioned and nationally coordinated blockchain infrastructure under the zakat authority, regulated sandboxes, and specific support of smaller institutions may decrease platform fragmentation and enhance more consistent and auditable reporting. These policy actions would help bring technological innovation in line with Shariah supervision and build the credibility of online zakat management in a moderate and contextualized way.

There are a number of limitations of this research. To begin with, the information sources used are the zakat institutions in East Java, Indonesia; thus, the results might not represent other areas or other countries with different regulatory conditions, institutional capabilities, and digital maturity. Second, the study is based on cross-sectional survey data and self-reported perceptions of muzakki and does not reflect the development of trust and disclosure over time or the perceptions of other stakeholders, i.e., mustahik, internal employees, and regulators, towards a blockchain-based system. Third, the model is based on blockchain capability, disclosure, and compliance with Shariah. Other potentially applicable determinants of trust, including organizational readiness, perceived risk, user literacy, and social influence, are not explicitly modelled.

These limitations can be improved in several tangible ways in future research. International comparisons of countries or categories of zakat institutions might be able to determine whether the technology-transparency-trust relationships found here would be found in other legal and governance systems. Longitudinal designs might look at the ways in which muzakki trust and disclosure practices shift as blockchain transitions out of pilot projects and into regular operations, and as the knowledge users gain about the technology. Mixed-method research integrating PLS-SEM with qualitative research based on interviews or case studies would assist in unpacking the role of privacy issues, cost, and digital literacy in influencing the uptake of blockchain-based zakat systems into practice. Lastly, the future models may also use more constructs that include organizational readiness, perceived risk, and social influence to offer a better picture of the determinants of trust in digital zakat governance.

Acknowledgement

This research was supported by a research grant from the Directorate of Research and Community Service, Ministry of Higher Education, Science and Technology, through the Fundamental Research 2025 program. We extend our deepest gratitude for the financial support provided, which enabled the successful completion of this research.

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