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BLOCKCHAIN USE CASE IN ISLAMIC SOCIAL FINANCE

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ABSTRACT

Purpose — This research explains and reviews two innovative solutions based on blockchain that were used for Islamic social finance (ISF) projects by two separate companies, namely Finterra and Blossom Finance. Policy implications are suggested for the future use of blockchain in innovative financial products for the Islamic finance industry.

Design/Methodology/Approach — This is a qualitative research conducted through library research and semi-structured interviews with experts and founders of Finterra and Blossom Finance. Data obtained from published literature and the interviews were accordingly examined and interpreted through content analysis to present the results in this research.

Findings — There is rising interest in ISF for economic revival in the aftermath of the COVID-19 pandemic. Innovation through blockchain technology seems to be the future of ISF, hence the need for relevant stakeholders to understand the technology. However, there is a regulatory gap in terms of a proper legal framework to support blockchain-related innovations in ISF and a policy gap in the management of Sharī‘ah and legal risks involved in ISF transactions.

Originality/Value — This research is original because it explains unique case studies from the source of innovation itself, analyses the hurdles that were present, and offers recommendations for future use of innovative technology in the Islamic financial sector.

Keywords — Blockchain technology, Blossom Finance, Finterra, Islamic social finance (ISF), Regulatory and policy issues

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INTRODUCTION

Technological innovation has changed the way financial services and products are offered to customers in the financial sector. Such financial innovations, whether for profit or impact, as in the case of Islamic social finance (ISF), are largely powered by information or data that underlie the automation and security of transactions. Automation is to facilitate the transaction while security is to safeguard the recording and storage of transactional data, both of which are crucial to the production and delivery of financial services. Different innovations facilitated by financial technology (fintech) are emerging today and used as means for offering or conducting simplified, yet secure financial transactions, including Islamic social financing. The simplification and security transcend not only the transactions but their recording and the storage of relevant data. The advent of digital business models, increasing internet and mobile penetration, and a technologically literate generation accelerate the emergence of new technologies and such innovations in financial dealings. One of the emerging technologies that has been used in fintech and is considered a key technology breakthrough in recent history is blockchain technology (Chang *et al.*, 2020). Blockchain technology offers a system for recording and keeping information in such a way that it is impossible or extremely difficult for the system to be hacked, changed or manipulated (Chang *et al.*, 2020).

The unique features of blockchain include decentralisation and immutability of records, faster settlement and reduced counterparty risks, encryption and decryption for security purposes, and near impossibility of changing historical records. These features provide benefits for financial transactions (Techracers, 2018). Immutability renders records insusceptible to alteration while decentralisation allows the same record to be distributed in an unalterable state, which enables building and maintaining consumers' trust in the system. Decentralisation also means eliminating certain intermediaries in offering services, transforming the role of stakeholders in financial markets and speeding up the settlement process, to allow for greater trade accuracy and security and less personnel/transaction costs in business (Techracers, 2018). The use of blockchain is a novel undertaking that has enabled greater efficiency and transparency for investors in Islamic social and commercial finance alike.

ISF is an aspect of Islamic finance that is considered an alternative source of financing to boost economies by helping to develop social welfare (Haneef, 2020). During and after the COVID-19 crisis, when the focus has turned towards social finance to revive the economy, ISF has become more popular.

Literature on the use of blockchain technology in ISF discussing the practical case studies is limited; the literature on blockchain technology and ISF is mainly on the potential use of blockchain in Islamic banking and finance. For example, Dahdal *et al.* (2022) describe the role and potential of blockchain technology in Islamic finance; Mohamed & Faisal (2024) explore blockchain among other technologies to enable innovative banking; and Mbaidin *et al.* (2024) review the critical success factors of blockchain technology in UAE Islamic banks. Literature on ISF and blockchain is also limited. A literature search found several studies on the potential use of blockchain in the deliverance of zakat, and how better transparency and more efficient distribution could take place with blockchain (Ashurov, 2020; Mohd Nor *et al.*, 2021; Ajmal *et al.*, 2023). Muneeza *et al.* (2023) explored the need to pay zakat on digital assets. Mohaiyadin *et*

al. (2022) explained the positive potential use of blockchain in the management of waqf. However, there is a gap in the literature in relation to real use cases of blockchain in the deliverance of ISF financial instruments, which is what this research aims to fill.

