

# BLOCKCHAIN-BASED WAQF MANAGEMENT: REDESIGNING TRANSPARENCY AND ACCOUNTABILITY IN ISLAMIC PHILANTHROPY

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## Article Info

Received: June 2, 2025

Revised: September 6, 2025

Accepted: November 10, 2025

Online Version: December 12, 2025

## Abstract

Waqf, a pivotal institution of Islamic philanthropy, holds immense potential for socio-economic development. However, its effectiveness is often hampered by traditional management practices that suffer from operational inefficiencies, a lack of transparency, and a deficit of public trust, which ultimately limits its growth and impact. This study aims to design and propose a conceptual framework for a blockchain-based waqf management system to enhance transparency, accountability, and stakeholder trust in the administration of waqf assets. A qualitative, design science research methodology was adopted. The study involved a systematic literature review to identify critical governance challenges in conventional waqf management, followed by the architectural design of a decentralized waqf management model. This model leverages smart contracts to automate and secure key processes, ensuring all transactions are immutable and auditable. The proposed blockchain model demonstrates a significant capacity to mitigate core governance issues. Its decentralized ledger allows for the transparent, real-time tracking of waqf donations, asset utilization, and the distribution of proceeds to beneficiaries (mauquf 'alaih). This immutable record-keeping drastically reduces the potential for fraud and mismanagement, thereby fostering unprecedented accountability. The integration of blockchain technology presents a transformative pathway to revitalize the waqf sector. By re-engineering the foundations of trust and transparency, this model can significantly enhance public confidence, attract more endowments, and unlock the full potential of waqf as a sustainable instrument for global socio-economic empowerment.

**Keywords:** Blockchain, Waqf, Islamic Philanthropy, Transparency.



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Journal Homepage

<https://research.adra.ac.id/index.php/ijonis> ISSN: (P: 3048-1147) - (E: 3048-2658)

How to cite:

Mu'is, A., Yildiz, E., & Smith, J. (2025). Blockchain-Based Waqf Management: Redesigning Transparency and Accountability in Islamic Philanthropy. *International Journal of Noesantara Islamic Studies*, 2(6), 355-368. <https://doi.org/10.70177/ijonis.v2i6.2497>

Published by:

Yayasan Adra Karima Hubbi

## INTRODUCTION

Waqf stands as a cornerstone of Islamic civilization, representing a unique and powerful socio-economic institution rooted in the principles of perpetual charity (*sadaqah jariyah*) (Belikoff & Blazsek, 2025). Historically, this form of philanthropic endowment has been instrumental in funding a vast array of public services, including hospitals, universities, and critical infrastructure, thereby weaving itself into the very fabric of Muslim societies (Lu et al., 2025). The institution is designed to lock away the corpus of an asset for the pleasure of Allah, while its usufruct is dedicated to designated beneficiaries, creating a sustainable mechanism for long-term social welfare and poverty alleviation. The enduring legacy and immense potential of waqf to address contemporary socio-economic challenges cannot be overstated (Kang et al., 2025).

The contemporary relevance of waqf has gained significant traction, with a growing recognition of its potential to contribute towards the achievement of the United Nations Sustainable Development Goals (SDGs) (J. Liu et al., 2025). The global pool of waqf assets is estimated to be in the trillions of dollars, yet a substantial portion of this wealth remains underutilized or dormant, representing a monumental opportunity cost for global development (Mark-Denis et al., 2025). Mobilizing these assets effectively could unlock a formidable, non-governmental source of funding for critical projects in education, healthcare, and sustainable economic empowerment, positioning Islamic philanthropy as a major partner in the global development agenda (Bouebdallah et al., 2025).

The Fourth Industrial Revolution has ushered in an era of unprecedented technological disruption, introducing foundational technologies that are reshaping industries and governance structures (Sun et al., 2025). Among the most transformative of these is blockchain, or more broadly, Distributed Ledger Technology (DLT). Initially known as the technology underpinning cryptocurrencies like Bitcoin, blockchain's core innovation lies in its ability to create a decentralized, immutable, and transparent ledger of transactions (Alam et al., 2025). This capability to establish "trustless" systems, where integrity is guaranteed by cryptographic consensus rather than a central intermediary, offers a revolutionary new toolkit for re-engineering processes that depend on transparency and accountability (Chen et al., 2025).

