Shariah in the Age of Blockchain: Rethinking Legal Authority and Smart Contracts in Decentralized Islamic Finance

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ABSTRACT

The emergence of blockchain technology and smart contracts is fundamentally transforming the architecture of financial systems, challenging traditional notions of legal authority, contractual enforcement, and institutional governance. Within this context, Islamic finance faces a critical question: how can Shariah-based legal principles be operationalized in decentralized, code-driven environments where authority is embedded in algorithms rather than institutions? This study addresses this challenge by reconceptualizing Shariah within the framework of decentralized finance (DeFi), proposing a novel model termed Algorithmic Shariah Governance (ASG). Employing a qualitative conceptual approach that integrates Islamic legal theory, blockchain architecture, and financial governance, the study demonstrates that smart contracts can function as programmable compliance mechanisms aligned with core Shariah principles such as transparency, fairness, and risk-sharing. However, the findings also reveal a fundamental tension between decentralized automation and the interpretive nature of Islamic jurisprudence. To address this, the study proposes a hybrid governance model that combines algorithmic enforcement with human-centered Shariah oversight. This research advances a theoretical shift from institution-based authority to code-mediated legal governance, positioning Islamic law as adaptable to emerging financial technologies. By bridging Shariah and blockchain, the study contributes a transformative framework for rethinking legal authority in the evolving landscape of decentralized Islamic finance.

Introduction

The rapid development of blockchain technology and decentralized finance (DeFi) has fundamentally transformed the architecture of financial systems, challenging conventional assumptions about legal authority, contractual enforcement, and institutional governance. At the core of this transformation lies the emergence of smart contracts—self-executing digital agreements encoded on distributed ledger systems that operate without centralized intermediaries. These technologies promise efficiency, transparency, and automation, but they also raise profound legal and ethical questions, particularly for normative systems such as Islamic law that are rooted in interpretive jurisprudence and institutional oversight.

Within the context of Islamic finance, these developments present both an opportunity and a challenge. Islamic finance is built upon a distinct set of legal and ethical principles derived from *Shariah*, including the prohibition of interest (*riba*), the avoidance of excessive uncertainty (*gharar*), the promotion of risk-sharing, and the emphasis on fairness and transparency. Traditionally, the implementation and supervision of these principles have relied on institutional mechanisms, such

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as Shariah supervisory boards, regulatory authorities, and legal scholars who interpret and validate financial practices. However, in decentralized environments, these institutional structures are increasingly bypassed or reconfigured, as financial transactions are executed automatically through code.

This shift raises a critical question: what constitutes legal authority in a decentralized system where rules are embedded in algorithms rather than interpreted by human actors? In conventional Islamic finance, legal authority is derived from a combination of textual sources, juristic interpretation, and institutional validation. In contrast, blockchain-based systems relocate authority into technological infrastructures, where compliance is enforced through pre-programmed logic rather than discretionary judgment. This transformation challenges the very foundations of Islamic legal governance, which has historically emphasized interpretive flexibility, contextual reasoning, and human agency.

Existing scholarship on Islamic finance has begun to engage with financial technology (fintech), particularly in areas such as digital banking, crowdfunding, and peer-to-peer lending. These studies highlight the potential of technology to enhance financial inclusion and operational efficiency while maintaining Shariah compliance. However, much of this literature remains focused on incremental adaptation within existing institutional frameworks. It often assumes the continued centrality of Shariah boards and regulatory bodies, without fully addressing the implications of decentralization.

Similarly, literature on blockchain and smart contracts has explored their potential to disrupt traditional legal systems, emphasizing their capacity to automate enforcement, reduce transaction costs, and eliminate intermediaries. Scholars have argued that "code is law," suggesting that legal rules can be embedded directly into software, thereby replacing or supplementing traditional legal institutions. While this perspective has gained traction in technology and legal studies, it raises important concerns about accountability, flexibility, and the role of human judgment—issues that are particularly salient in the context of Islamic law.

Despite these developments, there remains a significant gap in the literature: the absence of a comprehensive theoretical framework that integrates Islamic legal principles with decentralized technological systems. Existing studies tend to address either Islamic finance or blockchain governance in isolation, without adequately exploring how these domains intersect. As a result, key questions remain unresolved: Can Shariah principles be translated into algorithmic logic? How can interpretive flexibility be preserved in automated systems? And what forms of authority and governance are appropriate in decentralized environments?