The objective of this research is to firstly examine the use of blockchain technology in providing ISF products. Secondly, this research seeks to identify possible issues in the use of blockchain and suggest recommendations on how to overcome these issues. This study focuses on two case studies where blockchain technology has been used to create and provide ISF investment products. The first case study is Finterra's Islamic redeemable preferential shares (Finterra, 2020) and the second is Blossom's smart *ṣukūk* (Blossom, 2020). As such, the research problem for this research revolves around the integration of blockchain technology in ISF products and the identification of associated challenges and solutions.

This paper is divided into six sections. Following the introduction, the second section reviews the literature on ISF, its different instruments/mechanisms, and blockchain technology based on relevant existing works. The third section discusses the methodology employed in conducting the research. The next sections then examine two use cases of blockchain technology in providing ISF, analyse the implications of issues identified from the use cases, and draw lessons for policymakers. The last section concludes the paper.

LITERATURE REVIEW

Islamic Social Finance

ISF is the offering of the benevolent contracts of zakat (almsgiving), waqf (Islamic endowment), *ṣadaqah* (charity), *qarḍ* (benevolent loans) and others for the social upliftment of a community (Haneef, 2020). Its main goal is to improve social justice through fair dealings and wealth redistribution (Shepard, 2021). ISF is based on the primary sources of Sharī'ah, notably the Qur'ān and Sunnah.

The overall objectives of the Sharī'ah (*maqāṣid al-Sharī'ah*) are to provide ease and relieve hardship (Shepard, 2021). The Sharī'ah emphasises the social responsibilities of humans, who are considered the *khalīfah* (steward) of Allah (SWT) in this world (A'la Mawdudi, 2013). ISF seeks to improve wealth distribution and ensure social justice, fairness and prevention of exploitative practices and harm to the society and the environment (Farooq, 2012).

The Islamic social contracts of zakat, waqf, *ṣadaqah* and *qarḍ* are briefly explained hereunder:

- Zakat is a philanthropic obligation of every Muslim that possesses a threshold of certain categories of wealth. Zakat is compulsory and is referred to in numerous places in the Qur'ān and Sunnah. It is fixed at 2.5 per cent of an eligible Muslim's net wealth that reaches the *niṣāb* (threshold), and it is paid annually. The categories of wealth that are subject to zakat include cash, livestock, farm produce, gold, silver and income generated from assets, among others.
- *Ṣadaqah* is voluntary charity and philanthropy beyond the payment of zakat (Khan, 2019). Prophet Muhammad (SAW) was reported to have stated that the donation of *ṣadaqah* is essential for every Muslim (Muslim, n.d., no. 1009).
- Waqf is a philanthropic endowment in perpetuity that is encouraged in the Quran (3:92, 2:177), urging Muslims to do good deeds and spend in the way of Allah (SWT). Further,

in *Sunan Abi Dawud* Book 18 Hadith 17, it is mentioned that the Prophet (SAW) encouraged Muslims to dedicate their wealth or property inalienably or in perpetuity and offer proceeds therefrom to charity (Qadhi, 2007). Waqf is a form of Islamic charitable instrument for social finance to support and promote the welfare of the society. It has been very effective in the development of public utilities (e.g., health and educational institutions) as charitable endeavours in many jurisdictions.

- *Qard hasan* is a benevolent, voluntary and interest-free loan whose source can be found in the Quran (2:245). The creditor of benevolent loans do not seek any increase and in the event the debtor encounters any difficulty, the lender is required to extend the repayment time and can voluntarily waive the loan, or part of it, as charity (Quran, 2:280). The benevolent nature of *qard hasan*, for example, facilitates financial help to deserving individuals and entities by not encumbering them with the burden of collateral or interest (Abdullah, 2015).