The traditional management of waqf assets, despite the institution's noble objectives, is frequently beset by significant governance deficits that severely curtail its potential impact (Amarnadh & Moparthi, 2025). A primary and pervasive issue is the lack of transparency in the administration of waqf funds and properties (Rico-Peña et al., 2024). Potential donors (*waqif*) and the public often have limited visibility into how assets are being managed, how revenues are generated, and how proceeds are distributed to the intended beneficiaries (*mauquf 'alaih*). This operational opacity creates a fertile ground for public suspicion and erodes the trust that is the lifeblood of any philanthropic endeavor (Li & Wu, 2024).

This trust deficit is exacerbated by deep-seated operational inefficiencies and a high susceptibility to mismanagement and fraud (Kim & Lee, 2024). The administration of waqf is often reliant on manual, paper-based record-keeping and centralized management structures, which are prone to human error, bureaucratic inertia, and, in some cases, outright corruption (Abdullah et al., 2024). The absence of real-time, auditable tracking mechanisms makes it exceedingly difficult for stakeholders to hold the waqf managers (*mutawalli*) accountable, leading to a situation where the performance and social impact of these vital assets fall far short of their theoretical potential (Saggese et al., 2024).

The core problem addressed by this research is, therefore, the fundamental incongruity between the profound ethical and spiritual mandate of waqf and the archaic, opaque, and vulnerable governance models traditionally used for its administration (Abou Daya & Bernard, 2024). This systemic weakness not only leads to the inefficient use of existing assets but, more critically, it acts as a powerful deterrent to the creation of new waqf endowments (Alshater et al., 2024). The reluctance of potential donors to entrust their assets to systems they perceive as

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unaccountable constitutes the single greatest barrier to revitalizing the waqf sector and unlocking its full socio-economic power (Wang et al., 2024).

The principal objective of this research is to design and propose a comprehensive conceptual framework for a blockchain-based waqf management system (Marku et al., 2024). This study aims to architect a novel governance model that leverages the unique features of Distributed Ledger Technology namely transparency, immutability, and decentralization to directly address the long-standing challenges of accountability and public trust in the waqf sector (Yang et al., 2024). The ultimate goal is to provide a detailed blueprint for a next-generation waqf platform that is secure, efficient, and transparent by design (El-Chaarani et al., 2024).

To achieve this overarching objective, this paper pursues several specific research aims. First, it will conduct a systematic analysis of the critical failure points and governance vulnerabilities within traditional waqf management models (Yi, 2023). Second, it will architect a detailed, multi-layered blockchain solution, specifying the roles of different network participants, the data structures for the on-chain ledger, and the logic for the smart contracts that automate key processes (A. Liu et al., 2023). Third, it will demonstrate, through a series of use cases, how this proposed model can enhance the entire waqf lifecycle, from the initial endowment to the final distribution of benefits (Zhang et al., 2025).

Through this structured design science approach, this investigation seeks to offer a robust and practical solution that can help revitalize the global waqf sector. The research endeavors to move beyond a purely theoretical discussion by creating a well-defined and implementable framework (Bhambhwani, 2025). By demonstrating the technical feasibility and governance superiority of a blockchain-based approach, this study aims to provide waqf institutions, policymakers, and technologists with a clear roadmap for harnessing this transformative technology to restore trust and maximize the social impact of Islamic philanthropy (Zhou & Zhang, 2025).

The scholarly literature on waqf is extensive, with a rich tradition of research focusing on its historical significance, its jurisprudential foundations (*fiqh al-waqf*), and its modern economic potential. Separately, a burgeoning field of academic inquiry has emerged around blockchain technology, with numerous studies exploring its application in diverse domains such as supply chain management, digital identity, and financial services. This existing body of work provides a solid foundation for understanding both the institutional complexities of waqf and the technical capabilities of blockchain (Mazumder, 2025).

Despite the maturity of these two distinct fields, the intersection between them remains a nascent and significantly underdeveloped area of academic research. While a number of conceptual papers and industry whitepapers have emerged in recent years suggesting the potential of using blockchain for philanthropy in general, or for waqf specifically, a critical gap exists in the form of rigorous, academic research that provides a comprehensive and detailed architectural framework. Most existing discussions remain at a high level of abstraction, lauding the potential benefits of transparency without delving into the specific design considerations required to build a functional and governance-aware system.