This study argues that addressing these questions requires a fundamental reconceptualization of Shariah governance in the age of blockchain. Rather than attempting to directly replicate traditional institutional models within digital systems, it is necessary to rethink the nature of legal authority itself. In particular, this study proposes that Islamic legal governance must evolve from an institution-centered model toward a hybrid system that integrates algorithmic enforcement with human interpretive oversight.

At the heart of this reconceptualization is the recognition that blockchain technology does not eliminate the need for legal reasoning but rather transforms the way in which it is expressed and operationalized. Smart contracts, while capable of automating certain aspects of compliance, cannot fully capture the complexity and contextuality of Islamic jurisprudence. Concepts such as

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gharar or *maslahah* (public interest) often require qualitative assessment and interpretive judgment that cannot be easily reduced to binary code. This creates a tension between the determinacy of algorithms and the flexibility of Islamic legal reasoning.

To address this tension, this study introduces a new conceptual model termed Algorithmic Shariah Governance (ASG). This framework reconceptualizes Shariah governance as a layered system that combines computational logic with normative oversight. Rather than viewing smart contracts as replacements for legal authority, the ASG model positions them as tools for operationalizing Shariah principles, while maintaining a role for human scholars in interpretation, validation, and ethical guidance.

The ASG framework is grounded in three key insights. First, it recognizes that Shariah principles can be abstracted into high-level ethical parameters—such as transparency, fairness, and risk-sharing—that are compatible with algorithmic implementation. Second, it acknowledges the limitations of automation and the need for mechanisms that allow for human intervention and reinterpretation. Third, it emphasizes the importance of governance structures that ensure accountability, legitimacy, and adaptability in decentralized systems.

The relevance of this study is underscored by the rapid expansion of decentralized finance, which is reshaping global financial markets and regulatory landscapes. As blockchain-based systems become more widespread, the question of how to ensure Shariah compliance in these environments will become increasingly urgent. Without a coherent framework, there is a risk that Islamic finance may either be excluded from these innovations or incorporated in ways that compromise its ethical foundations.

Moreover, this study contributes to broader debates on the future of law in the digital age. The rise of algorithmic governance challenges traditional distinctions between law and technology, raising questions about the nature of regulation, authority, and legitimacy. By engaging with these issues from an Islamic legal perspective, this study offers a unique contribution to interdisciplinary scholarship, highlighting the potential of non-Western legal traditions to inform global discussions on technology and governance.

The central research problem addressed in this study is the lack of a theoretical model that explains how Islamic legal authority can be reconfigured in decentralized, blockchain-based financial systems. Specifically, the study seeks to answer the following questions: How can Shariah principles be operationalized within smart contracts? What are the limitations of algorithmic enforcement in capturing Islamic legal reasoning? And how can a hybrid governance model reconcile the tension between automation and interpretation?

To address these questions, this study adopts a qualitative conceptual approach, integrating insights from Islamic legal theory, blockchain technology, and governance studies. Rather than focusing on specific case studies, it aims to develop a generalizable framework that can guide future research and practical implementation.

The contribution of this study is threefold. First, it advances Islamic legal scholarship by reconceptualizing Shariah governance in the context of decentralized technologies. Second, it contributes to legal and technological studies by introducing a normative framework that integrates ethical principles with algorithmic systems. Third, it provides practical insights for policymakers, financial institutions, and technology developers seeking to design Shariah-compliant blockchain applications.

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Ultimately, this study argues that the emergence of blockchain and smart contracts does not signal the obsolescence of Islamic law but rather presents an opportunity for its renewal and transformation. By rethinking legal authority in the age of code, it is possible to develop a more adaptive, inclusive, and ethically grounded model of governance that aligns with both technological innovation and Islamic legal principles.

Literature Review

Islamic Finance and Shariah Governance: Institutional Foundations

Islamic finance is grounded in a distinct legal and ethical framework derived from *Shariah*, which governs financial transactions through principles such as the prohibition of *riba* (interest), avoidance of *gharar* (excessive uncertainty), and the promotion of risk-sharing and asset-backed financing. Traditionally, the governance of Islamic finance has relied on institutional mechanisms, particularly Shariah supervisory boards (SSBs), which provide legal opinions (*fatwas*) and ensure compliance with Islamic principles.

Scholars such as Muhammad Taqi Usmani emphasize the central role of human juristic authority in interpreting and applying Shariah to financial practices. This model is characterized by interpretive flexibility, where legal rulings are adapted to specific contexts through *ijtihad*. Institutional governance ensures legitimacy, accountability, and consistency across financial products and services.