From the above contracts, further ISF instruments can be developed such as for the purpose of Islamic microfinance which caters for the provision of small finances to segments of the population who are usually unserved or underserved due to their economic standing (Obaidullah, 2008). ISF instruments will be used by not-for-profit Islamic microfinance which is aimed at poverty alleviation by giving out *qard hasan*, collecting/allocating zakat, channeling *sadaqah* and returns from waqf (Obaidullah, 2008; Haneef *et al.*, 2015; Haneef, 2020). An empirical research by Widiastuti *et al.* (2022) concluded that integrating ISF tools such as waqf and zakat in joint projects was 12 per cent more effective in enriching the poor.

Another example is Islamic social *takāful*. *Takāful* is an Islamic version of insurance where members pool money into a common fund to guarantee one another based on the Shari'ah to cover life, health and general insurance needs. Generally, there are a number of models to establish *takāful* and pursue ISF ideals (Islamic Relief, 2019). A waqf model, for instance, compensates members for their loss using irredeemable donations that constitute an endowment fund (Cattelan, 2019; Rodríguez-Moreno, 2019). Meanwhile, in a commercial model, the common fund is established using members' voluntary contributions which an agency can manage for a fee charged from the fund. Alternatively, members can decide to invest/manage the fund by themselves, share profit therefrom or reinvest the same in the *takāful* fund (Masud, 2010; Umut & Akkurt, 2022). *Takāful* operates as a cooperative system of repayment or reimbursement in the event a calamity befalls any of the contributors, to whom compensation will be paid from the common fund. The members' contributions are regarded as *sadaqah* to the fund to help those in need of assistance. Where the fund records loss or incurs liability, these are spread among the members in accordance with their pre-agreed share of contribution (Archer *et al.*, 2009; Bakar, 2011).

Blockchain Technology

Fundamentally a blockchain is a digital ledger. However, it is unique because the transactions it records are cryptographically signed, time-stamped and distributed in a decentralised fashion without a central repository and often without a central regulatory authority. Information in the blockchain is grouped into blocks, with each block representing a distinct transaction and each

block recording a new transaction and being cryptographically linked to the previous one, after validation and after undergoing a consensus decision (Tapscott & Tapscott, 2017; Habashneh *et al.*, 2024). The transactions are verified by peers, also known as nodes. The blockchain is distributed to each node and forms a shared ledger within a community of users, such that under the normal operation of the blockchain network, no transaction can be changed once completed and published since each node would have a complete copy of the transactions and thus any changes made by individual nodes would be rejected as they are not agreed upon (Yaga *et al.*, 2019). As new transactions are performed, more blocks are added, and older blocks become more difficult to modify, thus ensuring immutability, and since each block is still in the ledger this aids auditability and transparency (Chishti & Puschmann, 2018; Zetzsche *et al.*, 2020). Blockchain can be private (permissioned) or public (permissionless)—the basic distinction being who is allowed to participate in the network, execute the consensus protocol, maintain the shared ledger, and have access to read and write data on the ledger. In other words, public blockchain is decentralised while private blockchain works based on access controls which restrict participants in the network (Praveen, 2017; Helliard *et al.*, 2020).

The Use of Blockchain Technology in Islamic Social Finance

Numerous studies have explored the application of blockchain technology in various domains, including entrepreneurship facilitation (Ahluwalia *et al.*, 2020; Bogusz *et al.*, 2020) and broader perspectives on its usage within Islamic finance (Elasrag, 2019; Rabbani *et al.*, 2020). However, there is limited research specifically focused on the utilisation of blockchain technology in ISF, particularly through case studies. Nonetheless, some studies have examined the potential application of blockchain technology to specific types of ISF instruments or products.

For instance, Mohd Nor *et al.* (2021) explored the potential of blockchain technology in zakat management, addressing multifaceted challenges such as trust, transparency, and governance. These challenges hinder the effective collection and distribution of zakat funds, impacting their socioeconomic objectives. However, blockchain technology presents a promising solution by revolutionising zakat operations, enabling a more professional, systematic, and transparent approach to collection and distribution. Through blockchain's inherent features such as transparency, immutability and decentralisation, zakat transactions can be executed with heightened integrity and accountability, mitigating the risk of fraud and corruption.

