

BLOCKCHAIN AS A WAQF DISRUPTOR: LESSONS LEARNED FROM FINTERRA'S WAQF CHAIN

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Abstract

The waqf sector encompasses considerable wealth that has accumulated since the dawn of Islam and has played a prominent role in social welfare and socioeconomic development. However, this role declined due to inefficiencies and the loss of public trust in waqf caused by corruption, mismanagement, and neglect. The emergence of blockchain technology could disrupt the waqf sector and restore public trust by offering features that enhance transparency and governance and facilitate donations to channel increased liquidity toward the development of idle assets. It also enables cause-based donations and coded contractual stipulations to strengthen governance. To assess the potential for successful implementation of blockchain-based waqf, this paper reviews the applicability of prevalent blockchain adoption challenges to the existing ecosystem and suggests possible enhancements. The research indicates that whereas a blockchain waqf platform was launched by Finterra through its Waqf Chain, several challenges face blockchain adoption that represents severe impediments to a successful proliferation of the technology.

Keywords

Blockchain waqf, Finterra, waqf chain, Islamic finance, social finance

Introduction

Blockchain technology is penetrating various sectors. It is considered a significant disruptor due to its decentralization, transparency, immutability, auditability, and disintermediation features and contribution to solving trust-related issues (Frizzo-Barker et al., 2020). Blockchain features enhance trust and overcome corruption, intermediation, governance, and transparency challenges. In this context, the literature on waqf revival increasingly invited the adoption of blockchain technology as a solution to improve the performance, governance, and efficacy of the waqf institution (Habib and Ahmad, 2020), support the development of idle waqf assets (Azganin, 2019; Huda, 2021; Rashid, 2019), improve the management of waqf and enable better utilization of the concept of cash waqf (Rashid, 2019), build trust, increase transparency, enhance governance, and lower transaction costs (Abojeib and Habib, 2021) and reviving the role of the waqf institution across the Muslim world (Ahmad and Habib, 2021). Blockchain technology can disrupt the waqf sector and offer effective solutions to its persistent problem.

Despite the considerable literature that considers blockchain a natural and perfect match to waqf (Habib and Ahmad, 2020) and the significant wealth that is locked in waqf assets that have accumulated over 1400 years, which range between USD 100 billion to 1 trillion (Islamic Development Bank (IsDB), 2014); blockchain has not been capitalized to unlock the value of this wealth except for one application, the Waqf Chain. Although this application emerged a few years ago and has reported impactful results, it has not reported further updates on its impact.

This paper aims to explore: To what extent is the existing ecosystem conducive to the successful adoption of blockchain technology in waqf? A case study analysis is performed on the Waqf Chain to identify the practical aspects of deploying blockchain in Waqf. By comparing the blockchain adoption challenges identified by the extant literature, the paper examines the applicability of those challenges in the context of waqf through the lens of the Waqf Chain. Due to the novelty of blockchain technologies, case studies of launched applications are a common approach to transferring the industry experience to the research arena (Treiblmaier, 2019). The Waqf Chain was selected as it is the only application launched in this domain. The paper analyses the relevance of blockchain adoption challenges to the waqf space as observed in the case under study. Based on the analysis results, the paper develops a list of recommended actions to facilitate the adoption of blockchain in waqf.

The analysis indicated that blockchain solutions face significant challenges that impede adoption. Adoption challenges highlighted by the literature extend to the implementation of blockchain in waqf and, in certain instances, are of

more adverse effect due to the nature of waqf as a charitable activity that does not entail returns on investment. This renders the cost challenge of greater implications and positions these applications as less attractive investment prospects. The complexity of Islamic Finance products caused by the added layers of legal and Sharia compliance requirements augments the complexity of blockchain as an implementation challenge. Legal uncertainty and lack of clarity is a challenge that, in the case of waqf, is coupled with outdated or unavailable waqf laws. Jurisdictional, Sharia, and technology opaqueness and the lack of standardization cast serious adoption obstacles. The technical challenges in implementing the technology, including interoperability and security, extend to the implementation of blockchain waqf. The current status of waqf administration by official waqf authorities renders decentralization an irrelevant feature.