However, contemporary scholarship has identified several limitations in this model. These include fragmentation of Shariah opinions across jurisdictions, potential conflicts of interest within supervisory boards, and the lack of standardization in compliance mechanisms. Moreover, the institutional model is inherently centralized, relying on hierarchical authority structures that may be incompatible with decentralized technological systems.

Blockchain and Smart Contracts: Code as Governance

Parallel to developments in Islamic finance, the rise of blockchain technology has introduced a new paradigm of governance based on decentralization, transparency, and automation. Blockchain operates as a distributed ledger system in which transactions are validated and recorded without the need for central intermediaries. Smart contracts extend this functionality by enabling self-executing agreements that automatically enforce predefined conditions.

Legal scholars have increasingly examined the implications of these technologies for traditional legal systems. The notion that "code is law" suggests that legal rules can be embedded directly into software, thereby shifting authority from human institutions to technological infrastructures. Smart contracts are often presented as mechanisms that enhance efficiency, reduce transaction costs, and eliminate the need for trust in intermediaries.

However, this perspective has been subject to significant critique. Scholars argue that code lacks the interpretive capacity required to address complex legal and ethical issues. Smart contracts operate on deterministic logic, which may not adequately capture ambiguity, contextual nuance, or unforeseen circumstances. Furthermore, issues of accountability and dispute resolution remain unresolved in fully automated systems.

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These critiques are particularly relevant when considering the application of blockchain in normative systems such as Islamic law, where interpretation and ethical reasoning play a central role.

Islamic Fintech and Decentralized Finance: Emerging Convergence

Recent scholarship has begun to explore the convergence between Islamic finance and financial technology, giving rise to the field of Islamic fintech. Studies in this area examine how digital platforms, mobile banking, and peer-to-peer financing can enhance access to Shariah-compliant financial services. Some researchers have also investigated the potential of blockchain to support transparency, traceability, and efficiency in Islamic financial transactions.

In the context of decentralized finance (DeFi), blockchain-based platforms enable financial activities such as lending, trading, and asset management without centralized control. This raises both opportunities and challenges for Islamic finance. On the one hand, DeFi aligns with certain Shariah principles, such as transparency and the elimination of intermediaries. On the other hand, the absence of regulatory oversight and the prevalence of speculative activities pose significant compliance concerns.

Existing studies on Islamic DeFi tend to focus on technical feasibility and product development, exploring how blockchain can be used to create Shariah-compliant financial instruments. However, they often overlook deeper questions related to legal authority, governance, and the role of human interpretation. As a result, the literature lacks a comprehensive framework that addresses the normative and institutional implications of decentralization.

The Challenge of Translating Shariah into Code

A critical issue that emerges from the literature is the difficulty of translating Shariah principles into algorithmic logic. Islamic jurisprudence is inherently interpretive, relying on qualitative reasoning, contextual analysis, and ethical judgment. Concepts such as *gharar*, *maslahah*, and *'adl* cannot be easily reduced to binary rules or fixed parameters.

While some aspects of Shariah compliance—such as the prohibition of interest—can be encoded into smart contracts, more complex principles require human deliberation and contextual assessment. This creates a fundamental tension between the determinacy of code and the flexibility of Islamic legal reasoning.

Existing approaches to this challenge have been limited. Some studies suggest simplifying Shariah principles to fit computational models, while others propose maintaining traditional governance structures alongside technological systems. However, these approaches either risk oversimplification or fail to fully engage with the transformative potential of blockchain.

Identifying the Gap: Rethinking Legal Authority in Decentralized Systems

The review of existing literature reveals a significant theoretical gap. While Islamic finance provides a well-developed model of institutional governance, and blockchain introduces a new paradigm of algorithmic governance, there is no integrated framework that explains how Shariah authority can function within decentralized systems.

Specifically, existing scholarship does not adequately address:
a) How legal authority is redefined when governance is embedded in code

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b) How interpretive flexibility can be preserved in automated environments

c) How human and algorithmic forms of governance can be integrated

This gap highlights the need for a new conceptual approach that moves beyond both traditional institutional models and purely technological solutions.

Toward Algorithmic Shariah Governance (ASG)

This study addresses the identified gap by proposing the Algorithmic Shariah Governance (ASG) framework. Unlike existing approaches, ASG conceptualizes Shariah governance as a hybrid system that combines algorithmic enforcement with human interpretive oversight.