Furthermore, Mohd Nor *et al.* (2021) highlighted the importance of fostering trust in zakat institutions to encourage greater community participation. Blockchain's potential to enhance trust through its transparent and tamper-proof ledger system is particularly significant. By providing an auditable record of zakat transactions, blockchain instils trust among stakeholders and regulatory authorities, fostering a culture of transparency and accountability within the zakat ecosystem.

Additionally, Mohd Nor *et al.* (2021) introduced the Technology Acceptance Model (TAM) as a theoretical framework for understanding users' behaviour and intention towards adopting new technology. TAM offers valuable insights into the factors influencing stakeholders' acceptance and utilisation of blockchain-based solutions in zakat management, focusing on perceived usefulness, ease of use, and user behaviour.

Another study by Salleh *et al.* (2022) discusses the stages of technology adoption and the

basics of blockchain technology in the context of zakat transactions. They emphasise the significance of technology adoption models, such as the Unified Theory of Acceptance and Use of Technology (UTAUT), in understanding users' attitudes towards new technologies. The review underscores the transformative potential of blockchain technology in revolutionising zakat management practices, particularly through the implementation of digital wallets.

Moving beyond zakat, Zulaikha and Rusmita (2018) propose a model for waqf management using blockchain technology, termed Waqf Blockchain. Their framework facilitates the raising and management of cash waqf, emphasising the connectivity and transparency enabled by blockchain technology in waqf transactions.

Similarly, Mutmainah *et al.* (2021) explore the integration of blockchain technology in waqf management in Indonesia. They discuss initiatives such as the Waqf Blockchain Initiative by the United Nations Development Program (UNDP) Indonesia and platforms such as Finterra's Waqf Chain, which aims to enhance transparency and credibility in waqf distribution through blockchain technology.

Finally, Kunhibava *et al.* (2021) examine the use of blockchain technology in *ṣukūk* issued for social purposes, focusing on the SmartSukuk introduced by Blossom Finance. They highlight the challenges facing blockchain *ṣukūk* across legal, regulatory, Sharī'ah and blockchain-related dimensions, emphasising the potential of blockchain technology to streamline fund mobilisation and distribution while reducing the need for intermediaries.

In summary, these studies collectively demonstrate the potential of blockchain technology to revolutionise ISF by enhancing transparency, accountability, and efficiency in the management of zakat, waqf and *ṣukūk* instruments. They underscore the importance of further research and collaboration among stakeholders to address challenges and maximise the benefits of blockchain technology in ISF.

METHODOLOGY

The qualitative methodology adopted in this study is aimed at comprehensively exploring the integration of blockchain technology within the domain of ISF. By employing qualitative methods, the research seeks to delve into the intricate aspects of blockchain's application in this context, allowing for a nuanced understanding of its implications (Stone, 2020). Qualitative methods offer the flexibility to explore underlying motives, perspectives and experiences of stakeholders, which is essential in understanding the complexities of blockchain technology in Islamic finance (Stone, 2020).

In this study, two primary data collection methods are employed: content analysis and expert interviews. Content analysis allows for the systematic examination of textual data sourced from academic literature, reports and online resources, facilitating the identification of pertinent themes and trends (Stone, 2020). Additionally, semi-structured interviews are conducted with key representatives from Finterra and Blossom Finance to gather insights into the practical implementation of blockchain solutions and the challenges encountered (Cownie & Bradney, 2013; Mayer, 2015; Kleinheksel *et al.*, 2020).

The selection of interview respondents from Finterra and Blossom Finance is grounded in their expertise and relevance to the research objectives. Finterra, a company specialising in both conventional and Islamic financial technologies, offers valuable insights into blockchain

application in fintech, with interviews conducted with the Founder and Chief Technical Architect (Cownie & Bradney, 2013; Mayer, 2015; Kleinhessel *et al.*, 2020). Similarly, interviews with Blossom Finance's Founder and CEO provide firsthand perspectives on the issuance of blockchain *ṣukūk* and associated challenges.

Data obtained from the content analysis and expert interviews are subjected to rigorous interpretation and analysis. Thematic analysis is employed to identify recurring themes, concepts, and insights emerging from the data. This iterative process of coding, categorisation, and synthesis facilitates the derivation of meaningful interpretations and actionable insights (Burnard, 1995; Kyngas, 2020).

