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Potential Blockchain Applications in Waqf for Sustainability: A Middle East and Asia Perspective

Potensi Aplikasi Blockchain dalam Wakaf Untuk Kelestarian: Penanda Aras dari Perspektif Timur Tengah dan Asia

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ABSTRACT

Waqf development in Malaysia benefits the economy and society, mostly in terms of facilities, education, investment, and others. Due to the massive development of the waqf industry, digitalization is deemed as a facilitative instrument in the operation of waqf. With the usage of digital platforms, the collection of waqf funds becomes more efficient and widely dispersed among Muslims. In this context, blockchain has become a new phenomenon, functioning as a ground-breaking innovation connected to bitcoin. The core idea behind a blockchain is that its users can access the ledger independently of a third party. Additionally, the blockchain counts all network nodes equally, taking human and computer communication into account without any special treatment or discrimination. Without realizing it, several waqf institutions have already applied this approach using their own platform. Therefore, this study aims to systematically review the potential application of blockchain in waqf institutions by referring to previous applications in other countries in the Middle East and Asia such as Oman, Bahrain, United Arab Emirates, Singapore, Indonesia, and Malaysia. Methodology wise, this paper employs the Systematic Literature Review which consists of the processes of identification in evaluation of the data from September 2022 until October 2022 by using related keywords to study. Secondly, is screening process which entails the process of choosing articles based on inclusion and exclusion criteria. This study screened all the 49 selected articles by choosing the criteria for articles selection which is done automatically based on the sorting function available in the database. Thirdly, eligibility which the authors manually monitored the retrieved articles to ensure all the remaining articles (after the screening process) are in line with the criteria. Lastly, the quality appraisal which to ensure that the substance of the articles was of high quality. The findings are important for waqf institutions to realize the potential benefit of blockchain in improving the efficiency of waqf operations towards attaining sustainable socio-economic development.

Keywords: Digitalization; blockchain; sustainability; waqf in the Middle East and Asia

ABSTRAK

Pembangunan wakaf di Malaysia memberi manfaat kepada ekonomi dan masyarakat, terutamanya dari segi kemudahan, pendidikan, pelaburan, dan lain-lain. Dengan perkembangan pesat industri wakaf, pendigitalan dilihat sebagai instrumen yang membantu dalam operasi wakaf. Dengan penggunaan platfom digital, kutipan dana wakaf menjadi

lebih cekap dan tersebar luas di kalangan umat Islam. Dalam konteks ini, blockchain menjadi satu fenomena baharu di mana ia berfungsi sebagai inovasi yang berkait dengan bitcoin. Idea asas di sebalik blockchain ialah para pengguna boleh mengakses lejar secara bebas daripada pihak ketiga. Selain itu, blockchain mengira semua nod rangkaian secara sama rata, mengambilkira komunikasi manusia dan komputer tanpa sebarang layanan khas atau diskriminasi. Tanpa disedari, beberapa institusi wakaf telah pun menggunakan pendekatan ini menerusi penggunaan platform mereka sendiri. Oleh itu, kajian ini mengkaji secara sistematik potensi aplikasi blockchain dalam institusi wakaf dengan merujuk kepada aplikasi terdahulu di negara-negara lain di Timur Tengah dan Asia seperti Oman, Bahrain, Emiriah Arab Bersatu, Singapura, Indonesia, dan Malaysia. Dari segi metodologi, kertas kerja ini menggunakan Kajian Literatur Sistematik yang terdiri daripada proses pengenalpastian dalam penilaian data dari September 2022 hingga Oktober 2022 dengan menggunakan kata kunci yang berkaitan untuk dikaji. Kedua, ialah proses saringan yang melibatkan proses pemilihan artikel berdasarkan kriteria kemasukan dan pengecualian. Kajian ini menapis kesemua 49 artikel terpilih dengan memilih kriteria pemilihan artikel yang dilakukan secara automatik berdasarkan fungsi pengisihan yang terdapat dalam pangkalan data. Ketiga, kelayakan yang mana penulis memantau secara manual artikel yang diambil untuk memastikan semua artikel yang tinggal (selepas proses saringan) adalah selaras dengan kriteria. Akhir sekali, penilaian kualiti untuk memastikan kandungan artikel adalah berkualiti tinggi. Penemuan kajian ini adalah penting bagi institusi wakaf untuk merealisasikan potensi manfaat blockchain dalam usaha meningkatkan kecekapan operasi wakaf ke arah mencapai pembangunan sosio-ekonomi yang mampan.