The framework recognizes that while blockchain can enhance transparency and efficiency, it cannot replace the normative and interpretive functions of Islamic jurisprudence. Instead, it positions smart contracts as tools for operationalizing Shariah principles, while maintaining a role for scholars and institutions in guiding interpretation and resolving ambiguity.

By integrating insights from Islamic legal theory, blockchain governance, and financial systems, the ASG framework provides a comprehensive model for understanding the future of Shariah in decentralized finance.

Synthesis

In summary, the literature demonstrates that while significant progress has been made in Islamic finance and blockchain studies, their intersection remains underdeveloped at the theoretical level. Existing approaches either focus on institutional governance or technological innovation, without adequately addressing their integration.

This study builds on these strands of scholarship to propose a new framework that reconceptualizes Shariah governance in the age of blockchain. By doing so, it contributes to both Islamic legal studies and emerging debates on digital governance, offering a novel perspective on the evolving relationship between law, technology, and finance.

Method

This study employs a qualitative conceptual research design to develop a theoretical framework for understanding Shariah governance in the context of blockchain technology and decentralized finance. Given the exploratory and interdisciplinary nature of the topic, the research does not rely on empirical data collection but instead focuses on theoretical reconstruction through normative inquiry and analytical synthesis. The objective is to formulate a conceptual model—Algorithmic Shariah Governance (ASG)—that captures the transformation of legal authority within code-mediated financial systems.

The analysis begins with a normative examination of Islamic legal principles relevant to financial governance. Core concepts such as the prohibition of *riba*, the avoidance of *gharar*, the principle of risk-sharing, and broader ethical objectives including justice (*'adl*) and public welfare (*maslahah*) are critically explored to identify their underlying normative logic. In this context, Islamic law is approached not as a fixed set of rules but as a dynamic interpretive tradition that balances textual sources with juristic reasoning (*ijtihad*). Particular attention is given to the institutional structure of Shariah governance, especially the role of Shariah supervisory boards, in

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order to understand how authority, legitimacy, and compliance have traditionally been constructed and maintained.

Building on this foundation, the study proceeds by engaging with the technological logic of blockchain systems and smart contracts. Key characteristics of blockchain—such as decentralization, immutability, automation, and transparency—are analyzed in relation to conventional legal functions, including contract enforcement, regulatory oversight, and dispute resolution. This stage involves a techno-legal synthesis that examines both the potential and the limitations of translating normative legal principles into computational logic. While certain aspects of Shariah compliance can be operationalized through algorithmic structures, the analysis also highlights the challenges posed by the rigidity of code in accommodating interpretive flexibility and contextual reasoning.

Through this integrative process, the study develops the conceptual framework of Algorithmic Shariah Governance (ASG). The framework is constructed by abstracting key ethical principles from Islamic law and translating them into governance-oriented parameters that can be embedded within blockchain-based systems. At the same time, the framework incorporates a complementary dimension of human oversight, recognizing that algorithmic enforcement alone is insufficient to capture the complexity of Islamic jurisprudence. The resulting model conceptualizes Shariah governance as a hybrid system in which computational mechanisms and human interpretive authority coexist and interact.

Throughout the analysis, the study adopts a critical-analytical perspective, examining existing models of both Islamic finance and blockchain governance for their conceptual limitations. Rather than treating these domains as independent, the research seeks to bridge them through an interdisciplinary approach that integrates insights from Islamic legal studies, financial governance, legal theory, and computer science. This allows for a more comprehensive understanding of how legal authority is reconfigured in decentralized environments.

It is important to note that this study is positioned as a foundational theoretical inquiry. The proposed ASG framework is not empirically tested within this research but is intended to provide a conceptual basis for future empirical validation, technological development, and policy analysis. Its validity lies in its theoretical coherence, explanatory depth, and relevance to the evolving landscape of decentralized Islamic finance.

Results and Discussion

The Displacement of Traditional Legal Authority

The first major finding highlights a structural shift in the locus of legal authority. In conventional Islamic finance, authority is derived from a combination of textual sources, juristic interpretation, and institutional validation, particularly through Shariah supervisory boards. These bodies play a central role in interpreting legal principles, issuing rulings, and ensuring compliance across financial products.

However, in blockchain-based systems, authority is increasingly embedded within algorithmic infrastructures. Smart contracts execute pre-defined rules automatically, without requiring ongoing human intervention. This shift effectively displaces traditional intermediaries and raises critical questions about the nature of legitimacy, accountability, and interpretive authority in decentralized environments.