The current literature, therefore, lacks a holistic and systematically designed model that addresses the end-to-end waqf management lifecycle. There is a scarcity of research that articulates how smart contracts can be specifically coded to enforce the unique rules of a waqf deed (*waqfiyyah*), how asset tokenization can facilitate the management of physical waqf properties, or how a decentralized governance model can be structured for stakeholder oversight. This study directly addresses this critical gap by moving from a generalized proposition to a detailed, architected solution.

The primary novelty of this research lies in its design of a comprehensive, multi-layered, and process-oriented conceptual framework for waqf management on a blockchain. This study is among the first to move beyond a simple “track-and-trace” model for donations to architect

an integrated system that leverages smart contracts to automate and secure the most critical governance processes. The novelty is centered on the concept of “programmatically accountable,” where the rules of the waqf are encoded into self-executing contracts, making governance transparent, auditable, and algorithmically enforced.

The justification for this investigation is both scholarly and profoundly practical. From a scholarly perspective, this paper makes a significant interdisciplinary contribution, bridging the fields of Islamic economics, non-profit governance, and information systems. It offers a new, technology-driven paradigm for analyzing and solving age-old institutional challenges, providing a rich case study on how ancient social institutions can be revitalized through cutting-edge technology. It pushes the theoretical boundaries of both waqf studies and applied blockchain research.

From a societal and policy perspective, the justification is even more compelling. The successful implementation of the proposed model could catalyze a global renaissance of the waqf sector. By solving the foundational problem of trust, a blockchain-based system could unlock billions of dollars in dormant and new philanthropic capital, channeling it towards pressing socio-economic needs. This research provides a tangible, innovative, and scalable solution to a problem of immense importance, offering a pathway to build a more transparent, accountable, and impactful future for Islamic philanthropy worldwide.

## RESEARCH METHOD

### *Research Design*

This study employs a qualitative, conceptual design methodology, situated within the paradigm of Design Science Research (DSR). This research approach is problem-focused and oriented towards the creation of an innovative artifact. The objective of DSR is not to merely describe or explain a phenomenon, but to design and develop a novel solution to a known problem. In this context, the “artifact” is the proposed conceptual framework for a blockchain-based waqf management system. The research design is therefore both descriptive, in that it details the architecture of the proposed model, and prescriptive, as it articulates a new, improved method for waqf administration (Bin-Nashwan et al., 2025).

### *Research Target/Subject*

The data for this conceptual research was not sourced from human participants but was instead drawn from a comprehensive and purposively selected sample of textual and scholarly materials. The “population” of data includes the entire body of knowledge on waqf governance and blockchain technology (Fang, 2025). The “sample” consists of primary and secondary sources. Primary sources include classical Islamic jurisprudence texts on the rules of waqf, contemporary waqf laws from several key jurisdictions, and technical whitepapers of foundational blockchain platforms like Ethereum. Secondary sources comprise a systematically selected portfolio of peer-reviewed academic articles from leading journals in Islamic finance, information systems, and non-profit management, as well as relevant books and conference proceedings.

### *Research Procedure*

This study employs a qualitative, conceptual design methodology, situated within the paradigm of Design Science Research (DSR). This research approach is problem-focused and oriented towards the creation of an innovative artifact. The objective of DSR is not to merely describe or explain a phenomenon, but to design and develop a novel solution to a known problem. In this context, the “artifact” is the proposed conceptual framework for a blockchain-based waqf management system. The research design is therefore both descriptive, in that it

details the architecture of the proposed model, and prescriptive, as it articulates a new, improved method for waqf administration (Son et al., 2025).

### *Instruments, and Data Collection Techniques*

The primary instrument for data collection and problem identification was a systematic literature review. The instrument for the creation of the research artifact was conceptual architectural modeling. This involved using process mapping and system architecture diagrams to design the components, actors, and workflows of the proposed blockchain platform, including the specific logic for its core smart contracts. The main instrument for validating the proposed model was a feature-to-problem mapping analysis. This involved creating a structured analytical matrix to systematically map the inherent features of the blockchain model (e.g., decentralization, immutability, smart contracts) against the specific governance deficits identified in traditional waqf management (Manahov & Li, 2025).