Kata kunci: Pendigitalan; blockchain; kemampanan; wakaf di Timur Tengah dan Asia

INTRODUCTION

Waqf has made significant contributions to society over the years, beginning with Prophet Muhammad SAW and continuing to the present day. Waqf grew quickly throughout the Islamic era of rule. Fauzi et al. (2021) claim that the majority of waqf developments are for the social and spiritual aspects, such as mosques, cemeteries, and Islamic schools. The growth in waqf property development nowadays shows some positive impact to the community, especially in terms of socioeconomic sustainability (Abd Mutalib & Maamor 2018; Suhaimi & Ab Rahman 2021). In Malaysia, waqf are seen as effective means of fostering the ummah's social and economic development which includes (Sapuan & Zeni 2021; Medias et al. 2022; Yakob et al. 2021; Ismail et al. 2023). A number of academic institutions have used waqf funds to assist the education sector, pay salaries, and offer infrastructure, services, and facilities for learning. Most public facilities including mosques, research centres, schools, hotels, and cafeterias are built on waqf land donated by the government. Dividends from waqf shares are used to support oil palm plantations, build public infrastructure, and oversee educational institutions.

Due to the massive development of waqf, digitalization is considered to be one of the things that would help waqf function. Utilizing digital platforms, the distribution of waqf funds among Muslims is effective and widespread (Fanani et al. 2021; Ismail et al. 2023). Blockchain is an example of digitalization in fintech tools. With digitalization, blockchain has become a brand-new fintech phenomenon. It has been proved previously on other tools of Islamic Social Finance (ISF) such as zakat, sadaqah and wassiyah (wills). Blockchain is an alternative for wassiyah and bequest solutions in the Islamic system, and an innovative technology can be used to build a digital system (Alharthi 2021).

Therefore, the purpose of this study is to conceptualize the potential application of digitalization for the development of waqf projects, specific to blockchain, referring to available models applied in Middle East and Asian countries such as Oman, Bahrain, United Emirates Arab, Singapore, Indonesia, and Malaysia. This is done through a benchmark of using systematic review on the finding of the several articles in the database of Scopus, WOS, and Google Scholar. A basic procedure of systematic literature review (SLR) is being adopted to ensure quality and related articles only is being screened and review to come out a conclusion. This study is vital to better waqf management and operations in term of transparency, recording and reporting for government, donor, and trustee.

LITERATURE REVIEW OR RESEARCH BACKGROUND

WAQF DEVELOPMENT IN MALAYSIA

Waqf land has been developed in a variety of ways, both traditional and contemporary. Contemporary advances in the housing (terrace homes, apartments), lodging (hotels, lodging), grocery stores (people's

bazaars), and other sectors are increasingly focusing on modern techniques (Hassan et al. 2020). Meanwhile in Malaysia, waqf have grown over time, along with the expectations for its administration and the country is seriously working to improve waqf instruments (Mohd Zeni et al. 2023; Sukmana 2020; Suhaimi & Ab Rahman 2021). The 12th Malaysia Plan (RMK-12), which is geared toward an effective and efficient waqf development, has been primarily highlighted by the government to ensure impact from waqf can be benefited the society as well as nation. In fact, government-donated waqf land has been used for the construction of public amenities like mosques, research centers, schools, hotels, and cafeterias. There are several advantages to the increase in waqf property in Malaysia today, and one of the most efficient ways to promote the ummah's social and economic development is through waqf (Abd Mutalib & Maamor 2018; Ismail et al. 2023; Suhaimi & Ab Rahman 2021). Some academic institutions used waqf funding to support the education sector, pay professor salaries, and provide infrastructure, services, and facilities for learning. A major use of dividends from Waqf shares is to finance oil palm farms, develop public infrastructure, and manage educational institutions (Medias et al. 2022).