Although blockchain has the potential to contribute to waqf positively, this potential can be reached by overcoming the existing challenges to develop an enabling ecosystem built on established legal, regulatory, and governance frameworks that allow and support their existence and operations (Abdul Aziz et al., 2019; EU Blockchain Observatory and Forum, 2019b). In charity, philanthropy, and waqf sectors, where trust is essential and scarce, solutions based on nascent technology may only gain scale and acceptability over time through a gradual process of genuine impact presentation and awareness building (S. Khan et al., 2022). The architectural design and the development of operational infrastructure is a costly and complex process, even more so for Islamic finance applications due to the unique complexity of Islamic finance contracts (Elasrag, 2019). In addition to that, observing the evolvement of the Finterra model and the shift in its focus towards investments in ethical finance and profit-yielding projects substantiate the need for subsidization or the provision of funding by governments and large Non-Profit Organizations to support the development and operation of waqf platforms and provide incubation opportunities to share the cost burdens and foster innovation. Collaboration and coordination with the waqf authorities as the official parties responsible for waqf in several Muslim countries (Rashid, 2019) is necessary. This would entail compliance with the applicable laws and regulations to ensure support by waqf authorities and other governing and monitoring institutions. Such requirements conflict with the proposed models of a fully decentralized, self-governing waqf blockchain, which may not be possible in the case of existing waqf. A mature ecosystem must be ready when mass adoption of blockchain solutions is in full force (EU Blockchain Observatory and Forum, 2019b).

The rest of the paper is organized as follows. Section 2 offers an overview of blockchain technology, its features, and its compatibility with the waqf sector. Then, the research design is presented, followed by discussing the subject case

study, the Waqf Chain, and an analysis of the blockchain waqf ecosystem. The last section concludes and presents the research recommendations.

Literature Review

The breadth of scholarship available on this topic underscores its significance in the field. Researchers have thoroughly explored various aspects, offering detailed analyses and engaging critically with numerous facets of the issue. Despite this extensive body of work, certain areas remain underexplored or present opportunities for reinterpretation in light of new data or perspectives. This study aims to address these gaps, bringing additional nuance to the understanding of this important subject

Blockchain Technology

Blockchain technology is a decentralized digital ledger that relies on peer-to-peer transmission. Users carry pseudonymous identities, and transactions are visible to all network users. Transactions and records are immutable and are tied to computational logic (De Filippi, 2017; Friedlmaier et al., 2018). Blockchain technology introduced cryptographic proof as a substitute for trust in order to allow parties who do not trust each other to transact without the intervention of a trusted third party (Nakamoto, 2008). Blockchain can help establish a digital economy that is secure, democratic, fair, and inclusive without the exploitation and surveillance of financial institutions or corrupted governments (EU Blockchain Observatory and Forum, 2019a). Blockchain is considered a significant disruptor in many sectors due to its ability to reconfigure the landscape of economics, politics, and culture (Frizzo-Barker et al., 2020) and remove trust-related challenges (Kamble et al., 2020). A recent survey on modern applications of blockchain technology identified that blockchain applications cover financial activities, governmental, military, and defense services, wireless networks, healthcare, information systems, the Internet of Things, and smart grids (Krichen et al., 2022). The charity and endowment management sectors have also entered the blockchain space to benefit from its superior capabilities to establish trust, enhance transparency and impact reporting, and the capabilities offered by smart contracts (CAF Charities Foundation, 2016). Early adopters in the space of charity and aid include the World Food Program through its blockchain-based donations system at refugee camps across the world (Aysan and Unal, 2021). Blockchain charitable organizations were launched, including the Blockchain Charity Foundation and Charity Stars by Binance, the world's largest cryptocurrency exchange by trading volume (Crunch Base, 2022), to support donations to sustainable development goals and the collection and distribution of donations for charities or specified projects including Covid-19 relief, women empowerment, and natural disaster relief and charity auctions. These organizations offer blockchain-enabled philanthropy. To increase public

trust in charities, Alice uses smart contracts to manage the collection and distribution of donations (Alice, 2022; Rugeviciute and Mehrpouya, 2019). Charities use the transparency feature offered by blockchain to report their impact in an attempt to increase trust and ultimately encourage contribution towards charitable causes (Rangone and Busolli, 2021).

