

Research/Review

Algorithmic Trust and Digital Gharar: A Maqāṣidiyyah Framework for Evaluating Blockchain in Islamic Trade Systems

Moh Ainul Yaqin^{1*}, Siti Kamiliyah Adriani², Nur Kholis³

¹ Master of Sharia Economics Study Program, UIN Sunan Ampel Surabaya, Indonesia: mohainuly1@gmail.com

² Master of Sharia Economics Study Program, UIN Sunan Ampel Surabaya, Indonesia: amilia.adriani@gmail.com

³ UIN Sunan Ampel Surabaya, Indonesia: nurkholis@uinsa.ac.id

*Corresponding Author: Moh Ainul Yaqin

Abstract: This study conceptually analyzes how blockchain technology reshapes the mechanisms of transparency and trust in global Islamic trade from the perspective of Islamic economics. The digitization of financial systems encourages a shift from trust based on social integrity and human relations, which traditionally form the foundation of muamalah practices, to an algorithmic trust model governed by code. In this context, this study examines how core values such as amanah and 'adl can be supported and even strengthened when economic interactions are increasingly mediated by technology. The research approach employs a qualitative-descriptive method, based on a literature review, with Miles and Huberman's analysis used to interpret the data and combine it with the normative principles of Islamic economics, thereby supporting the substance of Sharia. The main findings of this article show that blockchain has significant potential to enhance transparency, efficiency, and accountability through distributed ledgers and smart contracts, aligning with the objectives of maqāṣid al-sharī'ah. However, despite its ability to reduce informational gharar, this technology also gives rise to new uncertainties that are technical, epistemic, and social in nature. Cases such as the DAO hack and the Terra-Luna failure confirm that technical transparency does not automatically lead to substantive justice. As a contribution, this study offers a Digital-Trust Maqāṣidiyyah framework, which positions blockchain as a means to strengthen Sharia ethics through adaptive contracts, Sharia oracles, decentralized arbitration, digital literacy, and Sharia regulatory sandboxes.

Keyword: Algorithmic Trust; Blockchain; Islamic Economics; Maqāṣid Al-Sharī'Ah; Transparency Accountability.

Manuscript: September 18, 2025;

Revised: October 21, 2025;

Accepted: November 30, 2025;

Online Available: December 2, 2025

Curr. Ver.: December 2, 2025



Copyright: © 2025 by the authors.

Submitted for possible open

access publication under the

terms and conditions of the

Creative Commons Attribution

(CC BY SA) license

(<https://creativecommons.org/licenses/by-sa/4.0/>)

1. Introduction

The global Sharia trade is currently facing both exciting and challenging dynamics. On the one hand, the spirit of building a transparent, fair, and sustainable halal trade ecosystem is gaining strength as public awareness of Sharia values increases. However, on the other hand, there are still various structural and technological obstacles that hinder the creation of a truly reliable trading system (Pramono & Masrukhan, 2025). The basic principles of Islamic economics have established trust and transparency as the primary foundation for maintaining market stability. Values such as amanah, 'adl (justice), and the prohibition against gharar (destructive uncertainty) and ghisb (information fraud) are moral guidelines so that every transaction runs honestly and is balanced. Without clarity of information and a robust monitoring system, achieving cross-border cooperation is challenging, as transaction costs and the risk of irregularities continue to rise (Heriyanto & Taufiq, 2024; Johar & Maghfirah, 2023; Muthoharul Janan et al., 2025). This enables the primary objective of Islamic economics, namely the realization of maslahah or the common good, to be fully achieved.

This issue is becoming increasingly clear in modern Islamic finance practices. Profit-sharing systems, like mudhārabah and mushārahah, which ideally embody justice and partnership, often encounter moral hazard and information gaps between capital owners and

business managers. When the two parties are in different countries with different legal systems, oversight becomes challenging. As a result, a cooperative relationship that should be built on trust often turns into a risky one.

Research by Sutrisno and Widarjono (2022) suggests that profit-loss-sharing financing has a significant negative impact on the profitability of Islamic banking in Indonesia, indicating that agency problems and financing risks hinder the performance of Islamic banks, particularly when risk management and governance mechanisms are not functioning effectively. This fact confirms that trust is not only a matter of morality but also an economic factor that significantly determines the success of the Islamic financial system (Analia & Widyastuti, 2024). Studies demonstrate that trust and transparency in Islamic financial institutions enhance public confidence and encourage active engagement in the sector, while ethical norms and stable governance strengthen institutional trust and support the stability of Islamic banking operations (Suyatno et al., 2025).

Amidst these complexities, the global digitalization trend brings new hope. The development of information technology enables cross-border trade to occur faster, more efficiently, and with greater transparency. A World Trade Organization (WTO) report predicts that member countries of the Organization of Islamic Cooperation (OIC) that implement digital trading systems will experience an increase in net trade volumes due to reduced coordination costs and increased logistics efficiency (Bekkers & Kalachyhin, 2025). Nonetheless, digital transformation also raises an important question: to what extent can technology strengthen the value of justice and ethics in the Islamic trading system?

One of the innovations that is now widely discussed is blockchain technology. This digital record-keeping system offers high transparency, as every transaction is permanently recorded and cannot be altered (Alhat, 2024; Muthoharul Janan et al., 2025). In the context of Islamic economics, this technology is considered to be in harmony with the values of *maqāṣid Al-Sharīʿah*, especially in terms of maintaining fairness and honesty. Through the SMART contract mechanism, blockchain can ensure the automatic execution of contracts according to the agreement, without the need for third-party intervention. Some implementations in the Islamic social sector, such as the management of zakat and waqf, have shown promising results, as they increase accountability and accelerate the distribution of funds (Abojeib & Habib, 2019; Rejeb, 2020).