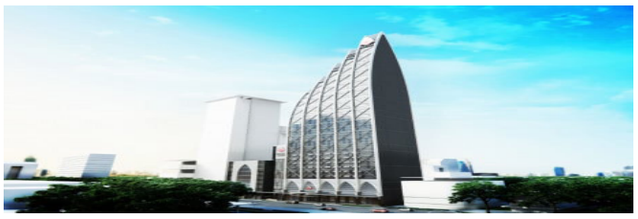
TABLE 1. Enactment on Waqf in Every State

No.	State	Law And Regulations
1.	Selangor	i. Waqf Enactment (Selangor) No.7 Year 1999 (Most Recent: Selangor Waqf Enactment 2015)
		ii. Islamic Administrative Enactment (Selangor) No.1 Year 2003 (Section 89 to Section 95)
2.	Malacca	i. Waqf Enactment (Malacca) No.5 Year 2005
		ii. Islamic Administrative Enactment No.7 2000 (Section 77 to Section 83)
3.	Negeri Sembilan	i. Waqf Enactment (Negeri Sembilan) No.5 Year 2005 (Not Empowered Yet)
		ii. Islamic Administrative (Negeri Sembilan) No.10 Year 2003 (Section 89 to Section 95)
4.	Federal Territory	i. Islamic Law Administrative Act (Federal Territories) Act 505 Year 1993 (Part VI-Finance (Charitable Trust) Section 60 to Section 71)
5.	Johor	i. Islamic Law Administrative Enactment (Johor) No.16 Year 2003 (Section 89 to Section 95)
6.	Penang	i. Islamic Law Administrative Enactment (Penang) No. 4 Year 2004 (Section 89 to Section 95)
7.	Perlis	i. Islamic Law Administrative Enactment (Perlis) No. 4 Year 2004 (Section 89 to Section 95)
8.	Perak	i. Islamic Law Administrative Enactment (Perak) No. 4 Year 2006 (Section 78 to Section 84)
9.	Kedah	i. Islamic Law Administrative Enactment (Kedah) No. 5 Year 2008 (Section 52 to Section 58)
10.	Pahang	i. Islamic Law Administrative Enactment (Pahang) No. 3 Year 1991 (Section 67 to Section 81)
11.	Terengganu	i. Islamic Law Administrative Enactment (Terengganu) No. 2 to 2001 (Section 63 to Section 69)
12.	Kelantan	i. Islamic and Malay Ceremonial Council Enactment (Kelantan) No. 4 Year 1994 (Section 61 to Section 66)
13.	Sabah	i. Baitulmal Foundation Enactment (Sabah) No. 11 Year 1998 (Section 21 – (Charity Fund Organisation)
		ii. Islamic Law Administrative Enactment (Sabah) No.13 Year 1992 (Part III – (Charitable Trust Fund) Section 43 to Section 55)
14	Sarawak	i. Islamic Council Ordinance Sarawak. Ordinance 41 Year 2001 (Part V – Establishment of Baitulmal and Waqf Council, Baitulmal, Waqf Nazr – Section 43 to Section 55)

Source: Yayasan Waqf Malaysia (2022)

In Malaysia, the State Religious Islamic Council (SIRC) of each state serves as the sole trustee for waqf (Usman & Rahman 2022; Zakaria & Muda 2017; Khalid et al. 2021). This practice has been outlined in the Constitution of Malaysia, which says that any matters relating to Islamic Laws including waqf are governed by state legislation (Table 1). Although each state may have its own methods for dealing with waqf, its fundamental qualities are the same in all states and jurisdictions (Ismail et al. 2023). Focusing on the current development of waqf projects in Malaysia (Yakob et al. 2021), several mega projects are highlighted, such as in Malacca's Pantai Puteri Hotel (Zakaria & Muda 2017). This hotel is a collaboration between JAWHAR and MAIM. The development of Seetee Aishah Waqf Garden in Penang is also a mega project. Other examples include Hotel Klana Beach Resort in Negeri Sembilan, MAIPs Waqf Complex in Perlis, Seri Warisan Hotel in Perak (Khalid et al. 2021; Suhaimi & Ab Rahman 2021) and other projects listed in Table 2 below.