The analysis reveals that this transformation does not eliminate legal authority but rather reconfigures it from institutional to computational form. Authority becomes encoded in protocol design,

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smart contract architecture, and consensus mechanisms. While this enhances efficiency and reduces reliance on centralized institutions, it also introduces new challenges, particularly regarding the rigidity of code and the absence of discretionary judgment.

The Tension between Algorithmic Determinacy and Juristic Flexibility

A second key finding identifies a fundamental tension between the deterministic logic of smart contracts and the interpretive flexibility of Islamic jurisprudence. Blockchain systems operate on binary, rule-based execution, where contractual terms are strictly enforced once predefined conditions are met. In contrast, Islamic law often requires contextual reasoning, ethical deliberation, and case-by-case interpretation.

Concepts such as *gharar* (uncertainty), *maslahah* (public interest), and fairness cannot always be reduced to fixed computational rules. They require qualitative assessment and may vary depending on context. As a result, the attempt to fully automate Shariah compliance risks oversimplifying complex legal and ethical principles.

This tension reveals a critical limitation of purely algorithmic governance. While smart contracts can enforce compliance efficiently, they lack the capacity for interpretation, discretion, and moral reasoning, which are essential components of Islamic legal thought. Consequently, a fully automated system is insufficient to capture the depth and adaptability of Shariah.

The Emergence of Algorithmic Shariah Governance (ASG)

In response to these challenges, the study develops the Algorithmic Shariah Governance (ASG) framework as a conceptual model that integrates technological and normative dimensions. The ASG framework does not seek to replace traditional governance structures but to reconfigure them within a decentralized context.

At its core, ASG conceptualizes governance as a layered interaction between three elements: normative principles, algorithmic enforcement, and human oversight. Shariah principles are first abstracted into high-level ethical parameters—such as transparency, fairness, and risk-sharing—which can be partially translated into smart contract logic. These parameters are then operationalized within blockchain systems, enabling automated enforcement of certain compliance conditions.

However, the framework simultaneously preserves a role for human authority, recognizing that not all aspects of Shariah can be encoded into algorithms. Scholars and supervisory bodies remain essential for interpreting ambiguous cases, updating governance protocols, and ensuring alignment with evolving ethical standards.

This hybrid structure allows for a balance between efficiency and flexibility, combining the strengths of automation with the depth of human interpretation.

From Institutional Governance to Hybrid Legal Authority

One of the most significant theoretical contributions of this study is the reconceptualization of legal authority as a hybrid construct. Traditional models of Islamic finance rely on centralized institutional authority, while blockchain systems emphasize decentralization and algorithmic enforcement. The ASG framework bridges these paradigms by introducing a model in which authority is distributed across both human and technological actors.

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This hybridization reflects a broader transformation in legal systems, where governance is no longer confined to formal institutions but is increasingly embedded in technological infrastructures. In this context, legal authority becomes multi-layered, involving interaction between code, institutions, and normative principles.

Such a reconceptualization challenges conventional distinctions between law and technology, suggesting that future legal systems may operate through a combination of code-based enforcement and human-centered interpretation.

Comparison with Existing Approaches

Compared to existing literature, the ASG framework offers several advantages. Traditional Islamic finance models emphasize institutional oversight but struggle to adapt to decentralized systems. Conversely, blockchain governance models prioritize automation but often neglect normative and ethical considerations.

The ASG framework addresses these limitations by integrating both perspectives. It recognizes the operational benefits of blockchain while maintaining the normative integrity of Shariah. Unlike purely technological approaches, it does not reduce compliance to binary rules. At the same time, unlike purely institutional models, it embraces the transformative potential of decentralization.

This integrative approach provides a more comprehensive understanding of how Islamic law can function within emerging financial technologies.

Implications for Islamic Finance and Digital Governance

The findings of this study have significant implications for the future of Islamic finance and digital governance. First, they suggest that Islamic finance institutions must move beyond traditional governance models and engage with technological innovation at a structural level. This includes developing frameworks that allow for the integration of smart contracts while preserving Shariah principles.

Second, the study highlights the need for new forms of regulatory and supervisory mechanisms that are compatible with decentralized systems. This may involve the creation of hybrid governance bodies that combine technological expertise with Islamic legal scholarship.

Third, the ASG framework opens new possibilities for financial inclusion and innovation. By leveraging blockchain technology, Islamic finance can expand access to Shariah-compliant services while enhancing transparency and efficiency.