In the space of Islamic social finance, applications that utilize blockchain in the collection and distribution of zakat on crypto holdings were launched by Blossom Finance, the issuance of blockchain-based sukuk, Smart Sukuk, by Blossom and Jibrel Network (Zakaria et al., 2021) and Sakkex (N. Khan et al., 2022).

Blockchain As a Waqf Solution

Waqf, the Islamic charitable trust, is a perpetual charity in which the asset/principal is withheld, and the return or usufruct of that waqf is used for the beneficiaries or causes stipulated by the donor (Kahf, 1999). It has long played a pivotal role in financing education, scholarship, healthcare, sustenance for the underprivileged, social and environmental welfare, and the construction of mosques, orphanages, and graveyards (Cizakça, 1998; Kahf, 1999; Sait and Lim, 2006). The perpetual nature of waqf resulted in the accumulation of significant wealth that spans Muslim countries and countries with Muslim minorities. The value of these assets cannot be precisely estimated but may range between USD 100 billion to 1 trillion (Islamic Development Bank (IsDB), 2014).

Despite the prominent role of the waqf throughout history and the considerable value of waqf assets, the role of waqf has deteriorated significantly due to antagonistic governments stand (Kahf, 2016), inefficient and corrupt management practices (Cizakça, 2000), lack of expertise and employment of modern wealth management practices to preserve and grow waqf, loss of ownership records, outdated and incomprehensive waqf laws and insufficient funding for the development of idle waqf assets (Abdul Aziz et al., 2019), lack of transparency, disclosure, and auditability of waqf performance and waqf records (Habib and Ahmad, 2020).

Recently, many countries have taken actions to revive the role of waqf through enacting waqf laws, including Lebanon, Türkiye, Kuwait, Jordan, Sudan, and Algeria (Kahf, 2016), the creation of new waqf schemes like cash waqf, waqf shares, corporate waqf and deposit waqf products (Ismail Abdel Mohsin, 2013) and the establishment of the Awqaf Properties Investment Fund by the Islamic Development Bank to finance the establishment and development of Islamic real estate endowments. These efforts have not contributed to the revival of waqf as the long-standing challenges have impaired public trust and prevented public engagement with waqf (Abdul Aziz et al., 2019).

As blockchain technology emerged, research on waqf revival quickly found it to be a natural match to waqf (Ahmad and Habib, 2021). As blockchain encompasses features that provide immutability and irreversibility of transactions and records, the ability to automate governance and distribution of funds through smart contracts, and the consensus mechanism that provides democratization, the transparency and traceability of records and transactions; trust in waqf may be re-established. Long-standing waqf challenges may find their resolution by implementing blockchain technology to replace or complement the existing practice.

Discussed the potential role that blockchain technology can play in improving governance and Sharia compliance. Waqf crowdfunding through blockchain can be an effective tool for developing idle waqf assets (Alaeddin et al., 2021; Azganin, 2019). Discussed the role that blockchain can play in enhancing waqf management and utilizing the cash waqf concept. Smart contracts were presented as a viable tool to enhance the waqf institution's efficacy and performance (Habib and Ahmad, 2020). However, this potential is constrained by legal and operational challenges (Azganin, 2019). A SWOT analysis on the implementation of blockchain in waqf by highlighted scalability, awareness, and perception by the government as critical impediments. The complexity and opacity surrounding blockchain impede the adoption of blockchain not only in waqf but also in zakat and sukuk (Alaeddin et al., 2021).

The paper builds on conceptual literature that discusses the potential role blockchain technology can play to elicit the practical viability of implementing blockchain in waqf concerning the adoption challenges identified by blockchain research. By tracing the launch, performance, and progress of the Waqf Chain, the first blockchain platform for waqf, the paper aims to identify how conducive is the existing ecosystem to the successful implementation of blockchain in waqf.

Research Design

The paper delves into the literature on blockchain to compile a list of challenges facing blockchain adoption. The paper examines the applicability of the listed conditions to the case of waqf, represented by the Waqf Chain. Building on the analysis, recommended actions are presented to overcome the existing challenges to enable the integration of blockchain technology as a waqf solution.