TABLE 2. Waqf Project Development in Malaysia

No.	States	Projects	Figure
1.	Selangor	Sultan Ampuan Jemaah Mosque, Bukit Jelutong	
2.	Federal Territory	Imarah Wakaf Tower MAIWP @ Menara Bank Islam	
3.	Johor	The Dialysis Centre building, MAIJ	
4.	Kedah	Sentosa Business Complex	
5.	Pahang	The MUIP Asnaf Complex	

6.	Terengganu	The Grand Puteri Hotel (JAWHAR-MAIDAM)	
7.	Kelantan	Jubli Perak Sultan Ismail Petra Islamic Complex	
8.	Sabah	Wisma MUIS	
9.	Sarawak	Hamidah Plaza Kuching	

Source: Author's Own

BLOCKCHAIN

The digital sector is now expanding into social services. Numerous digital platforms are used in our social interactions to promote donations, including waqf (Fanani et al. 2021). Blockchain can be used to foresee waqf issues, allowing for a real-time, transparent, and trustworthy waqf flow for the benefit and the sustainability of development from the beginning to the end. (Vidiati et al. 2021).

The blockchain is considered to help with waqf management because it reflects charitable efforts and participation from numerous parties. Blockchain will be very helpful for the benefit of waqifs and beneficiaries as well as waqf management, which appears to be a key component of waqf because it can record every transaction and provide clear reports (Zulaikha & Rusmita 2018). Every transaction is publicly recorded, and anyone with permission can see the transactions. The blockchain allows users to follow their transactions from the point of gifting to the point at which the beneficiaries use them.

Additionally, a smart contract feature that prioritises security and adherence to waqf rules improves performance and efficiency inside waqf institutions (Alharthi 2021). Smart contracts are incorporated into the blockchain technology to automate and transparently execute contract terms. As a result of data being stored in the cloud, the blockchain may be able to prevent forgery and manipulation, hence preserving privacy and enforcing cyber security (Zulaikha & Rusmita 2018). The commons-based system that supports sharing of the economy can use blockchain technology. A change in consumer transaction trends may result from the reduction of third-party engagement in the financial system brought about by blockchain.