Limitations and Future Directions

This study is conceptual in nature and does not include empirical validation of the proposed framework. Future research should explore the practical implementation of ASG through case studies, prototype development, and experimental applications in blockchain-based financial systems. Further investigation is also needed to examine legal, regulatory, and ethical challenges in real-world contexts.

Synthesis

In summary, the results demonstrate that the integration of blockchain technology into Islamic finance requires more than technical adaptation; it necessitates a fundamental rethinking of legal authority and governance. The Algorithmic Shariah Governance framework provides a novel and comprehensive

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model for addressing this challenge, offering a pathway for aligning Islamic legal principles with the realities of decentralized financial systems.

Conclusion

This study has explored the implications of blockchain technology and smart contracts for Islamic legal governance, demonstrating that the rise of decentralized financial systems necessitates a fundamental rethinking of how Shariah is interpreted, operationalized, and enforced. It has shown that the traditional model of Shariah governance—centered on institutional authority, juristic interpretation, and centralized oversight—is increasingly challenged by the emergence of code-based systems in which contractual rules are embedded and executed automatically.

In response to this transformation, the study has proposed the Algorithmic Shariah Governance (ASG) framework as a novel conceptual model that redefines the nature of legal authority in decentralized environments. By integrating normative principles, algorithmic enforcement, and human oversight, the ASG framework offers a hybrid approach that balances the efficiency of automation with the interpretive depth of Islamic jurisprudence. This model recognizes that while blockchain technology can enhance transparency, reduce transaction costs, and enable real-time compliance, it cannot fully substitute the ethical reasoning and contextual flexibility that are central to Shariah.

The findings highlight that the core challenge is not whether Islamic law can be adapted to blockchain, but rather how legal authority itself is transformed when governance is mediated through code. In this context, authority becomes distributed across technological infrastructures and human actors, creating a multi-layered system in which smart contracts function as instruments of compliance while scholars and institutions provide interpretive guidance and normative validation. This reconceptualization marks a significant shift from institution-based governance toward code-mediated and hybrid legal systems.

Theoretically, this study contributes to both Islamic legal scholarship and digital governance discourse by introducing a new framework that bridges normative and technological domains. It expands the understanding of Shariah as a dynamic and adaptable system capable of engaging with emerging technologies, while also enriching debates on the future of law in the digital age. By positioning Islamic law within the broader context of algorithmic governance, the study demonstrates its continued relevance and potential for innovation.

Practically, the ASG framework has important implications for policymakers, financial institutions, and technology developers. It suggests that the development of Shariah-compliant blockchain applications should not rely solely on technical solutions but must incorporate mechanisms for human oversight, ethical evaluation, and adaptive governance. This may involve the redesign of Shariah supervisory roles, the creation of interdisciplinary governance bodies, and the development of regulatory frameworks that accommodate decentralized systems.

Nevertheless, this study is not without limitations. As a conceptual inquiry, it does not provide empirical validation of the ASG framework or its application in real-world financial systems. Future research should focus on testing the framework through case studies, pilot projects, and experimental implementations of Shariah-compliant smart contracts. Further investigation is also needed to address legal and regulatory challenges, including issues of liability, dispute resolution, and cross-jurisdictional governance in decentralized environments.

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In conclusion, this study argues that the emergence of blockchain and decentralized finance does not diminish the relevance of Islamic law but instead creates new opportunities for its evolution. By reimagining Shariah governance through the lens of algorithmic systems, the ASG framework provides a pathway for integrating Islamic legal principles into the future of digital finance. This transformation underscores a broader shift in the nature of law itself, where authority is no longer confined to institutions but increasingly embedded within technological systems, requiring a new balance between automation and human judgment in the pursuit of ethical and just governance.

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Author Contributions Statement

The author solely contributed to all aspects of this research, including the conceptualization of the study, development of the theoretical framework, literature review, methodological design, analysis and interpretation of findings, and manuscript writing and revision. The author has read and approved the final version of the manuscript and agrees to be accountable for all aspects of the work.

AI Usage Statement

This study acknowledges the use of artificial intelligence (AI) tools to assist in language refinement, structural organization, and clarity of expression. The intellectual content of the manuscript, including the research concept, theoretical framework, analysis, and conclusions, was independently developed by the author.

All AI-assisted outputs were critically reviewed, revised, and validated by the author to ensure originality, accuracy, and adherence to academic standards. No AI tools were used for data generation, empirical analysis, or to replace the author's intellectual contribution. The author takes full responsibility for the content of this manuscript.

Conflict of Interest

The author declares that there are no conflicts of interest regarding the publication of this article. The research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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