Conducting semi-structured interviews with selected respondents enables researchers to gain real-world insights into the practical implementation of blockchain technology in ISF. These insights, coupled with findings from the content analysis, contribute to the development of practical recommendations and policy implications for stakeholders in the field.

The adoption of a qualitative methodology, comprising content analysis and expert interviews, provides a robust framework for investigating the utilisation of blockchain technology in ISF. Through this approach, the study aims to contribute to the advancement of knowledge in this emerging field, offering valuable insights and practical recommendations for stakeholders.

BLOCKCHAIN USE IN ISLAMIC FINANCE

Based on the interview data and literature, two ISF projects that used blockchain in their project structure are explained below.

Case Study 1: Finterra

Finterra developed a technology that could help raise capital as well as provide waqf management. Finterra built a blockchain called Galactic Network (galactic.io), the first version of which was launched in February 2019 at Bank Negara Malaysia.

Within this blockchain, Finterra developed two branches. One branch was the charitable waqf where there is no return on investment (ROI). The other branch was for the investment part of the system that had ROI, where waqf-linked instruments could also be launched.

One of the products that Finterra structured in this blockchain is the waqf-linked *mushārah* Islamic Redeemable Preferential Shares structure, known as the Finterra Global Plantations project. According to Finterra, waqf-linked investments ensure sustainability and address socioeconomic gaps in the society. The project is a joint venture between Finterra, a plantation listed company, AmBank Islamic, and Gain Green (a local plantation management company) and was launched in October 2020. It is a timber afforestation project where approximately 1,000 acres of land in Anak Kulim, Kedah, have been cleared and afforested with timber plantation. In this project, Finterra contributes capital and technology; the plantation company contributes land through lease; Gain Green contributes its skills in the maintenance and harvesting of the plantation; and AmBank Islamic, being licensed for funds collection and deployment, contributes in the provision of financial services. The Sharī'ah agency which approved the Sharī'ah structure was Salihin Shariah Advisory Shd Bhd.

Investors who invest with the intention of investment and return also get the added

benefit of indirectly contributing to waqf, since upon harvest of the timber, 5 per cent of the profit is deployed for waqf. This is structured as a smart contract on the blockchain. The smart contract is one layer of technology that runs on top of a blockchain, which entails a computer code with a set of rules under which parties thereto agree to interact with each other. The agreement is automatically enforced once the predefined rules are met. The code running the smart contract can facilitate, verify and enforce negotiation as well as the performance of a transaction (Khan *et al.*, 2021). Investors can register themselves via a mobile application or online, where they are subject to electronic know-your-customer and anti-money laundering (KYC/AML) processes. The investor gets an account, where they select what investment package they want. The investment itself is not for retail investors but for accredited investors, where investment starts from MYR100,000 onwards. Investors have to telegraphic transfer (TT) the investment amount from their account into the trustee account (AmBank Islamic).

Once the funds are transferred, the system issues their *mushārah* certificate through smart contracts, which will indicate the number of shares that the investors are holding and the schedule of dividend payment on a quarterly basis for 40 months (maturity is on the 41st month). At the relevant time, the system automatically pays out investors' quarterly dividends directly into their respective bank accounts.

The product is offered to investors at an average 12 per cent return per annum, with a tenure of 40 months. On the 41st month, investors' capital is returned to them, through AmBank Islamic, the trustee. The total contract is for 2,500 acres per year for four years, totalling to 10,000 acres. Total project size is approximately USD25 million. Contribution to the waqf fund itself is for social causes (Ghaouri, 2021). Investors can follow the development of the project from their phones through the mobile app. Finterra uses blockchain to solve three problems:

1. Trust is moved from an entity run by humans to an entity run by computer codes, thus transactions can be entered into without fear of deception.
2. The smart contract on which the terms of the contract are coded is written on the blockchain whereby the occurrence of some triggering event will cause the system to settle things automatically.
3. At any given point of time, one can verify the status of the transaction by viewing the blockchain, thus making it auditable and transparent. Once the transaction is written onto the blockchain there is no way that it can be hacked or changed by human intervention, as the blockchain is immutable.

When asked about the challenges faced in introducing this product, Mr. Hamid Rashid of Finterra mentioned that the legal environment was challenging. The regulators, notably Bank Negara Malaysia and Securities Commission Malaysia, at the time of introducing the product in 2017 and 2018, were still new to blockchain technology and had trouble understanding the product especially when combined with ISF. Thus, to avoid lengthy approval processes, Finterra structured its product according to the legal framework available at that time in Malaysia. Finterra structured its product as a redeemable share under regulations of the Companies Commission Malaysia (Rashid & Charan, personal communication, 21 July 2021). Hamid Rashid further added that regulators globally are generally behind industry innovation, and often regulators need to catch up with industry innovative structures.

Finterra also had challenges when it came to the religious councils. As Islamic social products involve waqf, *ṣadaqah* and zakat, the religious councils had to be involved, and at that time they had very little knowledge of blockchain and smart contracts. Overall, the religious councils then did not see the value of blockchain and were reluctant to adopt blockchain for their projects on waqf, *ṣadaqah* and zakat (Rashid & Charan, personal communication, 21 July 2021).

Case Study 2: Blossom Finance

Blockchain-based *ṣukūk*, or smart *ṣukūk*, is the digitisation of *ṣukūk* issuance with the use of blockchain. In other words, *ṣukūk* is deployed using blockchain technology. This smart *ṣukūk* based on blockchain was developed by Matthew Joseph Martin, founder and CEO of Blossom Finance. Smart *ṣukūk* are Sharī'ah compliant and must be asset-backed (Kunhibava *et al.*, 2020, p. 123). The blockchain records the transaction between the issuer and investors, and smart contracts will be coded on the blockchain with the rules of the *ṣukūk*, where subsequently tokens are issued to investors in digital form as *ṣukūk* certificates (Kunhibava *et al.*, 2020). Settlement, trading, and post-issuance payments of profit to the investors will be completed by the smart contracts. Besides offsetting issuance costs and speeding up the processes, this automation offers accuracy and auditability (Kunhibava *et al.*, 2021).

Blossom Finance launched a smart *ṣukūk* deployed on blockchain using the *muḍārabah* contract which supported microfinance institutions in central Java, Indonesia. By partnering with a local venture capital firm, PBMT Ventura, proceeds from the first tranche of the profit-sharing *ṣukūk* were channelled into 80 microfinance institutions from PBMT Ventura's network. This enabled these microfinance institutions to fund micro-businesses or social enterprises with the goal of poverty reduction in the region. With an annual net return of about 6 per cent, the first tranche was a six-month facility of up to USD5 million (Mathew J. Martin, personal communication, 16 July 2020).

As for legal compliance, Blossom Finance took a route similar to Finterra. Instead of developing an innovative product and then presenting it to the regulators, they reviewed the existing regulations and laws in Indonesia and developed the smart *ṣukūk* around those laws to make it compliant and thus acceptable. At the time, Indonesia had laws on digital signature, and this was crucial for the establishment and running of the smart *ṣukūk*. Blossom Finance had several dialogues with the regulatory authorities in Indonesia, including the Financial Services Authority (e.g., *Otoritas Jasa Keuangan* (OJK), Shariah Capital Markets Group, the Central Bank, and the Ministry of Finance among others). This is how Mathew Martin explained their approach:

...let's create a new model and go to the regulator and get their approval. No. What we did instead is we said, let's look at the existing regulations. How can we create a product or an instrument that works within the existing framework of law, that will be enforceable in a court of law, etc. And we work to build an operational model and a framework that worked without anything special needing to happen. And so that was our focus. So that took some time (Blossom Finance, 2020; Mathew J. Martin, personal communication, 16 July 2020).

This approach by Blossom Finance (and Finterra) indicates that the existence of an appropriate

legal framework is necessary to enable innovation in the financial markets. This will be further explored below.

Implications of Identified Issues and Lessons for Policymakers

The foregoing discussion underscores the undeniable interconnection between the future of ISF and technological advancements, with blockchain technology emerging as a pivotal component. Consequently, policymakers are urged to take proactive measures to enact regulations that facilitate the integration of blockchain technology within ISF frameworks while concurrently addressing associated risks. Specifically, attention must be directed towards establishing governance standards tailored to mitigate Sharī'ah risks inherent in technological applications. Paramount among these considerations is the formulation of robust rules pertaining to data privacy, reflecting the evolving landscape of digital finance.

Moreover, recognising that the convergence of blockchain technology and ISF represents a nascent field, fostering collaboration between regulatory bodies and industry innovators is imperative. By incentivising innovation through mechanisms such as regulatory sandboxes, policymakers can cultivate an environment conducive to the development of novel products and services. Such collaborative efforts are essential for navigating the complexities of this evolving landscape and ensuring that regulatory frameworks remain agile and responsive to emerging technological paradigms.

Furthermore, policymakers are encouraged to collaborate with stakeholders to develop a comprehensive legal framework that aligns with the principles of Islamic finance. In this endeavour, standard-setting bodies such as the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) play a crucial role in delineating Sharī'ah-compliant parameters for the utilisation of blockchain technology. By establishing guidelines endorsed by the global Islamic finance community, policymakers can provide clarity and confidence to market participants, fostering innovation while safeguarding adherence to Islamic principles.

Moving on to the specific implications derived from the case studies, a deeper examination reveals actionable insights for policymakers navigating the integration of blockchain technology within ISF. In the case of Finterra's waqf-linked *mushārah* Islamic Redeemable Preferential Shares structure, policymakers must acknowledge ISF concepts and establish legal parameters for their utilisation. Enacting regulatory rules and continuous disclosure requirements for perpetually developed products is essential, as is defining duty of care standards and appointing independent oversight for project management. Emphasis on customer KYC, data security, and protection against cyber threats is crucial, alongside the implementation of robust business continuity processes to mitigate operational and technological failures.

Similarly, in the context of Blossom Finance's blockchain-based *ṣukūk*, policymakers must enact guidelines for creating blockchain-based *ṣukūk* platforms. Facilitating laws for electronic KYC requirements and data privacy and protection is paramount, as is establishing legal acceptance of non-fiat currencies for blockchain platforms. Developing mechanisms for resolving and reporting technology, legal, and Sharī'ah-compliance risks is essential, along with regulating *ṣukūk* issuance, distribution, and trading to protect investors. Finally, ensuring smart contracts are capable and thoroughly tested for compliance is imperative for the sustainable

development of blockchain platforms within ISF. **Table 1** summarises the main lessons that could be learnt by policymakers from the two case studies discussed in this paper.

The regulatory implications for these specific innovations can be derived across multiple dimensions like data protection, product category, information security, technology risk management, legal implications, etc.

Table 1: Lessons for Policymakers from the Case Studies on Blockchain Use in ISF

Case	Product	Policy implications
Finterra	Waqf-linked <i>mushārah</i> Islamic Redeemable Preferential Shares structure	<ul style="list-style-type: none"> • It is imperative for policymakers to acknowledge ISF concepts such as <i>waqf</i> and set the legal parameters that should be adopted when using them. • Since the products may be developed for perpetuity, policymakers need to enact the regulatory rules and the continuous disclosure requirements that should be adopted by the product issuer. • The duty of care and the standard of care that need to be adopted in managing the projects need to be set and an independent party needs to be appointed to oversee the operations and manage the default risk. In this regard, it would be prudent to develop a governance code that should be followed in managing the project. • Since the solution is derived by leveraging emerging technologies, strong emphasis should be given on how customer KYC is to be completed and how data security, customer information protection, and protection from cyber threats, etc., are to be considered. • Applications built on blockchain may be vulnerable to operational and technological failures, so it is encouraged to have a strong business continuity process with fallback options.

Table 1: Lessons for Policymakers from the Case Studies on Blockchain Use in ISF (Cont.)

Case	Product	Policy implications
Blossom Finance	Blockchain-based <i>ṣukūk</i>	<ul style="list-style-type: none"> ● It is imperative for policymakers to enact guidelines to create blockchain-based <i>ṣukūk</i> platforms. ● Facilitating laws such as electronic KYC requirements, data privacy and data protection are also required to be set up to facilitate the issuance of such <i>ṣukūk</i>. ● If the blockchain platform intends to use currencies other than fiat money (e.g., cryptocurrencies), then legal acceptance of such currencies and currency exchanges are required to be set up to facilitate the beneficiaries. Ideally, all the activities involved in the value-chain of this transaction need to strongly adhere to the regulatory guidelines; for example, in regard to <i>ṣukūk</i> issuance, distribution, trading of digital <i>ṣukūk</i>, etc. ● To sustainably develop the blockchain platforms, policymakers need to set up ways to resolve and report risks detected in using the platform, including the technology, legal and Sharī'ah compliance risks. ● Whether a <i>ṣukūk</i> is issued for social or commercial purposes, with or without technology, it has to be regulated by the securities market regulator to ensure that investors are protected. ● Applications built on blockchain may be vulnerable to operational and technological failures, so it is encouraged to have a strong business continuity plan with fallback options. ● Smart contracts created should have the capability to handle multiple scenarios and be tested thoroughly to adhere to the business, compliance and legal arrangements.

Source: Authors' own

CONCLUSION

In summary, ISF tools of zakat, waqf, *qard hasan* and *ṣadaqah* provide assistance to those segments of society who are underprivileged. These ISF tools can be used in combination with Islamic finance contracts to create more instruments for ISF, such as social *takāful* and Islamic

microfinance. Lately, fintech companies such as Finterra and Blossom Finance have used technology, such as blockchain, to deliver ISF solutions to those in need. Blockchain is a digital ledger that is decentralised, distributed and creates a trusted historical account of the previous transactions which are time-stamped, tamper proof, auditable and transparent.

Two case studies, notably waqf-linked *mushārah* Islamic Redeemable Preferential Shares by Finterra and blockchain-based *ṣukūk* (smart *ṣukūk*), were reviewed in this research. Both investment products use blockchain in the deliverance of the two ISF finance products.

From the two case studies reviewed in this study, it is evident that it is practical to merge ISF with blockchain technology. While innovation in this field is inevitable, the challenge is whether all stakeholders are ready for the pace of innovation. Both regulators and religious authorities have to be open to the use of technology such as blockchain for delivering ISF transactions.

Based on the findings, there has to be a proper legal framework to support blockchain-related innovations in ISF. Managing Sharī'ah and legal risks involved in such transactions needs to be addressed at a policy level. If not, it might be impossible to enjoy the full potential of linking blockchain technology with ISF. When regulatory uncertainty and acceptance, interoperability with various blockchains, legal and compliance aspects, and ability to scale, among other issues, are sorted out, the adoption of blockchain for more Islamic social use cases can see exponential growth while reducing the potential associated risks.

Further research is recommended on the details of the legal framework, Sharī'ah governance, and policy documents to facilitate adoption of technology for ISF.

It is anticipated that the findings of this research will assist policymakers and stakeholders of ISF to realise the pace at which blockchain technology is adopted in ISF and the importance of being prepared to welcome such innovations without jeopardising its future growth and creating a favourable environment to sustainably develop it.

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Interviews Conducted

1. Mathew J. Martin, Founder and CEO, Blossom Inc., 16 July 2020 @ 3pm (online, interview lasted 45 minutes).
2. Hamid Rashid, CEO, and Sree Charan, Chief Product Architect, Finterra, 21 July 2021 @ 11am (online, interview lasted 2 hours).

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DECLARATION

Credit Authorship Contribution Statement

- Sherin Kunhibava: Conceptualisation, conducted interviews, analysed the interviews
- Aishath Muneeza: Implications, conducted interviews, conclusion
- Zakariya Mustapha: Introduction, literature review, arranged and conducted interviews
- Maryam Khalid: Reviewed paper
- Gopal Kiran: Reviewed paper

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Ethical Statement

The authors declare that they understand the Ethical Guidelines and have adhered to all the statements regarding ethics in publishing. They also confirm that this paper is original and has not been published in any other journal nor is under consideration by another publication.

Data Availability

Interview transcripts are stored digitally and are available in digital format from the authors.

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Appendix

None