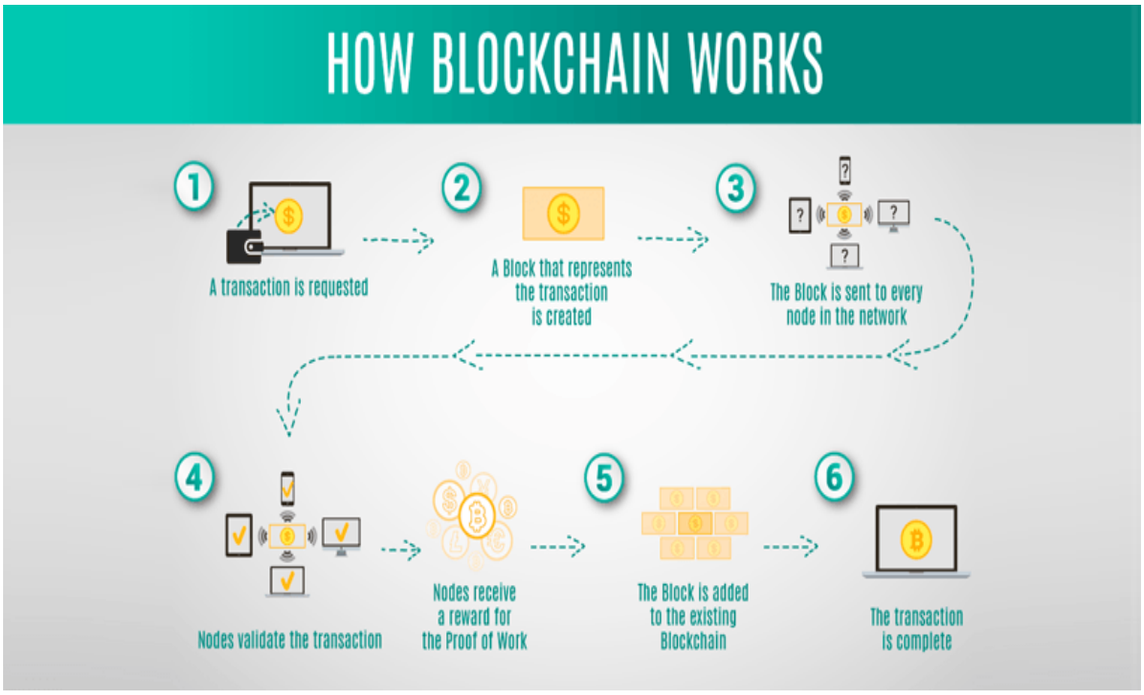


FIGURE 1. Blockchain Operation

Source: Zignuts Team (2018)

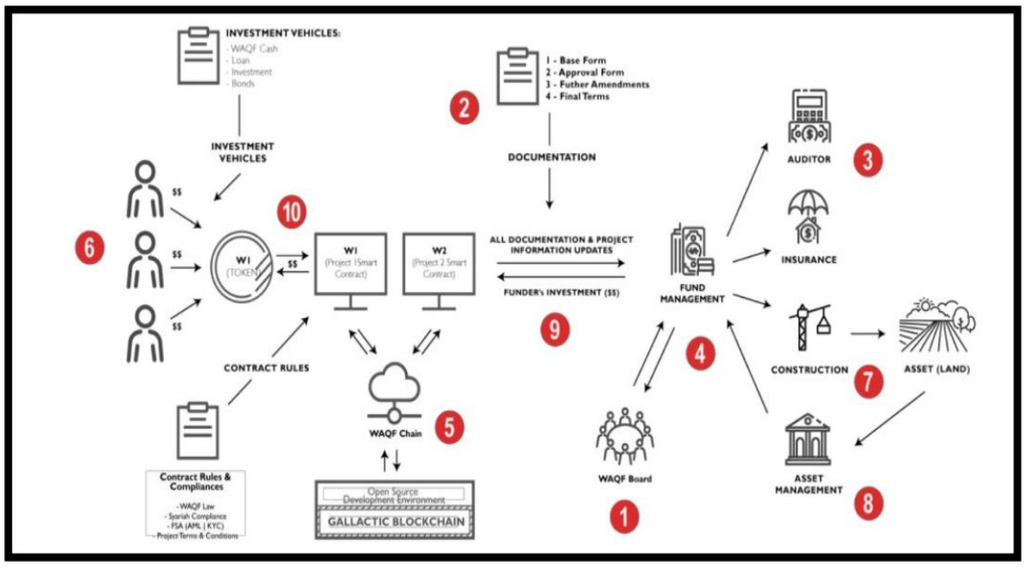


FIGURE 2. Application Blockchain in Waqf

Source: Mutmainah et al. (2021)

APPLICATION OF BLOCKCHAIN IN MIDDLE EAST AND ASIA

OMAN

The UAE, Bahrain, and Saudi Arabia were the first Gulf nations to show interest in blockchain technology in 2016, particularly in the field of financial and government services. Bahrain focused on studying legal issues and creating the necessary regulatory frameworks and legislation before launching the use of blockchain in financial services and digital documents, while the UAE and Saudi Arabia concentrated on identifying the current

state of the technology. The goal of Oman is to adopt all new technology and continuously stand alongside industrialized nations. By establishing Blockchain Solutions & Services Co (BSS) during the Oman Blockchain Symposium in November 2017, the Sultanate of Oman started its blockchain project.

By utilizing the top distributed ledger systems and doing it securely, this organization hopes to promote innovation and enhance its offerings (Al Hilali & Shaker 2021). Oman has been working diligently to implement a comprehensive digitization strategy for the country. The first blockchain-based platform for Sharia-compliant investments and Waqf charity crowdfunding was developed in Oman in 2019 for the Gulf region (Pitchay et al. 2021). Developing an understanding of the Oman government's perspective on blockchain solutions to governance and public administration concerns, as well as the benefits to Oman from adopting blockchain solutions to the identified governance difficulties, is important (Goldsmith et al. 2022).

BAHRAIN

The idea of blockchain technology was first presented in 2008; however, it is still seen as being in its infancy in terms of providing a new trust model across many smart communities, IoT, and even in the development of new business models (Al-Aswad et al. 2021). In Bahrain, the healthcare industry has begun utilizing blockchain to safeguard the transmission of patient Electronic Health Records (EHR) between various parties. The blockchain concept addresses the issue of trusted data exchange, but additional layers are needed to implement access control and safeguard privacy. As there are several use cases that call for a model for exchanging trusted data, this model can serve as an integrated model for various communities and systems. Researchers can use this model once it has been successfully developed to assure its dependability, accountability, and trustworthiness (Al-Aswad et al. 2021).

In an effort to establish itself as the region's top technological center, Bahrain has taken the lead in supporting new fintech and blockchain ventures. The Crypto-Asset Module, which offers a framework for the regulation and licensing of crypto-asset operations, has been promoted by the Central Bank of Bahrain. Additionally, the government has urged businesses to test out cryptocurrency-related goods and services in approved sandboxes. This progressive culture is uncommon among countries and is seen as a model for the adoption of cryptocurrencies around the world (Grossman 2022).

UNITED ARAB EMIRATES (UAE)

The UAE government intends to introduce blockchain technology throughout the nation and establish itself as a regional magnet for commercial innovation. The Emirates Blockchain Strategy 2021, which was introduced in 2018, has the objective of moving half of governmental transactions on a blockchain infrastructure by that year (AlTaei et al. 2018). The overall goal of the plan is to save millions of hours of labor and over billions of dollars in regular transaction and document processing. To establish a uniform description of these technologies at the federal level, the AI and Blockchain Guide Initiative was unveiled (Grossman 2022).

The United Arab Emirates will adopt blockchain for digital transactions, providing each client with a special identifying number that serves as their record on the safe chain. In order to protect the digital security of national papers and transactions, data in this secure chain cannot be altered or compromised. This eventually lowers operating costs and speeds up decision-making. With the use of blockchain technology, people will be able to conduct their transactions on time and in the most convenient location for their way of life and line of work while also saving time, effort, and resources. By implementing this technology, the UAE government hopes to reduce the cost of routinely handled transactions and papers, annual printing costs, and labor hours (AlTaei et al. 2018).

SINGAPORE

A financial technology company located in Singapore has developed a crowdfunding platform that makes use of blockchain technology to establish "smart contracts" connected to distinctive waqf enterprises. The organization believes that by doing this, it will be simpler to raise money, manage waqf, and transfer control of social initiatives like mosques, colleges, and welfare programs (Bouakkaz 2022).

In Singapore, there are 100 different categories of registered waqf. Money from the waqf is given to the needy, mosques, madrasas, communal welfare, funerals, and other charitable causes (Widiastuti 2020). The country also utilizes a smart contract built on the blockchain to record any modifications to the agreement between the crowd and the project initiator.

This will help authorities spot fraudulent fundraising (Muneeza et al. 2018). The use of blockchain technology in crowdfunding has opened up new possibilities for financial inclusion, fundraising, and maybe Islamic banking. The transactional and consensus-based characteristics of blockchain could simplify the legal and administrative requirements of crowdfunding.

INDONESIA

The waqf blockchain concept is being presented in Indonesia as a way to facilitate the raising of cash waqf with blockchain technology. In Indonesia, the digital economy is seen as having potential to be driven by blockchain (Vidiati et al. 2021). Therefore, in order to raise money for the waqf institution and other parties who have contributed to the services of cash waqf distribution, this model makes use of the idea of cash waqf (Zulaikha & Rusmita 2018). Data from the Indonesian Waqf Board shows that, compared to its potential of 180 trillion rupiah, the waqf collected cash between 2011 and 2018 of just 255 billion rupiah (Mutmainah et al. 2021). The problems with conventional transaction firms that are overseen and controlled by reliable third parties are outclassed by blockchain technology (Vidiati et al. 2021). Waqf management issues can be solved using blockchain technology. It permits straightforward auditing and verification of transactions. In addition to processing numerous transactions, blockchain is useful for tracking the sources of the supply chain. Consequently, a technology-based information system that can produce an accountability and transparency report is required given the great potential and high function of cash waqf (Zulkarnaen et al. 2021). Using blockchain technology, every transaction can be recorded and verified by network consensus. As a result, once data has been inputted, it cannot be changed, lost, or damaged.

They can't then be used as a tool by network providers. The potential for cash waqf in Indonesia is very strong. Technology that can provide openness and accountability is therefore required. Because of this, the goal of this study is to examine how using Blockchain Technology might improve the accountability and transparency of cash waqf in Indonesia (Zulkarnaen et al. 2021). It is anticipated that the blockchain technology's integration with waqf will close the gap between this waqf fund's potential and actualization (Mutmainah et al. 2021). Indonesia has also applied blockchain to other Islamic Social Finance tools such as zakat. Blockchain technology has been deployed, particularly for zakat distribution, management, and education by the National Amil Zakah Agency (Nurhalizah et al. 2021).

MALAYSIA

The adaptation of blockchain technology in zakat is currently widespread in Malaysia, unlike waqf, where it has only recently begun. Malaysia is interested in implementing blockchain in zakat management to provide security, transparency, and traceability of each zakat transaction from the fund distribution processes to collection processes as a result of the growing knowledge of blockchain for the use of Islamic finance (Nor et al. 2021). According to a study by Gazali et al. (2019), the major goal of the cash waqf blockchain platform's proposed model is to help madrasah find a long-term solution to their financial problems. The use of blockchain in crowdfunding will increase Malaysia's financial inclusion, among other things. Entrepreneurs and philanthropists are among the audiences that this technology appeals to as an alternative to traditional financial services.

In addition to enhancing data security, this technology is also productive and cost effective (Abd Razak et al. 2020). Additionally, the use of blockchain technology in Islamic finance could improve the effectiveness and transparency of handling waqf education funds in order to realize its full potential. Smart contracts and the use of blockchain technology are becoming more popular in Malaysia. The Financial Technology Regulatory Sandbox Framework was released by the Central Bank of Malaysia on October 18, 2016 (Zain et al. 2019). Due to its strong dual banking and financial services, Malaysia was exposed early to blockchain technology. The Central Bank of Malaysia has taken precautions to ensure the security of the local finance and business market in Malaysia in light of the growing popularity of cryptocurrencies like Bitcoin and Ethereum among investors worldwide. Emerging Fintech firms that offer the usage of Blockchain and smart contracts that are of a Shariah-compliant type have sprung up as a result of the burgeoning Malaysian Islamic financial services industry (Zain et al. 2019).

TABLE 3. Summary of Application of Blockchain in Middle East and Asia

Country	Scope	Year Implement
Oman	Sharia-compliant investments and Waqf charity crowdfunding	2019
Bahrain	Healthcare industry	2008
UAE	Governmental transaction	2018
Singapore	Crowdfunding platform	-
Indonesia	Cash Waqf	-
Malaysia	Zakat transaction	-

SUSTAINABILITY

Islamic social finance is an addition to the traditional financial system, which has a non-profit motive, a focus on eradicating poverty, and a commitment to long-term socioeconomic growth (Nor et al. 2021). In order to ensure sustainability, trust must be earned. This is done through maintaining shariah compliance, as well as by advancing social well-being. Blockchain integration would improve sustainability and good governance. With the support and assistance of blockchain technology, we can all improve our lives in accordance with the sustainable objectives set forth by the UN. Beyond enhancing our daily societies, blockchain can promote economic expansion by opening up numerous new business prospects (Schinckus 2020). For instance, research by Afifa et al. (2022) found that both Vietnam and India view blockchain as a valuable instrument for advancing sustainable development goals.

Fitting with shariah's goal of fostering trust and transparency, blockchain technology can optimize the principles embedded in Islamic finance, making them more sustainable than if they were accomplished through conventional methods (Chong 2021). Additionally, blockchain offers an intriguing prospect for sustainability and an increase in efforts to lower greenhouse gas emissions (Lardo et al. 2022). The benefits of blockchain also relate to keeping supply chain networks sustainable. Waqf closely complements the UN's Sustainable Development Goals (SDGs). Waqf places a great deal of emphasis on three principles—sustainability, community development, and the economy—that are also found in the SDGs (Ismail et al. 2023). Almost all of the services required in the Islamic world, including those in the agricultural and industrial sectors, the education and health sectors, basic infrastructure, and transportation facilities, are funded in large part by waqf institutions. These institutions have also increased business activities by fostering self-employment and those who support sustainable development (Vidiati et al. 2021).

Blockchain, which was created with the values of openness, effectiveness, and sustainability, can be used to stop abuse, loss, theft, and other things that might affect the possibility of collection, as well as lower operational expenses (Nurhalizah et al. 2021). A key component of the sustainable economic development of a developing nation is a digital waqf system (Fanani et al. 2021). On a cutting-edge technical platform, the waqf blockchain leverages assets and land for business and growth while maintaining very high long-term sustainable revenue (Bouakkaz 2022). Innovative blockchain and waqf will inspire the parties involved in waqf to put their trust in the waqf chain in order to raise money and support the growth of the Islamic community. Blockchain can be helpful to preserve waqifs' transactions in a reliable manner (Huang & Nordin 2021).

METHODS

SYSTEMATIC REVIEW PROCESS

IDENTIFICATION

There were four steps to the systematic review approach. The first step is identification. The evaluation was conducted from September 2022 until October 2022. The terms that will be used in the search were established in the first step. Based on previous research and a thesaurus, keywords related to Blockchain, Sustainability, Waqf, Oman, Bahrain, United Emirates Arab, Singapore, Indonesia and Malaysia were used (Table 4). At this stage,

after careful screening, one duplicated article was removed. In order to prevent bias, two researchers participated in the string query procedure and article search, as recommended by Delgado-Rodríguez & Sillero-Arenas (2017).

TABLE 4. Keywords and searching information strategy

Databases	Keyword Used
Scopus	TITLE-ABS-KEY ((“waqf” OR “zakat” OR “zakah”) AND (“blockchain” OR “digital” OR “digitalization”))
Web Of Science	TS = ((“waqf” OR “zakat” OR “zakah”) AND (“blockchain” OR “digital” OR “digitalization”))
Google Scholar	allintitle: ((“zakat” OR “waqf” OR “sadaqah” OR “islamic Social finance” AND “blockchain” AND “Asia” OR “middle east” OR “malaysia” OR “oman” OR “singapore” OR “Indonesia” OR “UAE” OR “bahrain”)

SCREENING

The second stage was screening, which entails the process of choosing articles based on inclusion and exclusion criteria. This study screened all the 49 selected articles by choosing the criteria for articles selection which is done automatically based on the sorting function available in the database. Table 5 has shown that we are included only article journals containing empirical data in our evaluation; thus, review articles, books, and conference proceedings are not included. We also concentrated on English-language publications and eliminated non-English-language items to avoid any mistakes or misunderstandings. Then, a 5-year timeframe (between 2018 and 2022) was chosen as an appropriate amount of time to guarantee that we are up to date on our issue and that the material is more credible. This process thus excluded 39 articles, as they did not fit the inclusion criteria. The remaining 10 articles were used for the third process of eligibility.

TABLE 5. The inclusion and exclusion criteria

Criterion	Eligibility	Exclusion
Literature type	Journal (research articles)	Journals (systematic review), book series, book, chapter in book, conference proceeding
Language	English	Non-English
Timeline	Between 2018-2022	<2018

ELIGIBILITY

The third process is the eligibility where the authors manually monitored the retrieved articles to ensure all the remaining articles (after the screening process) are in line with the criteria.

QUALITY APPRAISAL

The remaining articles were given to two experts for quality appraisal to ensure that the substance of the articles was of high quality. According to Petticrew & Roberts, (2006) the expert should rank the remaining articles into three quality categories namely high, moderate, and low. Articles that are categorized as high and moderate only should be reviewed. