الصكوك الذكية كآلية لتطوير وحشد الموارد الوقفية في عصر التكنولوجيا الرقمية

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الملخص

يمثّل الوقف أداة إسلامية مهمة لدعم التنمية الاجتماعية والاقتصادية، إلّا أنَّ كثيرًا من الأصول الوقفية غير مستغلة بالشكل الكافي بسبب تحديات إدارية ومالية وهيكلية، مما يضعف دور الوقف في مواجهة التحديات التنموية المعاصرة. تهدف هذه الدراسة إلى بحث سبل مبتكرة ومستدامة لإحياء الأصول الوقفية من

خلال دمج التكنولوجيا الرقمية، وخاصة تقنية البلوك تشين في الأدوات المالية الإسلامية. وبالاعتماد على منهجية نوعية مكتبية، تستعرض الورقة الأدبيات المتعلقة بالنماذج الوقفية التقليدية، والأدوات المالية مثل صكوك الانتفاع، وصكوك المشاركة والصكوك المرتبطة بالوقف النقدي، إضافةً إلى الابتكارات التكنولوجية الناشئة،كالصكوك الذكية القائمة على البلوك تشين. وتظهر النتائج أنّ الأدوات التقليدية أسهمت في تحسين استثمار الوقف لكنها ما زالت تعاني من محدودية الحوكمة وقابلية التوسع والشفافية، في حين توفر الصكوك الذكية المدمجة بالبلوك تشين إطارًا أكثر قوة وشفافية ولامركزية لإصدار الاستثمارات الوقفية وإدارتها، مما يتيح تحويل الأصول الجامدة إلى مشاريع إنتاجية، كالمستشفيات والمدارس والمباني التجارية، ويعزز في الوقت نفسه من فرص العمل وقيمة الأصول. وبذلك يبرز نموذج الصكوك الوقفية الذكية كآلية مستدامة وواعدة لحشد الموارد وتحقيق المقصد الأساس للوقف، وهو تعزيز الرفاه الاجتماعي والاقتصادي طويل الأمد.

الكلمات المفتاحية: الوقف، الصكوك الذكية، الرفاه الاجتماعي، التنمية، التكنولوجيا الرقمية.

Smart Sukuk as a Mechanism for Developing and Mobilizing Waqf Resources in the Age of Digital Technology

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Abstract:

Waqf, an Islamic endowment dedicated to the welfare of society, holds significant potential for contributing to socio-economic development. However, many Waqf properties remain underutilized due to administrative, financial, and structural challenges. These issues hinder the transformative role that Waqf can play in addressing contemporary socio-economic challenges, particularly in many countries. Hence, the objective of this study is to explore innovative and sustainable approaches for revitalizing Waqf assets through the integration of digital technology particularly blockchain into Islamic financial instruments. By conducting alibrary-based qualitative research, this paper critically reviews existing literature on traditional Waqf models, Islamic financial instruments such as Sukuk al-Intifa', Sukuk Musharakah, and cash Waqf-linked Sukuk, and emerging technological innovations including blockchain-based smart Sukuk. The findings reveal that while traditional Islamic financial instruments have made strides in improving Waqf utilization,

they still face limitations related to governance, scalability, and operational transparency. In contrast, blockchain-integrated smart Sukuk offer a more robust, transparent, and decentralized framework for issuing and managing Waqf-based investments. This approach not only facilitates the transformation of idle Waqf properties into productive assets such as schools, hospitals, and commercial buildings but also creates employment opportunities and enhances asset value. As such, the Waqf-based smart Sukuk model emerges as a forward-looking and sustainable mechanism for mobilizing resources and fulfilling the core objective of Waqf: the promotion of long-term social and economic welfare.

Keywords: Waqf, Smart Sukuk, Social Welfare, Development, Digital Technology.

1. INTRODUCTION

Waqf, an Islamic endowment dedicated to the welfare of society, has historically played a crucial role in supporting social, educational, religious, and charitable activities across Muslim communities. Dating back to the early Islamic era, Waqf institutions funded the construction of mosques, schools, hospitals, libraries, and infrastructure that have had lasting socio-economic impacts. Many of the classical Islamic civilizations thrived partly due to the effective management and utilization of Waqf properties, which acted as sustainable sources of social finance (Cizaka, 1998). This rich legacy underscore the profound significance of Waqf in fostering communal well-being and development.

Despite this historical importance, many contemporary Waqf properties remain underutilized due to administrative inefficiencies, legal complexities, lack of financial resources, and structural challenges. As a result, the vast potential of these assets in contributing to modern socio-economic development remains largely unrealized. To address these challenges, various Islamic financial instruments have been proposed to enhance Waqf asset utilization (Hasan, 2014). Notable among these are Sukuk al-Intifa', which grants usage rights over Waqf assets; Sukuk Musharakah, which involves partnership-based profit sharing; and cash Waqf-linked Sukuk, which combine philanthropic endowments with structured investment frameworks. These instruments have provided Shariah-compliant pathways to mobilize capital for Waqf development.

However, with the advent of new technologies, integrating blockchain with Islamic finance through smart Sukuk offers a more advanced, transparent, and efficient model. Smart Sukuk are better aligned with the needs of the modern financial ecosystem by automating processes, reducing reliance on intermediaries, and enhancing transaction security. This decentralized

platform facilitates the transformation of idle Waqf properties into productive assets such as schools, hospitals, commercial complexes, and housing developments. Additionally, the model contributes to job creation, increases asset value, and improves liquidity by enabling fractional ownership, thus broadening investor participation (Khan, M. B, 2021).

This study employs a qualitative library research methodology, drawing on extensive review and analysis of academic literature, industry reports, legal frameworks, and technological advancements related to Waqf and Islamic finance. Through this approach, it aims to present a comprehensive understanding of the evolving role of Waqf in socio-economic development and the potential of blockchain-enabled smart Sukuk to revolutionize its utilization. The findings highlight the Waqf-based smart Sukuk model as a forward-looking, sustainable solution for mobilizing resources and fulfilling the fundamental objective of Waqf: advancing long-term social and economic welfare.

2. THE CONCEPT OF WAQF AND ITS ROLE IN ISLAMIC HISTORY

Waqf, an Arabic which means prohibition, containment, or retention, refers in Islamic context to the act of preserving and dedicating property for charitable and benevolent purposes. Such property is meant to be used solely for its intended charitable objective and cannot be sold or repurposed (Kahf, 1992). Waqf plays a significant role in national development across various sectors, including religion, socioeconomics, and culture. Throughout Islamic history, countless examples highlight the value of charitable contributions in various forms. In every era, devout individuals have acknowledged the spiritual importance of Waqf and actively supported its establishment and growth (Aziz and Ali, 2018). The significance of this institution is reinforced by numerous verses in the Qur'an, which encourage believers to use their wealth for righteous causes. One such verse reflects Allah's command to

give generously for the sake of goodness is following;

> "but righteousness is one who believes in Allah… and gives wealth, in spite of love for it, to relatives, orphans, the needy, the traveler, those who ask, and for freeing slaves…" (Al-Baqarah, 2:177).

The concept of Waqf is also promoted by Prophet Moḥammad (PBUH) not only verbally but also by his action. In this respect, Prophet says:

> "The best thing a person leaves behind after him in the world, there are three: Righteous Son, who would pray to God for forgiveness and upgrade of levels; Continuous Charity, whose rewards he would get and such a learning which is worked upon even after his death" (Al-Tirmidhī, 1975).

Influenced by the teachings of Prophet Muḥammad (PBUH), the companions developed a strong and consistent inclination toward charitable giving. As a result, Jābir, one of the close companions of the Prophet, remarked that he was not aware of any companion who had not dedicated a portion of their property for the sake of Allah (Al-Shīrāzī, n.d.).

Following the example set by the companions, subsequent generations of Muslims continued this charitable tradition. They endowed various forms of property, including gardens, houses, and other assets, and actively contributed to the construction of mosques. Recognizing the significance of public welfare, they also donated land and buildings as Waqf for the establishment of hospitals, schools, and seminaries to promote education and training (Cizaka, 1998; Ali, 2024)

Historically, Muslims around the world eagerly embraced the prophetic model of Waqf, making it a vital aspect of Islamic culture. Over time, the institution of Waqf has continued to develop and has been utilized as a key

mechanism for enhancing social welfare and promoting the overall well-being of society.

3. DEVELOPMENT OF WAQF THROUGH SUKUK

In the Waqf sector, where many assets are in the form of property, issuing sukuk has become a popular method for financing the development of Waqf properties. While traditional Islamic practices relied on tools like Hikr and Ijaratayn, the introduction of sukuk instruments has significantly accelerated the progress and growth of Waqf. Additionally, the integration of sukuk and Waqf within a single structure represents an intriguing development that holds great potential.

Hence, the following sections provide a detailed discussion on the background of sukuk, including its structure and significance within Islamic finance. Furthermore, the sections explore the sukuk-based Waqf model, highlighting how this innovative approach combines traditional Islamic charitable principles with modern financial instruments to enhance the development and sustainability of Waqf assets.

3.1 Background of Sukuk

The Arabic term sukuk translates to "certification" or "pay-out order" and is the plural form of sakk. Historical documents indicate that the word sakk was used during the early Islamic caliphates, where it referred to written instruments representing financial obligations arising from trade and other commercial dealings in classical Islamic societies (Khan, 2003). These practices were in accordance with the guidance of the Holy Qur'an, which states: "When you deal with each other in transactions involving future obligations for a fixed period, write them down… This is more just in the sight of God, better as evidence, and more effective in preventing doubts among you" (Al-Qur'an, 2:282).

Today, sukuk are categorized as instruments within the Islamic capital markets. In modern Islamic finance, sukuk refer to Islamic securities that possess distinct characteristics. One of the earliest formal definitions of modern sukuk was provided in February 1988 during the fourth session of the Council of the Islamic Fiqh Academy. The Council described sukuk as "any combination of assets (or usufruct) that can be represented by written financial instruments, which may be traded at market value, provided that the majority of the asset group represented by the sukuk consists of tangible assets" (Academy, 1988, pp. 61-62). This definition is considered one of the foundational explanations of sukuk as understood today.

In 1990, Shell MDS issued one of the earliest sukuk in Malaysia, shortly after the formal definition was provided. However, following this issuance, there were no other successful sukuk offerings until the early 2000s. Beginning around 2000, several institutions started issuing sukuk, which led to the rapid growth of the sukuk market (Dusuki, 2009). As the market expanded significantly, there was a growing need for clarity on Shari'ah compliance and standardization. In response, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) introduced its Shari'ah Standard on 'Investment Sukuk' in May 2003. AAOIFI defined investment sukuk as: "certificates of equal value, representing undivided shares in tangible assets, usufruct, and services, or assets related to specific projects or special investment activities, provided that the sukuk value has been collected, the subscription period has ended, and the funds raised have been utilized for the intended purpose of the sukuk issuance" (AAOIFI, 2008, p. 307).

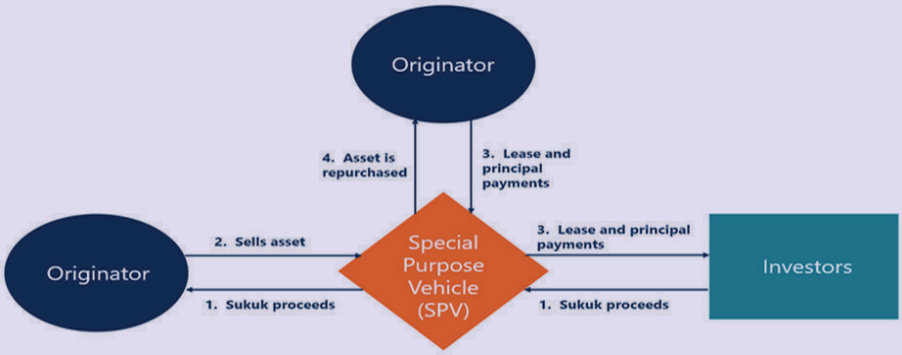
There are several different types of sukuk based on established Islamic contracts, including Murabaha, Mudarabah, Ijarah, Musharakah, Wakalah, and Salam. As Islamic financial institutions have evolved, more hybrid and complex sukuk structures have also emerged in the market. Throughout the first decade of the 21st century, the sukuk market experienced numerous

issuances in various forms and frameworks.

3.1.1 The General Process of Sukuk Issuance Typically Involves the Following Steps:

- Establishment of a Special Purpose Vehicle (SPV) to act on behalf of the investors;
- Issuance of sukuk certificates in exchange for proceeds, which are then circulated in the market;
- Ensuring cash flow to the investors through the contract period, including periodic payments and the return of principal at maturity;
- Repurchase of the underlying asset by the originator according to the terms agreed upon, after the sukuk certificates mature.

Figure 1. Sukuk Issuance Process



Source: (Inc., 2021)

3.2 Type of Sukuk

In this section, various models of Sukuk will be discussed to demonstrate how Islamic financial instruments can support the development and revitalization of Waqf assets. These models include Sukuk al-Ijarah, Sukuk al-Intifa', which enables the transfer of usufruct rights; Sukuk Musharakah, based on partnership and profit-sharing principles; and cash Waqf-linked Sukuk, which combine charitable endowments with structured investment

strategies. Each model offers unique mechanisms for mobilizing funds and enhancing the value of Waqf properties while maintaining compliance with Shariah principles.

3.2.1 Ijarah Sukuk

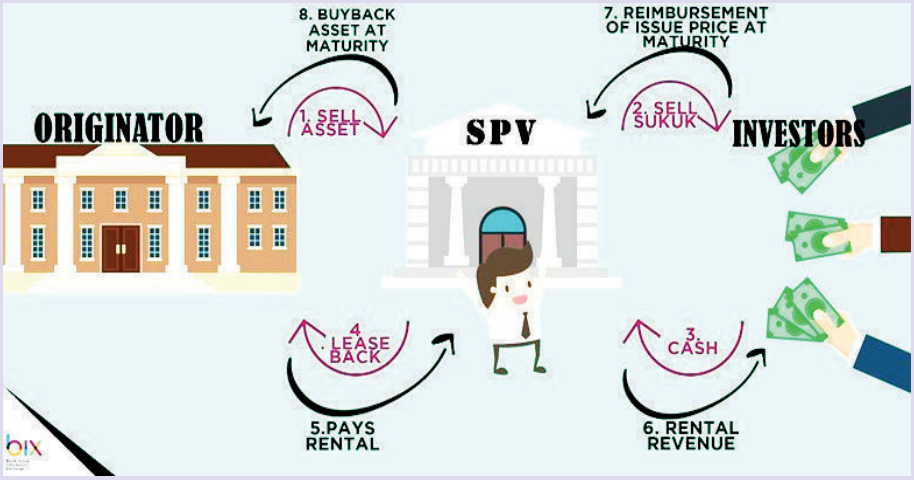
Sukuk al-Ijarah is a sukuk structure based on the rental concept, which also includes the right to purchase the leased property at the end of the lease term. This sukuk is issued through an Ijarah contract between the issuer and the sukuk investors. The process of implementing Sukuk al-Ijarah also involves an initial sale and purchase agreement. Thus, Sukuk al-Ijarah encompasses both the sale and purchase agreement as well as the entire leasing contract (al-Ijarah). Under this structure, each unit of sukuk is backed by a tangible asset, allowing sukuk holders to trade these units freely in domestic or international secondary markets without restrictions (Ahmad, 2009).

Ijarah Sukuk can be fully negotiated and traded on secondary markets, offering a high level of flexibility in both performance and marketability (Rohmatunnisa, 2008). These Sukuk can be issued by various entities, including central governments, municipalities, Waqf institutions, or any other asset users, whether private or public. Additionally, financial intermediaries or direct users of the leased assets may also issue Ijarah Sukuk (Kahf, 1997).

Sukuk Ijarah is one of the most significant types of sukuk contributing to economic well-being. It is widely accepted by Islamic scholars and is commonly used to finance various projects (Hussin, 2012). In Malaysia, Sukuk Ijarah has become one of the most popular sukuk structures globally since its introduction in 2001 (Yumanita, 2008). While it gained particular popularity in Muslim countries that developed sukuk, other nations recognizing the growing importance of sukuk—such as China, Japan, Thailand, and Germany—have also adopted this structure. Notable examples of Sukuk Ijarah issued worldwide include the Government of

Bahrain Sukuk Ijarah, Segari Energy Venture Sukuk, Qatar Sukuk, Tabreed Global Ijarah Sukuk, Pakistan Global Sukuk, Saxony-Anhalt Sukuk, and the Government of Malaysia's Global Sovereign Sukuk, among others (Nahar, 2018).

Figure 2. Parties involved in Ijarah Sukuk



Source: (bixMalaysia, 2019)

3.2.1.1 An Example of Sukuk Al-Ijarah Lebuhraya Kemuning-Shah Alam (LKSA)

The Lebuhraya Kemuning–Shah Alam (LKSA) is a 28.7 km (17.8 mi) highway in Malaysia, also known as the Bulatan Darul Ehsan Interchange. Construction began in 2007 and took 24 months to complete, finishing in mid-2010. The expressway was opened to traffic on May 18, 2010. The financing for the project was structured using Sukuk Ijarah based on a Build-Operate-Transfer (BOT) model, which applies Islamic financing principles to create a partnership between the originator and investors until the project is completed and transferred back to the originator. During the operational phase, Projek Lintasan Shah Alam Sdn. Bhd. (PLSA), acting on behalf of the originator, invited other investors—Sukuk Ijarah holders (lessors)—to

participate in the project's construction and development (Markom et al., 2012). The project was successful under the Ijarah Sukuk contract structure, with the lessee paying rent and using part of the proceeds to cover costs.

3.2.2 Cash Waqf-linked Sukuk

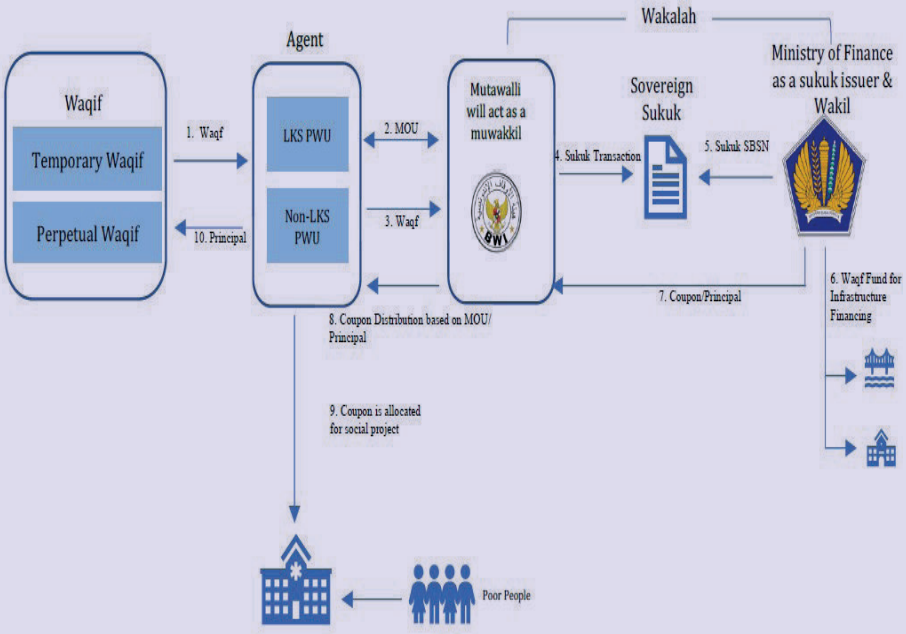
Cash Waqf-linked Sukuk, has been developed in Indonesia as a form of social investment (Fauziah, 2021). In this model, monetary endowments are gathered by the Waqf Board acting as the Nazir and subsequently deposited in banks following consultations with the Shari'ah advisory board (Dea, 2019). The Cash Waqf-linked Sukuk resembles project-based Sukuk, focusing on fostering tangible societal development. It serves to strengthen the linkage between the real economy and the financial sector (Ismal et al., 2015). Originating from an initiative by the Indonesian government, this Sukuk structure aims to stimulate economic growth, as reflected in GDP, with a particular focus on the real sector. The issuance of such Sukuk is based on Waqf assets, which may be either productive or non-productive.

The asset may be utilized for commercial purposes, either by developing it directly or by using it as the underlying asset for issuing Sukuk. Proceeds from the Sukuk issuance are employed by the government to support the state budget, which includes funding public services such as infrastructure development on Waqf land, educational institutions, and other projects aligned with Waqf objectives. This structure engages multiple stakeholders, including government entities, private sectors, and investors. The key steps involved in this structure are as follows:

- The National Waqf Board and the Ministry of Finance collaborate to identify infrastructure projects that can be developed utilizing Waqf assets. In conjunction with the Ministry of Finance, other relevant ministries pinpoint projects connected to Waqf assets that align with their respective development goals.

- The Ministry of Finance is responsible for establishing a Special Purpose Vehicle (SPV) that meets Shari'ah compliance requirements essential for the issuance of the Sukuk.
- Investors, including the central bank, commercial banks, non-bank financial institutions (NBFIs), and retail investors, are encouraged to participate in investing in the Cash Waqf Sukuk.

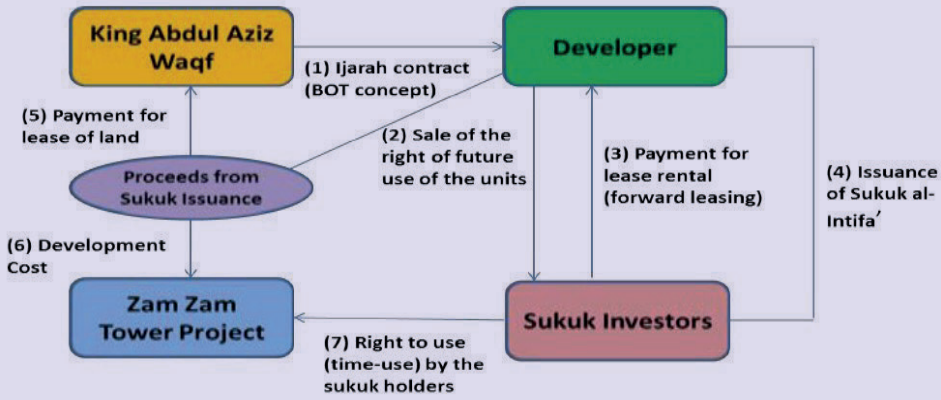
Figure 3. CWLS Structure



Source: (Fauzia et al., 2021)

This structure, developed in Indonesia, aims to integrate three sectors: the Islamic capital market, the National Waqf Board, and government institutions. According to Ismal et al., (2015), the various contracting parties involved can derive benefits from this Sukuk arrangement. Investors are anticipated to gain returns generated from the projects financed by the Sukuk. Additionally, Cash Waqf-linked Sukuk are considered liquid

Figure 4. Structure of Sukuk al-Intifa



Source: (Kholid et al, 2014; Hasan, 2014; Duriat et al., 2014)

3.2.4 Musharakah Sukuk

The musharakah Sukuk issued by MUIS was segmented into two portions. The first portion, valued at $25 million, was designated for the acquisition of a building located at 11 Beach Road. The second portion, which is the focus of this paper, raised $35 million to finance a mixed-use development project on Bencoolen Street (Yuliana et al, 2018). The Waqf property for this project was originally owned by an Arab merchant, Shaikh Ali B Omar Aljunied. Due to the high commercial value of the Bencoolen Street land, MUIS opted to undertake its development. The proposed project comprises 104 serviced apartments, a mosque, and a six-story commercial complex, with an estimated development cost of $35 million (Yuliana et al, 2018). To finance this development, a musharakah Sukuk was issued.

The project's initial phase was structured as a musharakah partnership involving three parties: the Waqf, Baitulmal, and Warees (a subsidiary of MUIS). The Waqf contributed the land and capital, Baitulmal supplied $35 million sourced from investors, while Warees provided a modest capital contribution in addition to their managerial expertise (Yuliana et al., 2018; Hasan, 2014)

financial instruments due to their sovereign classification, making them attractive for banks. The central bank may also utilize these Sukuk as a monetary policy tool or manage the assets through securitization by using the Sukuk inventory as the underlying assets.

3.2.3 Sukuk Al-Intifa'a

Sukuk al-Intifa'a represents ownership rights to the usufructs derived from leased properties or assets over a specified period (Rafay et al., 2017). It closely resembles Ijarah Sukuk but differs in that it extends the concept through time-sharing of segmented ownership in leased property. In Saudi Arabia, Sukuk al-Intifa'a has been preferred over conventional Ijarah Sukuk due to legal restrictions preventing foreign ownership of real estate in the holy cities of Makkah and Madinah (Lahsasna et al., 2018). This Sukuk structure was employed to finance the construction of the ZamZam Tower apartment and high-rise building on the King Abdul Aziz Waqf (KAAW) land adjacent to Masjid Al-Haram in Makkah, Saudi Arabia.

The Sukuk was structured based on a forward lease contract (Ijarah Mawsufah fi dhimma) (Hasan, 2014). The Waqf land owned by King Abdul Aziz Waqf (KAAW) was leased to the Binladin Group under a Build-Operate-Transfer (BOT) arrangement. Under this agreement, the Binladin Group was obligated to construct the apartments, shops, and tower, and subsequently receive lease payments. The Binladin Group then entered into a separate contract with Munshaat Real Estate Projects KSC from Kuwait, which was responsible for building, operating, and transferring the project back to the Binladin Group after 28 years. To finance this project, Munshaat Real Estate Projects KSC issued Sukuk al-Intifa'a valued at USD 390 million, with a tenure of 24 years. The Sukuk was based on a time-sharing concept, with usufruct rights divided on a weekly basis (Kholid et al., 2008). Holders of the Sukuk were granted rights to sell, inherit, grant,

and invest the certificates (Lahsasna et al., 2018). The structure of the Sukuk was organized as follows:

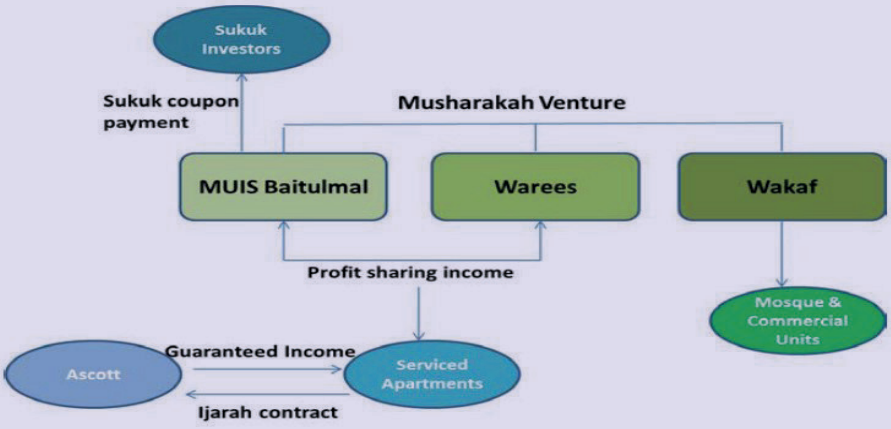
- King Abdul Aziz Waqf (KAAW) leased the land to the Binladin Group for a period of 28 years.
- The Binladin Group subsequently subleased the land to Munshaat Real Estate Projects KSC.
- Munshaat Real Estate Projects KSC issued Sukuk al-Intifa'a with a tenure of 24 years, valued at USD 390 million.
- Sukuk holders acquired usufruct rights to the asset on a time-sharing basis and paid the forward lease rental, which was then used by Munshaat Real Estate Projects KSC to finance construction costs.
- Munshaat Real Estate Projects KSC made lease payments for the land to KAAW.
- After 28 years, the Binladin Group will transfer the completed project back to KAAW.

This development serves pilgrims and tourists visiting the holy cities of Makkah and Madinah. The financing structure proved successful, with no conflict observed between the Waqf institution's objectives and investor interests from a Shari'ah perspective. The Sukuk al-Intifa'a contract facilitates the shared ownership of usufruct rights without transferring ownership of the underlying asset itself, which aligns with the Waqf principle prohibiting the sale of endowed property (Markom et al., 2012). Sukuk al-Intifa'a is particularly well-suited for financing Waqf projects under a Build-Operate-Transfer (BOT) model. Additionally, the success of this Sukuk structure is partly attributed to Saudi Arabia's legal restrictions that prohibit foreign ownership of land (Hasan, 2014).

In the subsequent phase, a lease agreement was executed between the Special Purpose Vehicle (SPV) and Ascott International Pte. Ltd., wherein Ascott committed to leasing the property for a duration of 10 years. This arrangement provided a stable income stream that supported investor returns. As a musharakah venture, profits were allocated proportionally based on the capital contributions of the three partners. Owing to the success of this Sukuk structure, MUIS was honored with the Mohammad Bin Rashid Al Maktoum Islamic Finance Award for Regional Continuing Contribution to Islamic Finance in that year (Syahirah et al., 2017; Duriat et al., 2014).

This innovative strategy substantially enhanced the property's revenue, increasing the annual rental income from $19,000 to a gross amount of $5.3 million by 2006 (Hasan, 2014). The distribution of returns among the three participating parties is illustrated in the figure below.

Figure 5. Musharakah Sukuk in Singapore



Source: (Hasan, 2014; Duriat et al., 2014)

4. DEVELOPING OF WAQF PRODUCT THROUGH SMART SUKUK

4.1 Smart Sukuk

Smart Sukuk represents one of the most recent and significant frameworks anticipated for future Sukuk issuances. It is poised to become a key instrument in

Islamic fundraising, particularly for infrastructure and industrial development, leveraging innovations in crowdfunding and financial technology.

Sukuk markets represent the most lucrative segment within Islamic finance. Nonetheless, it is evident that issuance is predominantly conducted by large institutions and public entities, resulting in relatively high issuance costs. The Smart Sukuk framework seeks to harness blockchain technology to enhance efficiency, transparency, and cost-effectiveness, thereby enabling small and medium-sized enterprises (SMEs), social impact projects, and community groups to issue Sukuk through innovative technological means. A core feature of Smart Sukuk is the standardization and automation of accounting, legal processes, and overhead payments typical of conventional Sukuk transactions, all supported by a licensed legal entity within the jurisdiction of issuance (Sa'ad, 2018; Khan et al., 2021). Essentially, Smart Sukuk involves the tokenization of investments, where funds are raised from investors in exchange for Sukuk tokens that represent fractional ownership in the Sukuk asset. In Islamic finance, funds generated through Smart Sukuk are automatically distributed to Sukuk token holders via blockchain technology, in accordance with the terms specified in the smart contract, eliminating the need for conventional banks or intermediaries. Consequently, any institution seeking capital can issue Smart Sukuk to raise funds from investors in exchange for tokens representing their ownership share in the Sukuk. Upon payment by the issuing institution, the proceeds are directly and automatically disbursed to the token holders through the blockchain system, governed by the smart contract's rules, without involving traditional banking or third-party entities. Comprehensive research indicates that the operational principles of Sukuk align closely with smart contract theory, with the primary distinction being the automation of processes—smart contracts execute automatically, whereas traditional Sukuk transactions are managed manually (Maghdeed, 2019; Khan et al., 2021).

The world's first innovation in Smart Sukuk was introduced by Blossom Finance. Blossom's Smart Sukuk utilizes Ethereum-based smart contracts, which function as blockchain computer programs. All processes related to

the Sukuk including record-keeping, assignment of rights, calculations, and payments, are managed automatically via these smart contracts, thereby creating a permanent and transparent audit trail (Blossom, 2019). The smart contract encodes the business rules directly into the payment currency on the blockchain, ensuring that the system enforces contract terms related to payments and ownership transfers autonomously (Blossom, 2018; Khan et al., 2021).

Smart Sukuk tokens can be structured in accordance with internationally recognized protocols to facilitate seamless global trading and reduce operational risks. For instance, employing the ERC20 token standard enables both issuers and investors to access international markets while addressing the challenges posed by diverse cryptocurrency exchanges. As described by Martin (Fintech, 2018), the current system utilizes an Ethereum-based smart contract to manage the entire Sukuk lifecycle: raising funds, issuing ERC20-based ownership certificates to investors, transferring capital into Indonesia, converting foreign currency into rupiah, executing investor repayments, distributing profits based on ownership proportions, and allocating Blossom's profit share according to the agreement. These processes are fully automated through blockchain technology, minimizing the need for manual handling or human oversight (Fintech, 2018; Khan et al., 2021)

The issuance of smart Sukuk eliminates the need for intermediaries due to the decentralized nature of blockchain technology. This can significantly reduce associated costs and allow for the issuance of smaller lot sizes, making investments more accessible and financially practical. Smaller denominations also have the potential to enhance market liquidity, addressing one of the key limitations of traditional Sukuk markets, which often suffer from illiquidity due to the tendency of investors to retain high-quality instruments backed by tangible assets. In contrast, smart Sukuk enables the issuance of smaller, tradable units that represent actual ownership of the underlying assets, thereby fostering a more liquid and dynamic market. According to Martin (Fintech, 2018), advancements in technology and increased market liquidity have

created a favorable environment for investors.

4.2 Application of Waqf based Smart Sukuk through Ijarah Contract

A Waqf body either an Islamic charitable foundation or a government-administered Waqf board typically holds assets such as property or undeveloped land. The objective of a Waqf-based smart Sukuk is to revitalize outdated buildings or develop unused land into productive assets. Under this model, the Waqf entity leases the property to a developer for a long-term period, typically 20 to 30 years. The developer collaborates with a Special Purpose Vehicle (SPV) to raise capital for the project through the issuance of smart Sukuk. The development follows a Build-Operate-Transfer (BOT) framework, wherein the SPV engages a qualified property developer or management firm to undertake construction and oversee operations. Once completed, revenue generated from leasing commercial and residential units is distributed periodically to investors via the SPV. Upon contract maturity, ownership of the developed property reverts to the Waqf entity, which continues to earn rental income thereafter (Khan et al., 2021).

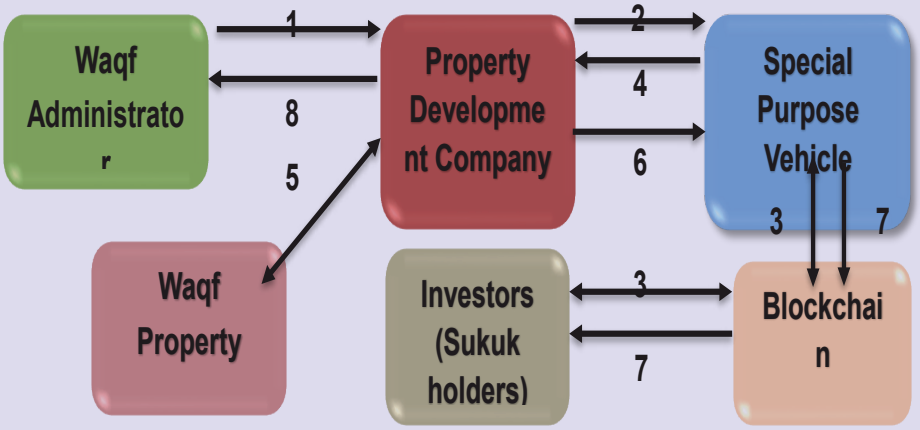
The functioning of the model is outlined as follows:

1. The Waqf manager enters into an Ijarah agreement with a real estate development firm under the Build-Operate-Transfer (BOT) arrangement. The firm receives the Waqf land on a long-term lease to develop and manage it as a modern commercial rental property.
2. After securing the land from the Waqf authority, the development company sets up a Special Purpose Vehicle (SPV) to issue Sukuk. The SPV then invites investors to subscribe to the Sukuk through a blockchain-based platform, based on the Ijarah contract.
3. Once the terms and conditions of the Waqf-based Ijarah smart Sukuk are accepted, investors subscribe by transferring funds via the blockchain platform. Each investment is recorded in individual blocks, preserving a clear record of each transaction.
4. The SPV uses the collected funds to finance the development of the

Waqf property through the property development company.

5. The SPV appoints the development company to oversee the Waqf assets. The company also signs forward lease agreements with tenants for the future use of the developed property.
6. Lease payments collected from tenants by the development company are transferred to the SPV.
7. The SPV then distributes periodic returns to the Sukuk holders via the blockchain system, where each transaction is securely recorded as a permanent log.
8. At the end of the contract period, the completed property, along with its tenants, is transferred back to the Waqf institution (Source: Khan et al., 2021).

Figure 6. Flow of the Proposed Model



Source: (Khan et al., 2021)

The proposed model aims to address the developmental challenges faced by Waqf properties, ensuring that the fundamental purpose of Waqf promoting social welfare is upheld. Beyond serving the broader interests of society, the model offers several additional advantages. One significant benefit is

the potential to generate employment opportunities. As highlighted earlier, approximately 4,317.88 hectares of Wakaf Aam (general Waqf) land remain largely unused (Ismail et al., 2015). If Waqf authorities choose to develop these lands for public amenities such as hospitals, schools, or religious and educational institutions, this would not only benefit the community but also create jobs for many individuals. Another notable advantage lies in the appreciation of Waqf property value through strategic investment. Since Waqf assets can be developed for various purposes, investing in them can yield returns that are beneficial not only to society but also to the Waqf administration itself (Khan et al., 2021).

4.3 Issues in Waqf Technology Adoption

Re-emphasizing the fact that Waqf is a long-standing Islamic institution which involves dedicating assets such as land, building or cash for religious, educational, or social welfare purposes in perpetuality. This signifies the need for the decentralization of access to Waqf and also contributing to it. Since Waqf in the past and currently managed through manual approaches, which sometimes can be bureaucratic. Contrary to this traditional process of Waqf management, digitization is taking place due to adoption and enhancement through innovative approaches such as exploring digital technologies such as blockchain, online fundraising platforms, and computerized management system in addressing multi-layer issues including transparency and corruption, accountabilities and leakages, inefficiencies and underutilization of assets. Asyari et al., (2024) noted that by using digital technology, Waqf can have a broader and more significant impact on social and economic welfare of society. Despite its importance and impact some of the issues in Waqf technology adoption as noted by Azwina et al., (2025) spotted that despite several advancements, the legal framework governing digital Waqf management remains underdeveloped, which raises concerns about regulatory gaps, Shariah compliance, and data protection.

4.3.1 Regulatory Gaps in Waqf Management

As different countries and jurisdictions continue to develop national digital framework for financial services at different pace and domestication, these brings about different regulatory digital laws. Therefore, Waqf digital adoption and management also grows based on the overall digitization of countries and jurisdiction, hence, there may be imbalance regulatory framework based on the aspiration of different countries. This was consolidated by the study conducted by (Azwina et al, 2025) that one of the most significant challenges in the digital transformation of Waqf management is the absence of specific laws addressing the use of blockchain and other digital platforms in waqf administration. Furthermore, they noted that without clear guidelines, Waqf institutions may face difficulties in adopting blockchain technologies for asset management, fundraising, or transaction recording, as these tools remain unregulated.

4.3.2 Shariah Compliance Ambiguities

Like we have different schools of thoughts on varying issues in Islamic finance, Waqf is not an exemption, especially with early diverse opinions of digital assets (Azwina et al, 2025) opine that there are ambiguities in shariah compliance regarding the use of blockchain and smart contract in Waqf transaction in that Shariah law mandates that Waqf assets be held in perpetuity for charitable purposes, and any kind of alteration or disposal is prohibited. Azwina et al (2025) posit that this creates challenges when attempting to integrated new technologies such as blockchain and smart contracts, as these technologies introduces new complexities that may not fully align with traditional Shariah principles. Furthermore, Shariah also governs the types of assets that can be endowed as Waqf, traditionally limiting them to physical assets such as land and buildings. Meanwhile, blockchain's decentralised nature, while enhancing transparency, introduces questions about who has ultimate control over Waqf assets. On the other hand, smart contracts, self-executing contracts with predetermined rules may automate Waqf transactions, but ensuring their alignment with Shariah principles remain complex.

4.3.3 Data protection and Privacy Concerns

As digitization takes effect, Waqf institutions reliant on technological services most of which are third party providers raises issues of data and privacy confidentiality and protection. For instance, the data and information of waqf beneficiaries are as important as those of donors which in most cases are high-net-worth individuals and government officials. Azwina et al, (2025) emphasized that Waqf institutions often handle sensitive personal information about donors, beneficiaries, and the assets they manage, hence, the lack of regulation exposes Waqf institutions to potential risks, such as data breaches and unauthorized access, which could compromise the trust of donors and beneficiaries. Similarly, cross-boarder transfer brings about cross-board data exposure, which underscores compliance with international data protection standards especially with reference to jurisdictions with no or weaker privacy regulatory laws.

4.3.4 Institutional and Administrative Inefficiencies

With manual and traditional Waqf management procedures which is deeply entrenched and adopted across regions and jurisdictions, Waqf operators, management or stakeholders may be resistance to change due to knowledge gap, over reliant on the statuesque or knowledge gap therefore slowing down the adoption or digital integration for Waqf management. Moreover, low digital accessibilities in some regions and jurisdictions also setback the digital ambitions of Waqf managers in such areas. According to Salleh (2023), it requires knowledge to adopt new technology and change management must happen in order to promote blockchain solution, hence, the application of blockchain in Waqf institution requires digital literacy of Waqf managers and stakeholders. Consequently, despite digital enabling environment, and availabilities of digital tools, Waqf assts remain poorly managed and grossly underdeveloped due to bureaucratic bottlenecks and questionable practices.

5. CONCLUSION

Waqf has long been a pivotal institution in supporting social, educational,

and economic development within Muslim societies, serving as a sustainable source of public welfare financing. Despite its historical significance, a considerable portion of Waqf assets remains underutilized due to administrative and structural challenges. In the past 15 years, innovative Islamic financial instruments such as Sukuk al-Ijarah, Sukuk al-Intifa', Sukuk Musharakah, and cash Waqf-linked Sukuk have emerged to enhance the mobilization and development of Waqf assets. While these relatively recent instruments have contributed positively, they still face limitations in addressing the demands of modern financial ecosystems and technological advancements. The adoption of blockchain technology through smart Sukuk offers a more advanced and future-ready solution. By increasing transparency, automating processes, and enabling fractional ownership, smart Sukuk reduce operational inefficiencies and expand access to a wider investor base. This facilitates the transformation of dormant Waqf properties into productive, income-generating assets, while also fostering job creation and maximizing social impact. This study highlights the Waqf-based smart Sukuk model as a sustainable and innovative mechanism capable of unlocking the full socio-economic potential of Waqf assets. It presents a promising avenue to modernize the Waqf sector, ensuring that its core mission, promoting social welfare and long-term community development is preserved and enhanced in the digital era.

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