The examination of the literature identified that laws and regulations represent a major obstacle to the adoption of the technology, including jurisdictional issues, anonymity, decentralization, and data retention and privacy issues (EU Blockchain Observatory and Forum, 2019b; Lu, 2019) resulting in controversy and lack of clarity on the role of regulators towards blockchain (Kshetri and Voas, 2018). Blockchain entails high operational and maintenance costs with

complex infrastructure (Aysan et al., 2021; Elasrag, 2019) thus, considerable investments are needed for the development and expansion of blockchain, whereas priorities in resource allocation towards economic and social segments are not clear (Kshetri and Voas, 2018). The lack of standardization, interoperability, and integration with existing systems was one of the main challenges in adopting blockchain technology (EU Blockchain Observatory and Forum, 2019a; Motta et al., 2020; Papathanasiou et al., 2020). Technical problems, including limited scalability (Toufaily et al., 2021) and interoperability, are augmented in countries with limited technical capabilities, which would hinder their ability to benefit from blockchain (Kshetri and Voas, 2018). Awareness of the technology is considered an impediment to its implementation (Helliari et al., 2020; Kayikci et al., 2022; Toufaily et al., 2021) or at least limits the scope of the implementation (Tokkozhina et al., 2022), there is also a negative perception of blockchain due to its connection to bitcoin, the dark-web, money laundering, and other notorious activities.

The Waqf Chain Platform

Finterra, a technology-based company specializing in blockchain projects, was established in 2017, and introduced the first blockchain based waqf platform, the Waqf Chain. The platform harnesses the benefits of blockchain technology to fund waqf and charitable causes (Abojeib and Habib, 2021) with the aim of enhancing waqf management, the development of idle assets, and building an integrated development ecosystem (Rashid, 2019). Through micro contributions, the platform allows the financing of large projects. It relies on smart contracts to manage the process of a donation receipt, token issuance, profit distribution, and the management of resulting assets in case of asset development (Rashid, 2019). The Waqf Chain is built on an in-house blockchain. It is registered in 5 countries and is compliant with the Malaysian Monetary Regulatory Authorities, including Know Your Customer and Anti-Money Laundering requirements. The local waqf and relevant Sharia laws are coded into the Waqf Chain products (Bouakkaz, 2022). The Waqf Chain model allows for four types of instrumenting, depending on the nature of the project: Sukuk, Islamic loans, Cash waqf, and Mudharabah. Through its cash waqf initiatives, the Waqf Chain has established 12 waqf fund pools that have reportedly impacted 9,450 lives. However, the reported impact has not witnessed any updates since these results were first announced (Waqf Chain, 2020).

It is also worth noting that apart from the Waqf Chain, the blockchain space did not witness new applications that introduce waqf-related products or platforms. The following sections present an analysis of the Waqf Chain and the ecosystem conditions to explore the possible challenges that impede the integration of blockchain technology in Waqf.

The Analysis

The following Table 1 synthesizes challenges drawn from the literature review on blockchain implementation to identify the relevant challenges for blockchain waqf implementation. A discussion of the challenges in the context of waqf are presented after the table.

Table 1. Blockchain challenges and their relevance to waqf

| Potential Challenge | Description | Relevance for blockchain waqf |
|----------------------------------|---|---|
| Cost | The technology is expensive to develop and operate | Costly with high investment requirements. High switching costs. Charitable projects are less attractive without ROI |
| Complexity | Blockchain is a complex technology. | Sharia and legal compliance make Islamic Finance instruments even more complex. |
| Legal and regulatory Uncertainty | Laws are not introduced in many countries Some countries ban involvement with blockchain and cryptocurrencies | The existing legal and regulatory system may impede the adoption of blockchain. Enforceability of smart contracts is not clear. Legalization of cryptocurrencies to finance waqf development is uncertain and is subject to extensive regulatory compliance requirements. |
| Jurisdictional issues | Lack of standardization | Varying legal and Sharia requirements makes blockchain more costly and complex to develop for waqf. |
| Sharia issues | Inconsistent and unfavorable Sharia positions and rulings | Fatwas considering blockchain/ its applications/ cryptocurrencies haram represent an adoption challenge |
| Awareness | Low awareness of blockchain | Low awareness and misconceptions hamper adoption, result in unfavorable decisions, and distorts the perception of the potential value of blockchain for waqf Lack of awareness of the concept of waqf is an additional challenge. |
| Interoperability | Integration with other blockchains and systems | Challenge in migrating data from legacy systems and integration with other blockchains For waqf, interoperability also entails off-chain integration due to the physical nature of underlying assets. |
| Scalability | Limited scalability | Only a challenge in the short term. Should be resolved with the advancement of the technology |
| Security | Security against cyberattacks, security breaches, retention of data Compliance with security laws | Security is a prevalent issue and is applicable in the case of waqf Blockchain waqf can ensure compliance with relevant laws |
| Decentralization | Peer-to-peer transmission and transacting without intermediation | Not relevant in the case of waqf due to government involvement with the assets |

- **Costs:** Blockchain technology is promoted for its ability to reduce administrative and management costs due to disintermediation (Al-Jaroodi and Mohamed, 2019; Lu, 2019) and cuts regulatory costs (Lu, 2019), however, the development and operation of blockchain technology is costly. This is also relevant for blockchain waqf where considerable investments are required to develop and maintain the infrastructure of a private blockchain network (N. Khan and Ouaich, 2019) which was the approach taken by Finterra in building its network Galactic. This may not be readily available to several Muslim countries suffering severe economic challenges. Given the charitable nature of waqf, solutions that do not yield returns on investment may not represent attractive ventures to governments or profit seeking investors. Following the progress of Finterra, the founder of the Waqf Chain, shows an increased focus on projects that support ethical finance and entail the payment of profits to investors (Finterra Ventures, 2022). Switching costs may also represent an obstacle as migrating to blockchain entails considerable costs which could deter adoption as it is considered more expensive to migrate from the existing alternatives (Catalini and Gans, 2020) to the more costly blockchain solutions (Aysan et al., 2021).
- **Complexity:** Blockchain is a complex technology and more so for Islamic Finance products (Elasrag, 2019). The additional processes to ensure legal and Sharia compliance renders Islamic Finance solutions more complex (Zakaria et al., 2021). As the development of waqf assets relies on Islamic Finance instruments like Mudharabah and Sukuk, complexity of the design and implementation are relevant issues for blockchain waqf.
- **Legal and regulatory uncertainty:** The novelty of blockchain technology and the uncertainty surrounding its acceptance by the existing legal system, in addition to stands taken by some countries that consider involvement with cryptocurrencies illegal, pose a major risk to the adoption of blockchain in waqf. Legal enforceability of smart contracts, which are one of the pillars for the Waqf Chain and any other platform that engages in the management of waqf assets represent another high-risk area. Apart from blockchain related laws, the unavailability or obsolescence of waqf laws represents another obstacle for the adoption of advanced technologies like blockchain.
- **Jurisdictional issues:** The large geographical span of waqf assets across countries with varying jurisdictional requirements represents a challenge for the integration of blockchain solutions across these jurisdictions. The lack of standardization means the platform and contracts must be customized to accommodate the varying compliance requirements of the jurisdictions in which they operate, posing additional complexity and potentially added costs.

- **Sharia issues:** Given the general negative perception towards blockchain, some unfavorable Shariah positions and Sharia rulings have been issued that prohibit the involvement with cryptocurrencies (Abdeldayem et al., 2020; S. Khan and Rabbani, 2022), a component used in financing waqf development. Consensus among scholars on the value and permissibility of blockchain requires additional communication and awareness building.
- **Awareness:** As a nascent technology with more failing than succeeding use cases (Labazova et al., 2019), the limited awareness of blockchain technology represent a major challenge to its proliferation, especially in sectors such as waqf where waqf authorities hold more traditional and conservative mindsets. The limited awareness extends to all stakeholders including governments and the wider public. On top of the technology awareness, the awareness of the concept of waqf by majority of Muslim population (Puad et al., 2014) could hamper the adoption of blockchain solutions that target waqf.
- **The technological limitations:** Interoperability is a significant requirement for the success of blockchain in waqf and it extends beyond the system interoperability level to cover the off-chain world due to the physical nature of waqf assets that may qualify for development. Given the less advanced systems in managing waqf assets in Muslim countries, blockchain for waqf may face additional interoperability challenges. Mapping the data from the legacy systems to the blockchain could be challenging (S. Khan et al., 2022). Decentralization, a key benefit of adopting blockchain technology, may not be applicable in the case of waqf assets as they fall under the control of governments in majority of the counties. Finding the right mechanism to benefit from the decentralization feature of blockchain while under the management of the government is still unresolved (Lu, 2019). Privacy, security, and sovereignty issues could interfere with the adoption of blockchain technology in waqf given the opaqueness of the technology and its direct violation to laws that protect the privacy and retention of data as well as issues linked to tracing sources of funds and compliance with central banks and other monetary authorities. In the case of the Waqf Chain, compliance with the KYC, Anti money-laundry and other regulatory requirements was observed and may not pose a major challenge. Also, the continuous advancement of the technology is likely to overcome technical difficulties. As for scalability, advancements in this area are continuously unfolding and are likely to overcome this challenge in the future.

Conclusion and Policy Recommendations

Blockchain technology has the potential to disrupt the waqf sector. It encompasses features that represent a strong match to the prevailing challenges

that constrained waqf from continuing its contribution towards social welfare and the participation in socioeconomic development. However, assessing the existing ecosystem reveals that effective integration of blockchain technology in waqf faces serious challenges that start from legal and regulatory uncertainty, governance challenges related to waqf laws and jurisdictional disparity. The lack of technology awareness given its novelty is augmented in the case of waqf due to lack of awareness of the practice of waqf. Cost and complexity are significant challenges that face blockchain adoption and when considered for charity related projects that do not generate returns on investment, the decision to invest in blockchain solutions may not be viewed as a viable project. The implementation of blockchain entails technical challenges, however, with the continued evolution of the technology they are likely to be resolved.

Building on the experiences gained from early adopters, represented by the Waqf Chain, and considering the impact the initiated projects delivered, replicating the model in different jurisdictions can furnish salient socio-economic development outcomes. Blockchain technology can help reinstate trust in the waqf sector by building credibility through verifiable performance that is routinely reported, monitored, and tracked.

However, the implementation of blockchain in waqf requires enhancement to the present ecosystem before this solution can proliferate. The below are suggested actions and policy recommendations to facilitate the integration of blockchain in the waqf sector:

- An enabling ecosystem that supports and incubates innovation. Subsidization and governmental backing are essential to support infrastructure building as blockchain solutions are costly and have not yet reached enough scale to achieve meaningful cost economies. Investments by governments and major Islamic organizations to share the cost burdens can support the development and operation of blockchain waqf. It could also be spearheaded by GCC countries which show increased interest in futuristic technologies. National strategies incorporating blockchain as a viable technological solution and introducing legal and regulatory frameworks that cover blockchain or at least allow its adoption are needed. A top-down approach to support the adoption of blockchain can encourage its adoption.
- A comprehensive and fully functional legal system to govern blockchain-based applications and protect donors. As the technology is still in its infancy, data protection and privacy of sensitive personal information could be compromised. Developing the standards for the technology and its governance requires a careful approach that balances governing the practice and fostering the technology's development (EU Blockchain Observatory and Forum, 2019b). Consistent monitoring by regulatory

bodies is necessary to protect the public from predatory and deceitful practices that prey on the public's interest in nascent technologies and claim attachment to these technologies to achieve fictitious gains.

- A comprehensive Sharia governance framework is necessary to establish the ground rules for these emerging applications and ensure their practices do not deviate from the principles of waqf (Habib and Ahmad, 2020). This, however, may represent a serious challenge given the contrast in waqf rules among the different Islamic schools of thought.
- Coordination and collaboration with waqf authorities is essential for the success of applications that aim to resolve legacy waqf issues.
- Investments in research and development through academic and learning centers, the establishment of incubators, and subsidization of training and education on blockchain can help fill the skill gap and support a wider adoption. Increased awareness and trust in blockchain could result in the emergence of more applications in waqf and other social finance activities. More research and experimentation with the technology are needed to harness the various benefits blockchain can bring into the waqf space.

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