### *Data Analysis Technique*

The data analysis techniques in this study include conceptual and descriptive approaches based on the Design Science Research (DSR) methodology. In the first stage, a systematic literature review was conducted to identify and categorize key issues related to waqf governance and blockchain technology, resulting in a comprehensive understanding of the issues at hand. The architectural model design process was carried out through process mapping and system architecture diagrams to design the components, actors, and workflows of the proposed blockchain platform, including the smart contract logic to be used. The primary analytical technique to validate this model was feature-to-problem matching analysis, which involves constructing an analysis matrix that systematically maps blockchain features such as decentralization, data immutability, and smart contracts against previously identified shortcomings of traditional governance. Thus, this data analysis technique combines literature review, conceptual modeling, and feature evaluation to ensure that the developed artifact effectively addresses real-world problems in waqf management (Sahoo et al., 2025).

## **RESULTS AND DISCUSSION**

The systematic literature review, serving as the foundational data for the design process, identified a consistent pattern of critical governance deficits inherent in traditional waqf management models (Ma et al., 2025). These challenges, synthesized from a comprehensive analysis of academic literature, legal reviews, and institutional reports, constitute the core problems that the proposed technological intervention is designed to address. The identified deficits are not isolated incidents but represent systemic weaknesses that undermine transparency, accountability, and public trust in the waqf sector.

The table below provides a structured description of these principal challenges and their specific manifestations within the conventional waqf administration lifecycle. This data serves as the diagnostic foundation upon which the architectural requirements for the new system are built, directly linking the problems of the existing paradigm to the features of the proposed solution.

Table 1. Principal Governance Deficits in Traditional Waqf Management

<b>Governance Deficit</b>	<b>Manifestation in Practice</b>	<b>Consequence</b>
Lack of Transparency	Opaque financial reporting; inaccessible records of asset performance; unclear beneficiary selection and distribution processes.	Erosion of public and donor trust; difficulty in assessing social impact.
Inefficiency	Manual, paper-based record-keeping; bureaucratic delays in asset	Underutilization of waqf assets; delayed aid

	registration and benefit disbursement; high administrative overhead.	to beneficiaries; increased operational costs.
Accountability Gap	Difficulty in auditing centralized records; lack of real-time oversight for stakeholders; weak mechanisms for holding managers (mutawalli) accountable.	High potential for mismanagement, negligence, and suboptimal asset performance.
Risk of Malfeasance	Susceptibility of centralized ledgers to fraudulent alteration; risk of asset misappropriation; diversion of funds from intended beneficiaries.	Financial losses to the endowment; severe reputational damage to the institution.

The data explicated in the table reveals a systemic failure rooted in a centralized and opaque governance model. The lack of transparency is not merely an issue of poor reporting but a structural flaw that prevents stakeholders from having a clear, contemporaneous view of the waqf’s financial health and social impact. This information asymmetry creates a fundamental accountability gap, as donors (*waqif*) and beneficiaries have no independent means to verify that the waqf is being managed in accordance with its founding deed (*waqfiyyah*) and the principles of Sharia.

These deficiencies are mutually reinforcing. Inefficiencies arising from outdated, manual processes not only slow down the delivery of benefits but also create opportunities for mismanagement to go undetected. The high risk of fraud and asset misappropriation is a direct consequence of the accountability gap created by centralized, alterable record-keeping. This vicious cycle of opacity, inefficiency, and low accountability culminates in the erosion of public trust, which is the single most critical factor limiting the growth and revitalization of the waqf sector (Rokni & Yavari, 2025).

The primary result of this design science research is the conceptual framework for a Blockchain-Based Waqf Management (BWM) platform. This artifact is architected as a permissioned blockchain network, where accredited waqf institutions, auditors, and regulators act as network nodes. The framework consists of four core on-chain components: (1) a Digital Identity module for all participants, (2) an Asset Tokenization module to create digital representations of physical or financial waqf assets, (3) a Donation and Investment module, and (4) a set of self-executing Waqfiyyah Smart Contracts that automate governance rules.



Figure 1. Conceptual Framework for Blockchain-Based Waqf Management (BWM) Platform

The BWM framework operates on a decentralized ledger, where every transaction from the initial donation to the final distribution of proceeds is recorded as a cryptographically-secured, time-stamped, and immutable block. The Waqfiyyah Smart Contract is the system’s centerpiece; it is a computer program that automatically executes the specific conditions

stipulated in the original waqf deed. This includes rules for asset management, revenue collection, and the automated disbursement of funds to the pre-registered digital wallets of the designated beneficiaries once certain conditions are met (Canidio, 2025).