However, behind these various potentials lie fundamental problems that many previous studies have not addressed. Most studies of blockchain in Islamic finance have focused on technical aspects, such as operational efficiency, data security, and product compliance with Sharia law, and have not explored the deeper dimension of value (Aisah et al., 2025; Truby et al., 2022). Research by Chong (2021) highlights that, while blockchain can improve transparency, the concept of trust in digital contexts remains a relatively understudied philosophical topic. A similar point was made by Alshater et al. (2022), who found that the majority of research remains conceptual and has not adequately explored how technology has altered the meaning of faith in Islamic economics. Meanwhile, recent research emphasizes the importance of designing smart contracts that are more flexible to adapt to social dynamics and Shariah interpretations, noting that smart contracts face challenges in their immutability when business conditions or Islamic regulations change, while cross-border Islamic fintech operations encounter difficulties due to a lack of harmonized international regulations and information asymmetries across jurisdictions (Uula, 2025).

Building on these findings, there is a need to revisit how the concept of trust in Islamic economics can be applied to complex digital systems, such as blockchain. So far, trust is understood as a social value that grows from integrity and trust between parties. In the digital world, however, trust has evolved into trust in systems, codes, and algorithms. These changes bring ethical and epistemological consequences that have not been widely discussed. As trust moves from humans to machines, an important question arises: can values such as *ihsan* and *'adl* still be maintained in a system that relies entirely on algorithmic logic?

To answer this problem, this study tries to present a new perspective called "Digital-Trust *Maqāṣidiyyah*". This approach sees technology not as a substitute for Islamic values, but as a means to realize them in the modern context. Through this framework, the relationship between digital evidence-based trust and Sharia principles, such as *gharar*, *ghish*, and agency fees, can be understood more comprehensively. This research aims to demonstrate how blockchain can serve as an instrument that not only mitigates the risk of uncertainty and enhances efficiency, but also fosters the values of trust, fairness, and mutual benefit in cross-border trade. In this way, technology is no longer seen as a mere tool of

efficiency, but rather as part of a moral ecosystem that supports the great goals of maqāṣid Al-Sharī'ah.

This approach is expected to open up a new direction for the development of a digital Islamic economy that is not only technically efficient but also has ethical depth. By re-understanding the meaning of trust in the context of blockchain, the Islamic trading system can be built on a firmer foundation of a system that is not only transparent and accountable, but also humane and fair.

2. Literature Review

Blockchain Technology

Conceptually, blockchain can be understood as a digital ledger whose data is distributed within a network. This technology collects transaction records into blocks of limited capacity that are then securely connected through cryptography. Its main characteristic that sets it apart from other systems is its distributed ledger, where data is copied and distributed to multiple computers (Demir, 2023; Zanjat et al., 2024). This is supported by an immutability feature that prevents manipulation after a transaction is recorded. Additionally, smart contracts enable the automatic execution of agreements without intermediaries, while their decentralized architecture allows these systems to operate autonomously through peer-to-peer networks, eliminating the need for a central authority (Kabiri & Sharifzadeh, 2022). Over time, the evolution of blockchain in the financial sector has progressed beyond its initial role of supporting only cryptocurrencies. Its applications are now penetrating various modern financial services, such as in the banking sector to improve the efficiency of cross-border payments, and in the capital markets to enable the tokenization of assets. Recent trends show the widespread adoption of fintech and digital finance. This is reflected in various initiatives, ranging from the development of Central Bank Digital Currencies (CBDCs) by many central banks to the emergence of the Decentralized Finance (DeFi) ecosystem, as well as tokenization practices that transform physical assets into more liquid and transparent digital assets (de Fortuny & Zhang, 2023).

Transparency and Trust in the Islamic Economy

The principles of trust (amanah) and transparency (shifāfah) are the main pillars that support the building of the Islamic economy. This system is founded on the principles of moral and ethical values derived from Islamic teachings, where every economic actor is obliged to uphold the beliefs they hold. Other inherent values are honesty (sidq) in the delivery of information, as well as justice ('adl) to maintain a balance of rights and obligations of all parties involved (Abdurrohman Akbar et al., 2024; Shu et al., 2022). This philosophical foundation is reinforced by Maqāṣid al-Sharī'ah, which outlines the noble goals of the Shari'ah, focusing on the protection and maintenance of the five essential aspects: religion, soul, intellect, property, and heredity. Meanwhile, at the practical level, fiqh mu'amalāt provides a legal framework that regulates the details of transactions and economic relations, ensuring they are always in line with Sharia principles (Tarantang et al., 2023). Empirically, the central role of this trust has been proven to encourage the growth of the Sharia economic sector. For example, the significant growth of Islamic financial assets in Indonesia, which reached IDR 9,529.21 trillion in the first quarter of 2024, reflects an increase in public confidence. This trust is driven by transparency in fund management, a commitment to Sharia compliance, and a positive track record established by Islamic financial institutions (KNEKS, 2025).

Integration of Blockchain in the Context of Islamic Economics and Islamic Finance.

When blockchain technology is integrated into the Islamic economic ecosystem, it opens up significant opportunities to strengthen existing principles. Its main potential lies in increasing transparency through open and verifiable transaction records. Additionally, operational efficiency can be improved by reducing reliance on intermediaries and speeding up the transaction completion process. Sharia compliance verification can even be programmed into smart contracts to ensure that every transaction runs automatically in accordance with the provisions (Dias Menezes et al., 2023; Ibrahim et al., 2022). Nonetheless, this integration is not without its challenges. One of the crucial issues is how the supervision mechanism of the Sharia Council can be implemented in a decentralized system. High energy consumption, particularly on Proof-of-Work-based blockchains, is also a concern.

On the other hand, limited scalability or transaction capacity is still an obstacle to mass adoption. Some of the built-in features of blockchain are inherently aligned with the needs of Sharia trading. The immutability of data, for example, ensures that transaction records cannot be altered, thus supporting legal certainty in contracts. The ability of smart contracts to automate Sharia rules and enhance global supply chain traceability also increases accountability throughout the entire trading process (Lee & Yeon, 2021; Surjandari et al., 2021). However, the adoption of this technology still faces various practical obstacles, including immature regulatory frameworks, varying levels of technological literacy, interoperability issues between systems, and the need for technical adjustments to ensure comprehensive Sharia compliance.

3. Research Methods

This study employs a qualitative–descriptive research design, supported by a structured literature review, to explore the conceptual relationship between technological innovations and normative economic principles (Lim, 2024). A qualitative–descriptive approach is particularly suitable for studies aimed at building theoretical interpretations rather than testing hypotheses, as it allows the researcher to examine meanings, conceptual patterns, and analytical relationships within existing scholarship (Hall & Liebenberg, 2024). Qualitative descriptive designs are widely used when the objective is to present a comprehensive yet interpretive account of a phenomenon based on documented knowledge, offering straightforward depictions of experiences and events without extensive theorization or abstraction.

The research relies exclusively on secondary data collected through a systematic literature review. This method is used to assemble, evaluate, and synthesise scholarly sources relevant to the topic under investigation (Lim, 2024). Literature-based research is an appropriate methodological choice when empirical evidence is dispersed, emerging, or insufficient for primary data collection. Structured literature reviews also enable researchers to organise existing concepts, identify methodological and theoretical gaps, and construct an integrative understanding grounded in established studies. The review process follows systematic procedures, including defining inclusion criteria, searching academic databases, screening sources for relevance, and extracting key conceptual insights. This approach ensures transparency and replicability in qualitative conceptual research.

Data analysis follows the interactive model proposed by Miles, Huberman, and Saldaña (2019), which remains one of the most widely used analytic frameworks in qualitative inquiry. The analysis proceeds through three iterative stages. First, data reduction involves synthesising essential concepts from the selected literature by identifying recurrent themes, methodological discussions, and theoretical constructs. Second, data display is conducted by arranging synthesized insights into an organized analytical narrative, enabling the researcher to visualize relationships and refine interpretive categories. Third, conclusion drawing and verification involve interpreting the synthesised patterns, developing conceptual propositions, and checking the consistency of interpretations through cross-source comparison. This analytic cycle enhances the credibility and coherence of the final argument.

4. Results and Discussion

Fundamentally, the discourse on Blockchain in the Islamic economy is often caught in the narrative of excessive optimism. This section seeks to penetrate these surface claims by delving into the tensions that arise when rigid technological logic interacts with dynamic muamalah principles.

Gharar and Blockchain

The technical transparency, a primary characteristic of blockchain technology, is often considered a solution to the problem of gharar (uncertainty) in transactions. In Islam, gharar refers to a condition in which a contract contains ambiguity that could cause harm to one of the parties. With a permanent data logging system that all parties can track, blockchain appears to offer a mechanism that is transparent and free of manipulation. Logically, this openness can indeed reduce the risk of fraud. However, this view oversimplifies the problem. Uncertainty in Islamic economics is not only due to a lack of information, but can also arise from the way the system is built and run.

One notable example is the 2016 DAO Hack event. This case is often used as a classic reference in understanding social gharar in blockchain technology. A collective investment project called "The DAO" is built on the Ethereum network, utilizing a fully automated smart

contract system. In theory, this system is considered ideal because every investment decision is driven by code that humans cannot manipulate. However, a gap in the code allowed hackers to steal approximately 3.6 million ETH, equivalent to around \$ 50 million at the time. This incident shook the belief in the principle of immutability that has been glorified. Eventually, the Ethereum community decided to implement a "hard fork" to recover the funds. This decision marked the emergence of a paradox: a system that was considered inevitable and irreversible turned out to be dependent on social decisions. From the perspective of fiqh muamalah, this phenomenon is similar to the need for a sulh (peace) mechanism in problematic contracts. However, in the context of blockchain, the space for sulh was not designed from the beginning, so gharar fi al-ma'lūm arises, i.e., uncertainty in what is actually known, because the code that seems inevitable can be influenced by social variables outside the system (Ressi et al., 2025; Rikken et al., 2023).

Another example that demonstrates the epistemic gharar dimension can be seen in the case that befell Maker DAO at an event known as "Black Thursday" on March 12, 2020. MakerDAO, one of the most significant decentralized finance projects, suffered a failure when the crypto market plummeted drastically and the Ethereum network crashed. The delay in updating price data (due to an Oracle failure) caused several liquidation auctions to run unnaturally, resulting in some users losing their assets because the system received a "0 DAI" bid and closed their positions without fair compensation. Although all processes are transparent and recorded in a distributed ledger, the majority of users do not understand why the system fails. They believe that smart contracts will always execute correctly, even though they rely on external data that can be corrupted or delayed. This situation illustrates that information transparency is not equivalent to clarity of meaning. Many users suffer losses not because their information is hidden, but because they lack an understanding of the technical logic behind it. From the perspective of Islamic economics, this includes the epistemic gharar of uncertainty that stems from the limited knowledge of the parties involved in the transaction. Contracts built on a system like this violate the principle of tamyiz al-gharar (adequate explanation of risk), which is mandatory for a contract to be valid according to Sharia (Elliott & Golub, 2022; Klages-Mundt & Minca, 2022).

A more recent and large-scale case occurred in the collapse of the TerraUSD (UST) and LUNA ecosystems in May 2022. The algorithmic stablecoin, which claims to have a 1:1 fixed value against the US dollar, has failed to maintain its stability. In a matter of days, the price of UST dropped to below \$0.10, and the value of LUNA plummeted to worthless, erasing more than \$45 billion in market capitalization in a week. This tragedy shows the gharar fāḥish, which is a great uncertainty that cancels the contract. The developer promises value stability without adequate real asset support, a form of gharar fi al-ma'dūm, because the object of the guarantee (underlying value) does not actually exist. Perfect ledger transparency cannot save the system from collapse when its own algorithmic logic is misdesigned. In the Islamic view, selling or trading assets that have no basis in real value falls under the category of bai' al-gharar (buying and selling involving extreme uncertainty), which is prohibited because it causes systemic harm to society (van Basshuysen, 2023; Zavolokina et al., 2023).

These three examples demonstrate that blockchain can indeed reduce the gharar of information through technical transparency; however, it also presents a new form of uncertainty: conceptual, epistemic, and social gharars. In the case of The DAO, uncertainty arises from the conflict between deterministic code and dynamic social reality; in the case of MakerDAO, from blind trust in a system that is not fully understood; and in the case of TerraUSD, from the promise of value stability that turns out to have no clear economic foundation. All this suggests that the root of the problem lies not in the absence of transparency, but in the assumption that technical transparency is equivalent to Sharia certainty.

Therefore, the application of blockchain in Islamic economics must be accompanied by an applicative and contextual approach to Islamic jurisprudence (fiqh). Principles such as *maslahah* (benefit), *'adl* (justice), and *amanah* (trust) need to be the main guides in technology design. Smart contracts should not be seen as a substitute for the principle of *muamalah*, but rather as a tool that must be subject to ethical values and Islamic law. With the integration of these values, blockchain will not only be a technically efficient system, but also fair, humane, and in line with the goals of Sharia (*maqāṣid al-sharī'ah*), which include safeguarding property, avoiding injustice, and promoting prosperity for all people.

Paradigm Shift in Beliefs and Their Impact

The development of blockchain technology marks a fundamental shift in the way humans build and maintain trust. In the classical Islamic economic system, trust is built on personal integrity, social reputation, and moral values such as honesty and integrity. *Ṣidq* (honesty), then in the digital ecosystem, trust is transferred to a technical structure that relies on algorithms. Blockchain introduced the idea of a "trustless society", where every transaction no longer requires a third party, such as a bank or authoritative institution, as everything is secured by cryptographic code and network consensus. However, conceptually, the term "no trust" is actually misleading. What happens is not the removal of trust, but the transformation from interpersonal trust to algorithmic trust. Humans stop trusting other humans but start trusting the systems, codes, and developers who design them (Ferrari & Thuraisingham, 2020).

This transformation has quite profound ethical implications. In the logic of Sharia, beliefs are never morally neutral; it is rooted in social responsibility, empathy, and trust values. Meanwhile, algorithmic beliefs are functional in nature; they guarantee efficiency, speed, and procedural certainty, but lose the moral meaning that was once attached to them. Beliefs that were once guarded by the heart and conscience are now replaced by mathematical verification. As a result, a spiritual distance emerges: the system becomes technically correct, but ethically hollow (Danaher & Sætra, 2022). In the context of Islamic economics, this raises a more philosophical question: can the certainty generated by the code replace the value of honesty born of a sense of faith?

Furthermore, the paradigm of "algorithmic trust" actually opens up space for the emergence of a new form of *gharar*, namely the modern uncertainty hidden behind the claims of transparency and decentralization. Although blockchain is often referred to as a "no-middleman" system, in reality, it creates a new dependence on a small group of individuals: developers, miners, and validators who possess the technical expertise to maintain the network's operation. Ordinary users don't understand the hashing logic, consensus mechanisms, or how smart contracts work that are at the heart of the system. They put their trust in a system that they consider "secure," but they don't really know who controls it or how the code works. This is what is known as asymmetric trust, an unbalanced form of trust because knowledge and power over the system are not evenly distributed.

This condition creates two new social classes in the digital ecosystem: those who are literate and those who are code blind. The first group has the control to read, modify, and even influence the course of the system, while the second group is just passive users who trust the "honesty" of the system without understanding its limits. This phenomenon is similar to *gharar fi al-ma'lūm* uncertainty in terms of what seems inevitable. The system looks transparent, but that transparency is meaningless to those who can't understand it. When only a few people truly understand the code, the principles of *'adl* (justice) and *musāwāh* (equality) that are at the core of Islamic economics begin to be threatened. Trust that should be distributed evenly has turned into a new source of inequality.

Criticism of this phenomenon is not just a theoretical discourse. In practice, major cases such as the Curve Finance incident in July 2023 demonstrate that even systems considered decentralized still rely on the expertise of a few parties. A bug in the Vyper programming language resulted in losses of over \$ 50 million due to a security gap in smart contracts (Ressi et al., 2025). For most users, the contract appears secure because it has been publicly verified; however, few truly understand how the code works. This dependence on technical expertise gives birth to an epistemic *gharar* of uncertainty that arises not because of the absence of information, but because of the limitations of human understanding of the system he trusts. Thus, algorithmic beliefs do not eliminate risk; they move it from the social level to the technological level.

Empirical findings in Indonesia reinforce this reflection. The Indonesian Islamic Financial Development Report 2023, published by the Financial Services Authority (OJK), reveals significant growth in national Islamic financial assets, indicating a strengthening of digital penetration in this industry (Otoritas Jasa Keuangan, 2023). However, despite the increasing adoption of technology, the ethical and spiritual dimensions that are the foundation of Islamic beliefs seem to be weakening. A study of 380 Sharia fintech customers in Indonesia found that the perception of innovation and ease of use had a significant effect on interest in using the service, while personal religiosity had no significant influence on the decision (Johari et al., 2025). This means that technology is accepted not because it is considered trustworthy, but because it is considered efficient.

This gap is even more pronounced when it is examined in conjunction with digital financial literacy research among the younger generation of Indonesian Muslims. Although the rate of use of digital payment apps is very high, many users do not understand the structure of digital contracts, the logic of disguised interest, or the security risks associated with personal data (Ferrari & Thuraisingham, 2020; Musari & Hidayat, 2022). When literacy is low but trust is high, asymmetric trust is formed, which is the precursor to the modern gharar situation, where a person believes in a system without fully understanding how it works. In other words, people are becoming more trusting, not because of increased faith or piety, but due to their submission to technological authority.

This phenomenon demonstrates that the digitalization of the Islamic economy cannot focus solely on technical and efficiency aspects, but must also revive its ethical values. Blockchain and financial technology should not be a "black box" that only the digital elite understands. In Islam, beliefs are never mechanistic. It is a spiritual contract that demands awareness, responsibility, and goodwill. Therefore, the integration of trust, *maslahah*, and *'adl* in digital architecture is not just a complement but an absolute requirement for technology to remain on the side of humans. Blockchain should be understood not as a substitute for human trust, but as a tool to strengthen it.

Only with a balance between technical sophistication and ethical wisdom can the transformation of trust from the social world to the algorithmic world be directed towards benefit. Without it, the system built to remove gharar will actually give rise to new forms of gharar that are more refined, modern, and more difficult to identify.

Implementation Reality

The most fundamental challenge in implementing Sharia smart contracts lies in bridging the gap between binary and rational technological logic and the complexity of Sharia values, which are contextual, normative, and rich in ethical meaning. The world of codes operates within a deterministic framework of each command being translated into a definite "if-then" structure, while Islamic law, particularly in the realm of *fiqh muamalah*, demands interpretive flexibility through *ijtihad* and consideration of *maslahah* (common benefit) and *'urf* (local social context). The critical question that arises is: how can such abstract principles be accurately translated into rigid algorithmic language? This is where the fundamental paradox of the idea of "automatic compliance" lies. Technology can indeed ensure procedural compliance with contracts, but it is unable to understand and assess the moral substance that is the spirit of Sharia. Fully automated obedience risks reducing the teachings of Islam to mere technical instructions that lose their human dimension.

Furthermore, the decentralized structure that is the foundation of blockchain actually causes a crisis of authority in the context of Sharia. So far, religious authorities such as DSN-MUI, AAOIFI, and various national fatwa institutions have functioned as interpreters and guardians of *Shari'ah* compliance standards, as reflected in primary rulings like Fatwa DSN-MUI No. 116/2017 on electronic money and Fatwa No. 140/2021 on Islamic fintech governance, alongside AAOIFI's Shariah Standards such as Standard No. 29 on gharar and No. 59 on *Shari'ah* supervisory governance, which collectively provide normative guidance for ensuring ethical and legally sound digital transactions.

However, in a cross-border blockchain ecosystem, this authoritative mechanism becomes blurred. Smart contracts created in a single jurisdiction can be used globally regardless of sectarian differences, social contexts, or local regulations. The absence of a central institution with the legitimacy to supervise and enforce Sharia standards creates a gray area in digital governance. This condition has the potential to cause normative disorientation where Sharia compliance is no longer guaranteed by credible authorities, but is left to the technical interpretation of developers. In the long run, this not only poses a risk of legal inconsistency but also weakens the epistemic authority of religious institutions in interpreting Sharia principles in the digital realm (Fachruddin et al., 2024; Lee & Yeon, 2021; Osmani et al., 2020).

Meanwhile, at the macro governance level, a serious dilemma arises. Regulators face an inherent contradiction: how to regulate something that is designed to resist regulation? Decentralization is the soul of blockchain, but accountability is the heart of Islamic economics. OJK, DSN-MUI, and Islamic financial institutions in various countries must formulate policies that strike a balance between the freedom of innovation and the protection of *maqāṣid Al-Shari'ah*. The challenge is not only in drafting rules, but also in creating a supervisory framework that is adaptive to the autonomous nature of blockchain without compromising its innovative potential. Overly strict regulation can kill creativity, while loose

oversight can give rise to new distortions, such as code manipulation, user exploitation, and digital ghara. Therefore, the blockchain regulatory dilemma in the Islamic economy demands a value-based RegTech and SupTech approach, namely, technological oversight that aligns with Sharia ethics, not just administrative compliance. Without this kind of regulatory paradigm, technology that should be a means of benefit can actually become an instrument of disruption to the principles of justice and Islamic social balance (Amuso & Baron, 2024).

Digital-Trust Maqāṣidiyyah in the Integration of Blockchain and Islamic Economics

The Maqāṣidiyyah Digital-Trust model is a conceptual framework that ensures the application of blockchain in the Islamic economy remains grounded in the values of Maqāṣid al-Sharī'ah. This model departs from the principle that technology is only a *wasīlah* (a means), not the end goal. Therefore, digital innovation should not dominate Shariah logic, but rather strengthen ethics, justice, and social welfare in the practice of *muamalah*.

This framework is built upon three foundational pillars—*Insāniyyah*, *Hukmiyyah*, and *Murāqabah Akhlāqiyyah*—which collectively ensure that digital systems evolve in ways that remain humane, just, and ethically sustainable. Within the first pillar, the emphasis on human-centered design requires that blockchain development be mindful of moral and social sensitivity. Smart contracts should not operate as inflexible mechanisms; instead, they must allow opportunities for *ṣulh* (reconciliation) and renegotiation so that major decisions remain guided by human judgment and Sharī'ah values rather than being determined solely by algorithms. From this perspective, technology serves the principles of *mu'āmalah*, rather than replacing them as the primary determinant of outcomes (Cenci & Cawthorne, 2020; Ghafran & Yasmin, 2020).

The second pillar, hybrid ethical governance, calls for Sharī'ah governance to be embedded within the architecture of blockchain systems. Instead of supervising from the periphery, the Sharī'ah Supervisory Board must hold the technical authority to review, intervene in, and—when necessary—terminate smart contracts that risk contravening Sharī'ah principles. This governance structure strengthens core protections such as *ḥifẓ al-māl*, *ḥifẓ al-'aql*, and *ḥifẓ al-dīn*, while preserving equilibrium between automated processes and moral accountability (Brender & Gauthier, 2023; Sharif & Ghodoosi, 2022).

The third pillar involves continuous ethical auditing, which expands oversight beyond legal-Sharī'ah compliance to include equitable benefit distribution, security safeguards, algorithmic transparency, and inclusive access. Such ongoing review helps preempt digital inequalities and ensures that blockchain implementations genuinely reflect Islamic commitments to social justice (Heeks, 2022).

Taken together, this model positions blockchain not merely as a mechanism for technical transparency but as an instrument that upholds balance between technological efficiency and Sharī'ah-oriented ethics, ensuring that digital innovation remains aligned with substantive welfare and justice.

5. Conclusion

The integration of *Insāniyyah*, *Hukmiyyah*, and *Murāqabah Akhlāqiyyah* within a blockchain governance model demonstrates that emerging technologies can be aligned with a value system that prioritizes human dignity, justice, and ethical accountability. The synthesis of these three pillars shows that a technologically advanced system does not have to compromise on moral foundations; rather, it can be strengthened by them. As blockchain increasingly shapes financial transactions, data management, and institutional governance, the proposed framework reaffirms the centrality of human moral reasoning alongside automated processes. This conclusion underscores that the pursuit of digital efficiency should not overshadow the need for ethical reflexivity, especially in contexts where Sharī'ah principles and social welfare considerations remain paramount. When technology is guided by principles of reconciliation, compassion, and responsible oversight, it not only becomes more inclusive but also more resilient in navigating complex socio-economic environments.

The implications of adopting such a value-embedded framework extend across multiple dimensions of digital transformation in Muslim-majority contexts. First, the human-centered component of the model suggests that blockchain developers and regulators should prioritize designs that enable ethical discretion, renegotiation, and conflict resolution. This shifts the normative assumption that automation is always superior and acknowledges that human judgment remains indispensable in safeguarding fairness. Second, embedding Sharī'ah governance directly into the blockchain architecture has significant institutional implications.

It requires multidisciplinary expertise among Shari'ah Supervisory Boards, who must be competent not only in jurisprudence but also in the technical architectures of distributed systems. Their authority to intervene in smart contracts signals a transformative shift from post-hoc monitoring to real-time ethical governance, potentially influencing how Islamic financial institutions operationalize compliance. Third, the emphasis on continuous ethical auditing implies that blockchain systems must be evaluated not only for their technical efficacy but also for their social impact. This broadens the scope of digital ethics toward distributive justice, accessibility, transparency, and environmental sustainability. Such an approach ensures that blockchain does not become a driver of new digital divides but instead promotes equitable participation and empowerment. Collectively, these implications suggest that a value-based governance framework has the potential to transform the way Islamic institutions and communities interact with digital infrastructures.

Several practical suggestions emerge from this conceptual model. Future implementations should prioritize interdisciplinary collaboration among technologists, Shari'ah scholars, ethicists, and social scientists to design systems that strike a balance between technical robustness and ethical integrity. Institutions developing blockchain platforms could establish integrated ethics and Shari'ah labs to ensure that moral considerations are embedded from the earliest design stages. Policymakers should also consider creating regulatory sandboxes that allow experimentation with value-based blockchain models while providing safeguards against exploitation and exclusion. Moreover, there is a need for capacity-building programs to enhance the digital literacy of Shari'ah scholars and the ethical literacy of technologists, ensuring mutual understanding and joint problem-solving. Ultimately, future research should empirically assess how this governance model operates in practice, examining its effectiveness, limitations, and adaptability across various sectors, including finance, healthcare, education, and public administration. These steps will contribute to a more holistic and ethically grounded digital ecosystem that supports sustainable innovation in line with Islamic moral principles.

References

- Abdurrohman Akbar, F. M., Rosidta, A., & Lazuardi, A. (2024). Pengembangan model pembiayaan syariah untuk usaha mikro, kecil, dan menengah (UMKM). *Ar Rasyiid: Journal of Islamic Studies*, 2(1), 29–38. <https://doi.org/10.70367/arraysiid.v2i1.17>
- Abojeib, M., & Habib, F. (2019). Blockchain for Islamic social responsibility institutions. In *FinTech as a disruptive technology for financial institutions* (pp. 221–240). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-5225-7805-5.ch010>
- Aisah, N., Putri, S. Z. J., & Hafizi, M. R. (2025). Blockchain technology innovation as an optimization of transaction security in Islamic financial institutions. *Journal of Central Banking Law and Institutions*, 4, 23–48. <https://doi.org/10.21098/jcli.v4i1.265>
- Alhat, P. (2024). Blockchain technology. *International Journal of Scientific Research in Engineering and Management*, 8(4), 1–5. <https://doi.org/10.55041/IJSREM30694>
- Alshater, M. M., Saba, I., Supriani, I., & Rabbani, M. R. (2022). Fintech in Islamic finance literature: A review. *Heliyon*, 8(9), e10385. <https://doi.org/10.1016/j.heliyon.2022.e10385>
- Amuso, V., & Baron, I. Z. (2024). Disruptive technology and regulatory conundrums: The emerging governance of virtual currencies. *Governance*, 37(2), 561–578. <https://doi.org/10.1111/gove.12783>
- Analía, F. D., & Widyastuti, T. (2024). Analysis of community saving interest in Bank Mega Syariah through Islamic banking literacy and family environment with trust in Islamic banking as an intervening variable. *GoodWill Journal of Economics, Management, and Accounting*, 4(2), 188–197. <https://doi.org/10.65246/sg163791>
- Bekkers, E., & Kalachyhin, R. T. H. (2025). *The long-run impact of digitalization on trade patterns*. WTO. <https://doi.org/10.2139/ssrn.5185824>

- Brender, N., & Gauthier, M. (2023). Three lines model paradigm shift: A blockchain-based control framework. *Journal of Applied Accounting Research*. <https://doi.org/10.1108/JAAR-06-2022-0143>
- Cenci, A., & Cawthorne, D. (2020). Refining value sensitive design: A capability-based procedural ethics approach to technological design for well-being. *Science and Engineering Ethics*, 26(5). <https://doi.org/10.1007/s11948-020-00223-3>
- Chong, F. H. L. (2021). Enhancing trust through digital Islamic finance and blockchain technology. *Qualitative Research in Financial Markets*, 13(3), 328–341. <https://doi.org/10.1108/QRFM-05-2020-0076>
- Danaher, J., & Sætra, H. S. (2022). Technology and moral change: The transformation of truth and trust. *Ethics and Information Technology*, 24(3), 35. <https://doi.org/10.1007/s10676-022-09661-y>
- de Fortuny, E. J., & Zhang, Y. (2023). Exploring the new frontier: Decentralized financial services. *Service Science*. <https://doi.org/10.1287/serv.2021.0048>
- Demir, S. (2023). Blockchain technology. In *Smart and sustainable operations and supply chain management in Industry 4.0* (pp. 367–384). CRC Press. <https://doi.org/10.1201/9781003180302-18>
- Dias Menezes, L., de Araújo, L. V., & Nishijima, M. (2023). Blockchain and smart contract architecture for notaries services under civil law: A Brazilian experience. *International Journal of Information Security*, 22(4), 869–880. <https://doi.org/10.1007/s10207-023-00673-3>
- Elliott, M., & Golub, B. (2022). Networks and economic fragility. *Annual Review of Economics*, 14(1), 665–696. <https://doi.org/10.1146/annurev-economics-051520-021647>
- Fachruddin, M. R., Tajrid, A., & Heradhyaksa, B. (2024). Regulation of investor protection of information technology-based Shari'ah crowdfunding services in Indonesia from the perspective of Shari'ah economic law. *Electronic Journal of Education, Social Economics and Technology*, 5(2), 13–21. <https://doi.org/10.33122/ejeset.v5i2.194>
- Ferrari, E., & Thuraisingham, B. (2020). Digital trust: Trust management in cyberspace. *IEEE Internet Computing*, 24(6), 6–7. <https://doi.org/10.1109/MIC.2020.3028898>
- Ghafran, C., & Yasmin, S. (2020). Ethical governance: Insight from the Islamic perspective and an empirical enquiry. *Journal of Business Ethics*, 513–533. <https://doi.org/10.1007/s10551-019-04170-3>
- Hall, S., & Liebenberg, L. (2024). Qualitative description as an introductory method to qualitative research for master's-level students and research trainees. *International Journal of Qualitative Methods*, 23. <https://doi.org/10.1177/16094069241242264>
- Heeks, R. (2022). Digital inequality beyond the digital divide: Conceptualizing adverse digital incorporation in the global South. *Information Technology for Development*, 28(4). <https://doi.org/10.1080/02681102.2022.2068492>
- Heriyanto, H., & Taufiq, T. (2024). Nilai-nilai ekonomi dan etika bisnis dalam perspektif Islam. *JIMMI: Jurnal Ilmiah Mahasiswa Multidisiplin*, 1(1), 24–37. <https://doi.org/10.71153/jimmi.v1i1.99>
- Ibrahim, R., Harby, A. A., Nashwan, M. S., & Elhakeem, A. (2022). Financial contract administration in construction via cryptocurrency blockchain and smart contract: A proof of concept. *Buildings*, 12(8), 1072. <https://doi.org/10.3390/buildings12081072>
- Johar, J., & Maghfirah, M. (2023). Re-interpretation of Islamic transaction principles in economic activities. *Madania: Jurnal Kajian Keislaman*, 27(1), 23. <https://doi.org/10.29300/madania.v27i1.3385>

- Johari, M., Supiandi, & Loreno, D. T. (2025). Sharia meets digital finance: How innovativeness and TAM constructs influence Islamic fintech adoption. *Journal of STI Policy and Management*, 10(1), 56–71. <https://doi.org/10.14203/STIPM.2024.415>
- Kabiri, Y., & Sharifzadeh, M. (2022). Blockchain and smart contracts. In *Industry 4.0 vision for energy and materials* (pp. 59–72). Wiley. <https://doi.org/10.1002/9781119695868.ch2>
- Klages-Mundt, A., & Minca, A. (2022). While stability lasts: A stochastic model of noncustodial stablecoins. *Mathematical Finance*, 32(4), 943–981. <https://doi.org/10.1111/mafi.12357>
- KNEKS. (2025, Mei 15). *Perkembangan total aset keuangan syariah: Momentum awal tahun 2025*. <https://kneks.go.id/berita/703/perkembangan-total-aset-keuangan-syariah-momentum-awal-tahun-2025>
- Lee, H., & Yeon, C. (2021). Blockchain-based traceability for anti-counterfeit in cross-border e-commerce transactions. *Sustainability*, 13(19), 11057. <https://doi.org/10.3390/su131911057>
- Lim, W. M. (2024). What is qualitative research? An overview and guidelines. *Australasian Marketing Journal*, 33(2), 199–229. <https://doi.org/10.1177/14413582241264619>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2019). *Qualitative data analysis: A methods sourcebook* (4th ed.). SAGE Publications.
- Musari, K., & Hidayat, S. E. (2022). Digital financial knowledge and behavior of Generation Z in Indonesia (pp. 96–117). <https://doi.org/10.4018/978-1-7998-8447-7.ch007>
- Muthoharul Janan, R., Abdillah, M., Triana Yulie Asieh, I., & Achmad Sadat, F. (2025). Penerapan prinsip keadilan dalam perdagangan modern: Perspektif ekonomi Islam untuk etika bisnis berkelanjutan. *Jurnal Global Ilmiah*, 2(4). <https://doi.org/10.55324/jgi.v2i4.176>
- Osmani, M., El-Haddadeh, R., Hindi, N., Janssen, M., & Weerakkody, V. (2020). Blockchain for next-generation services in banking and finance: Cost, benefit, risk and opportunity analysis. *Journal of Enterprise Information Management*, 34(3), 884–899. <https://doi.org/10.1108/JEIM-02-2020-0044>
- Otoritas Jasa Keuangan. (2023). *Indonesian Islamic finance report 2023* (pp. 16–20). OJK.
- Pramono, S., & Masrukhan, M. (2025). The dynamics of international trade and the relevance of the Sharia economic system in the global market. *Multitech Journal of Science and Technology*, 2(7), 461–476. <https://doi.org/10.59890/mjst.v2i1.43>
- Rejeb, D. (2020). Blockchain and smart contract application for zakat institution. *International Journal of Zakat*, 5(3), 20–29. <https://doi.org/10.37706/ijaz.v5i3.260>
- Ressi, D., Spanò, A., Benetollo, L., Bugliesi, M., Piazza, C., & Rossi, S. (2025). Vulnerability detection in Solidity smart contracts via machine learning: A qualitative analysis. *Blockchain: Research and Applications*, 100390. <https://doi.org/10.1016/j.bcra.2025.100390>
- Rikken, O., Janssen, M., & Kwee, Z. (2023). The ins and outs of decentralized autonomous organizations (DAOs): Unraveling the definitions, characteristics, and emerging developments. *Blockchain: Research and Applications*, 4(3), 100143. <https://doi.org/10.1016/j.bcra.2023.100143>
- Sharif, M. M., & Ghodoosi, F. (2022). The ethics of blockchain in organizations. *Journal of Business Ethics*, 178(4), 1009–1025. <https://doi.org/10.1007/s10551-022-05058-5>
- Shu, C., Hashmi, H. B. A., Xiao, Z., Haider, S. W., & Nasir, M. (2022). How do Islamic values influence CSR? A systematic literature review of studies from 1995–2020. *Journal of Business Ethics*, 181(2), 471–494. <https://doi.org/10.1007/s10551-021-04964-4>

- Surjandari, I., Yusuf, H., Laoh, E., & Maulida, R. (2021). Designing a permissioned blockchain network for the halal industry using Hyperledger Fabric with multiple channels and the raft consensus mechanism. *Journal of Big Data*, 8(1), 10. <https://doi.org/10.1186/s40537-020-00405-7>
- Sutrisno, S., & Widarjono, A. (2022). Is profit-loss-sharing financing matter for Islamic bank's profitability? The Indonesian case. *Risks*, 10(11), 207. <https://doi.org/10.3390/risks10110207>
- Suyatno, M. I. Y., Kusumawardani, A., Praptitorini, M. D., & Suyatno, P. D. L. (2025). The impact of Islamic economic law on financial regulation: Evidence from the Indonesian dual financial system. *Al Dżahab*, 6(2), 125–135. <https://doi.org/10.32939/dhb.v6i2.5863>
- Tarantang, J., Hasan, A., Pelu, I. E. A. S., & Dakhoir, A. (2023). The idea of building a house of *Maqashid Sharia* perspective. *Journal of Islamic Architecture*, 7(3), 541–548. <https://doi.org/10.18860/jia.v7i3.19496>
- Truby, J., Dahdal, A., & Ismailov, O. (2022). The role and potential of blockchain technology in Islamic finance. *European Business Law Review*, 33(2), 175–192. <https://doi.org/10.54648/EULR2022005>
- Uula, M. M. (2025). Smart contracts and the Islamic finance industry. *Journal of Islamic Economics Literatures*, 6(1). <https://doi.org/10.58968/jiel.v6i1.631>
- van Basshuysen, P. (2023). Markets, market algorithms, and algorithmic bias. *Journal of Economic Methodology*, 30(4), 310–321. <https://doi.org/10.1080/1350178X.2022.2100919>
- Zanjat, S. N., Karmore, B. S., & Barbudhe, V. K. (2024). Cryptographic techniques for securing blockchain transactions (pp. 150–160). <https://doi.org/10.4018/979-8-3693-3494-2.ch008>
- Zavolokina, L., Zani, N., & Schwabe, G. (2023). Designing for trust in blockchain platforms. *IEEE Transactions on Engineering Management*, 70(3), 849–863. <https://doi.org/10.1109/TEM.2020.3015359>