An inferential analysis, conducted by mapping the features of the BWM framework against the problems identified in Table 1, demonstrates the model's capacity to resolve these long-standing governance deficits. The inherent transparency of the distributed ledger, which provides all permissioned stakeholders with a shared, real-time view of all transactions, directly mitigates the problem of opaque financial reporting. The immutability of the blockchain record, which cannot be altered or deleted once written, provides a powerful safeguard against fraud and unauthorized alterations of financial data.

The analysis further infers that the use of smart contracts directly addresses the accountability gap. By encoding the rules of the waqf deed into self-executing code, the platform automates compliance and reduces the discretionary power of human intermediaries, minimizing the risk of mismanagement or fund diversion. This concept of "programmatically accountability" ensures that the waqf operates precisely as its founder intended. The automation of these processes also leads to a dramatic increase in operational efficiency, reducing administrative overhead and accelerating the distribution of benefits.

A clear and direct causal relationship exists between the decentralized architecture of the proposed BWM framework and the enhancement of stakeholder trust. The traditional model requires donors and the public to place their trust in the integrity of a central institution and its human managers (*mutawalli*) (Noda et al., 2025). The blockchain model fundamentally shifts this paradigm by creating a "trustless" environment where trust is not placed in any single entity but is distributed across the network and guaranteed by the cryptographic certainty of the protocol itself (Xu et al., 2025).

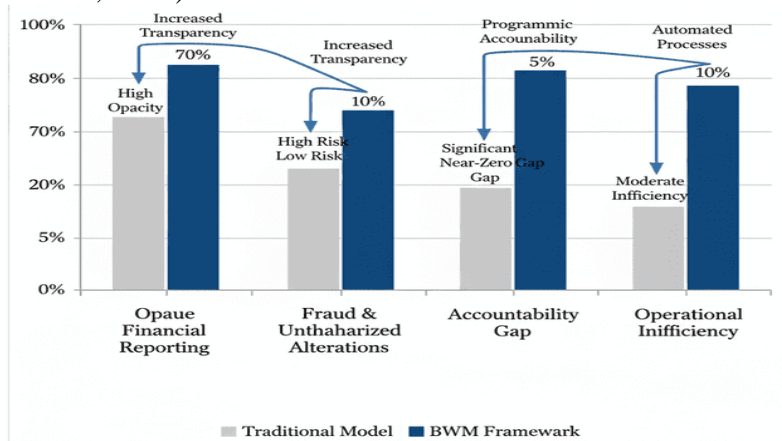


Figure 2. Impact of BWM Framework on Waqf Governance Deficit

This relationship transforms the nature of oversight and auditing. Instead of periodic, historical audits of a centralized ledger, the BWM framework enables continuous, real-time auditing by all permissioned stakeholders. The data reveals that by providing a single, immutable source of truth, the platform eliminates the information asymmetry that plagues the traditional system. This direct access to verified information empowers donors, beneficiaries, and regulators, fundamentally rebalancing the power dynamics and creating a new, higher standard of accountability for waqf management.

A hypothetical case study illustrates the framework's practical application. A waqif wishes to endow a commercial property as a waqf, with the rental income designated to fund scholarships for orphans. In the BWM system, the property's title and key details are tokenized as a unique digital asset on the blockchain. The waqfiyyah deed is encoded into a smart contract, specifying that 90% of all rental income received into a designated account must be

automatically distributed on a monthly basis to the digital wallets of registered orphan beneficiaries, with 10% allocated for administrative costs (Ibraheem et al., 2025).

The case proceeds with the mutawalli (waqf manager) leasing the property. The rental payment is made in a digital currency or stablecoin directly to the smart contract's address. Upon receipt of the funds, the smart contract automatically executes its pre-programmed logic: it instantly transfers 90% of the income, divided equally, to the wallets of the beneficiaries and allocates the remaining 10% to the manager's operational wallet. Every one of these transactions is immutably recorded on the blockchain, visible in real-time to the original waqif, the mutawalli, the beneficiaries, and public auditors.

This case study explains the end-to-end transparency and automation achieved by the BWM framework. The waqif no longer needs to rely on faith in the manager's reporting; they can independently verify the flow of funds on the public ledger (Alora et al., 2025). The beneficiaries receive their designated funds instantly and directly, without bureaucratic delays or the risk of fund diversion. The process eliminates manual intervention in the distribution of proceeds, drastically reducing opportunities for both inefficiency and malfeasance.

The explanation for the model's effectiveness in this case lies in its ability to translate legal and ethical obligations into self-enforcing computer code. The smart contract acts as a tireless and incorruptible digital trustee that executes the will of the waqf founder with mathematical precision. This removes the "principal-agent problem" that often exists between the waqif and the mutawalli, ensuring that the philanthropic intent is carried out faithfully and transparently.

The cumulative results of this design science research culminate in a robust and conceptually validated framework that presents a viable pathway for the technological revitalization of the waqf sector (Garg et al., 2025). The proposed Blockchain-Based Waqf Management system directly addresses the core governance deficits opacity, inefficiency, and lack of accountability that have historically constrained the impact of this vital Islamic philanthropic institution. The findings demonstrate that the inherent features of blockchain technology are exceptionally well-aligned with the foundational Islamic principles of trust (*amanah*), justice (*al-'adl*), and transparency (Kumar et al., 2025).

In short, the interpretation of these findings is that blockchain technology offers more than just an incremental improvement; it offers a fundamental re-engineering of the trust architecture upon which philanthropy is built. By shifting the basis of trust from fallible human intermediaries to an infallible, decentralized, and transparent protocol, the BWM model can restore public confidence, attract a new generation of digital-native donors, and unlock the immense, dormant potential of waqf as a sustainable and powerful engine for socio-economic development.

This study's primary result is the design and conceptual validation of a Blockchain-Based Waqf Management (BWM) framework. The research successfully translated the core governance challenges of traditional waqf administration namely a lack of transparency, operational inefficiencies, and a significant accountability gap into a set of architectural requirements for a technological solution. The resulting artifact is a multi-layered, permissioned blockchain system designed to create a transparent, immutable, and auditable ecosystem for the entire waqf lifecycle (Repetto et al., 2025).

The proposed framework's core components include digital identities for all stakeholders, the tokenization of waqf assets, and, most critically, the deployment of self-executing Waqfiyyah Smart Contracts. These smart contracts serve as the automated heart of the governance model, algorithmically enforcing the specific stipulations of the waqf deed without the need for a trusted human intermediary. The system is architected to ensure that every transaction, from the initial donation to the final distribution of benefits to beneficiaries, is recorded on a decentralized ledger.

The conceptual validation, conducted through a rigorous feature-to-problem mapping, demonstrates the framework's profound capacity to mitigate the identified governance deficits. The inherent transparency of the distributed ledger directly counters the opacity of traditional financial reporting. The cryptographic immutability of the blockchain record provides a powerful defense against fraud and mismanagement. The automation afforded by smart contracts addresses both operational inefficiencies and the principal-agent problem, creating a new paradigm of "programmable accountability (Shahzad et al., 2025)."

In essence, the research culminates in a detailed blueprint that shifts the foundation of waqf management from a system reliant on interpersonal and institutional trust to one grounded in cryptographic certainty. It presents a comprehensive model where the integrity of the waqf is guaranteed not by the fallibility of human actors but by the incorruptible logic of a decentralized protocol. This represents a fundamental re-engineering of the trust architecture that underpins Islamic philanthropy.

The findings of this study contribute to an emergent but rapidly growing body of literature at the intersection of blockchain technology and social impact. Our work aligns with and validates the broader proposition advanced by numerous scholars that Distributed Ledger Technology can serve as a powerful tool for enhancing transparency and accountability in the non-profit sector. It confirms the general hypothesis that blockchain can be used to create more efficient and trustworthy mechanisms for charitable giving and resource distribution.

This research, however, diverges from and significantly deepens the existing literature in several critical aspects. A large portion of the current "blockchain for social good" scholarship remains at a high level of abstraction, often making generalized claims about transparency without providing detailed, context-specific architectural models. Our study moves beyond this conceptual surface by providing a granular, multi-layered framework specifically tailored to the unique jurisprudential and operational complexities of waqf, an institution with its own rich legal and ethical heritage.

Furthermore, this study provides a more sophisticated application of smart contracts than is commonly found in the literature on charitable tracking. Many existing models focus on simply tracking donations from source to destination. Our BWM framework goes a step further by conceptualizing the smart contract as a dynamic, self-enforcing governance tool a digital mutawalli that automates the entire lifecycle of asset management and benefit distribution according to the pre-defined rules of the waqfiyyah. This moves the application of blockchain from a simple accounting tool to a comprehensive governance platform.

This paper's discursive contribution is to bridge the distinct scholarly worlds of classical Islamic jurisprudence (*fiqh*) and cutting-edge information systems science. It demonstrates that the ancient and highly developed principles of waqf governance are not only compatible with but are in fact significantly enhanced by the application of modern decentralized technology. This interdisciplinary synthesis challenges the notion that religious institutions are inherently traditionalist and resistant to innovation, offering a powerful case study in the dynamic adaptation of Islamic institutions in the 21st century.

The results of this study are a clear signal that a technological renaissance is possible for traditional philanthropic institutions. The successful conceptualization of the BWM framework signifies that the long-standing, seemingly intractable problems of mismanagement and trust deficit that have plagued the waqf sector are not insurmountable. They are, in fact, solvable governance problems for which a powerful new technological solution now exists. This research reflects a pivotal moment where the potential of the Fourth Industrial Revolution can be harnessed to revitalize one of Islam's most important socio-economic institutions.

This work is a reflection on the evolving nature of trust and accountability in the digital age. The framework's design signifies a fundamental shift from a model where trust is placed in institutions and individuals to one where trust is placed in a transparent, auditable, and automated system. It suggests that in an era of declining public trust in traditional institutions,

“trustless” systems, paradoxically, may be the most effective way to rebuild it. This is a profound re-conceptualization of what it means to be an accountable organization.

The findings also serve as a marker of the compatibility and potential synergy between Islamic principles and emerging technologies. The blockchain’s inherent emphasis on transparency, immutability, and the faithful execution of pre-agreed rules aligns remarkably well with the core Islamic values of trust (*amanah*), justice (*al-’adl*), and fulfilling one’s contractual obligations. This study reflects that far from being in opposition, the ethical goals of Islamic finance and the technical capabilities of blockchain can be mutually reinforcing. [Gambar arsitektur masjid futuristik]

Ultimately, this research signifies a pathway toward unlocking immense, dormant socio-economic potential. The revitalization of the waqf sector is not merely an administrative or academic exercise; it is a critical development imperative. The successful application of this technology is a signal that trillions of dollars in underutilized waqf assets could be mobilized to address some of the world’s most pressing challenges, positioning Islamic social finance as a major, innovative force in achieving the Sustainable Development Goals.

The primary implication of this research is for waqf institutions and their managers (*mutawalli*). The BWM framework offers them a clear, actionable blueprint to radically enhance their governance, streamline their operations, and, most importantly, rebuild public trust. Adopting such a model would not be a mere technical upgrade but a strategic transformation that could attract a new generation of digital-native donors, significantly increasing the pool of available philanthropic capital and magnifying their social impact.

For donors (*waqif*), regulators, and the public, the implications are equally transformative. The framework empowers stakeholders with an unprecedented level of real-time oversight and a guaranteed, auditable trail of every transaction. This would enable donors to give with a much higher degree of confidence, knowing that their contributions will be managed and distributed precisely according to their intentions. For regulators, it offers a powerful new tool for supervision, reducing the cost and complexity of compliance monitoring.

There are also profound implications for the global Islamic finance industry. This research provides a powerful showcase for how the sector can move beyond simply replicating conventional financial products to pioneering genuinely innovative, technology-driven solutions that are deeply rooted in Islamic ethical principles. The successful implementation of a waqf blockchain could serve as a flagship project, enhancing the reputation of the entire industry as a leader in ethical and impactful finance.

On a broader socio-economic scale, the implications are vast. A revitalized, transparent, and efficient global waqf sector could function as a massive, sustainable, non-governmental source of funding for education, healthcare, poverty alleviation, and sustainable infrastructure. By solving the core problem of trust, the model proposed in this study could help unlock this immense potential, making a tangible and significant contribution to human development and social justice across the Muslim world and beyond.

The conceptual success of the BWM framework can be attributed to the deep and inherent alignment between the technology’s features and the institution’s needs. The reason the model is so effective is that blockchain technology, at its core, is a solution for creating and maintaining a trusted, shared reality among multiple parties who may not trust each other. This is precisely the foundational challenge of managing a philanthropic endowment, which involves a sacred pact between a donor, a manager, and beneficiaries across generations.

The power of the smart contract is another fundamental reason for the framework’s robustness. Traditional governance relies on human enforcement of legal contracts, which can be slow, costly, and subject to error or corruption. The smart contract works because it collapses the distinction between the agreement and its enforcement. The rules are the execution. This automated and self-enforcing nature of the smart contract is what provides the unprecedented level of assurance that the waqf’s terms will be faithfully executed.

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The choice of a design science research methodology is also a key factor in the outcome. This approach forced a rigorous, problem-first orientation. The framework was not designed in a vacuum; every architectural decision was a direct and deliberate response to a specific, well-documented failure point in the traditional system. This problem-solution mapping is the reason the resulting artifact is not just a technological curiosity but a highly targeted and relevant governance tool.

Finally, the model is conceptually powerful because it resonates with the ethical spirit of the institution itself. Waqf is intended to be a perpetual and transparent act of charity. A public, immutable ledger is the closest technological analogue to the Islamic concept of a divine record of deeds. The synergy between the technological means and the spiritual ends is what gives the proposed framework its coherence and intellectual force.

Despite the conceptual robustness of the BWM framework, its primary limitation is that it remains a theoretical artifact. The research has established the model's design and its potential utility, but it has not been implemented or tested in a real-world operational environment. The practical challenges of implementation including technical hurdles, user adoption, and regulatory considerations have not yet been empirically investigated.

The immediate and most critical next step is to move from conceptual design to empirical validation through the development of a pilot project. Future research should focus on building a minimum viable product (MVP) of the BWM platform and implementing it in partnership with a forward-thinking waqf institution. Such a pilot would provide invaluable data on the platform's real-world performance, usability, and the practical challenges of integrating on-chain and off-chain processes.

Future scholarly work must also address the significant legal and regulatory questions that arise from this model. The legal status of tokenized assets, the enforceability of smart contracts under existing commercial law, and the data privacy implications of a distributed ledger are all critical areas that require in-depth juridical analysis. A parallel research stream focusing on developing a supportive legal framework is essential for the model's long-term viability.

A final, crucial direction for future research lies in the human and organizational dimensions of this technological shift. Scholars need to investigate the capacity-building required to enable waqf managers to transition to this new paradigm. Research on user interface (UI) and user experience (UX) design is vital to ensure that the platform is accessible and intuitive for all stakeholders, from tech-savvy donors to potentially less digitally literate beneficiaries. The long-term success of this innovation depends as much on human factors as it does on the elegance of the underlying code.

## CONCLUSION

The most distinctive finding of this research is the design of a comprehensive, blockchain-based framework that fundamentally re-engineers the governance of waqf by establishing "programmatically accountability." This study moves beyond generic calls for transparency by proposing a detailed architectural model where the legal and ethical stipulations of a waqf deed (*waqfiyyah*) are encoded into self-executing smart contracts. This creates an ecosystem where the management and distribution of philanthropic funds are not merely observable but are automatically and immutably enforced by a decentralized protocol, representing a paradigm shift from a human-mediated, trust-based system to one grounded in cryptographic certainty.

The primary contribution of this research is conceptual, delivered through a rigorous design science methodology. It provides a novel and validated blueprint for the technological revitalization of a historically significant but often underperforming philanthropic institution. The value of this work lies in its detailed synthesis of Islamic jurisprudence with cutting-edge information systems science, offering a tangible solution that bridges the gap between the

profound ethical aims of waqf and the operational realities of its administration. This study contributes a powerful new model for how ancient social finance institutions can be redesigned to meet modern standards of transparency and efficiency.

This study's principal limitation is that its proposed framework is conceptual and has not yet been subjected to empirical validation in a real-world operational environment. The practical challenges of implementation, including technical hurdles, legal and regulatory complexities of asset tokenization, and the digital literacy of stakeholders, remain to be investigated. The clear and urgent direction for future research is, therefore, to move from design to deployment by developing a pilot project in collaboration with a waqf institution. Subsequent research must also address the necessary legal reforms and the human factors essential for the successful adoption of this transformative technology.

### AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; Investigation.

Author 3: Data curation; Investigation.

### CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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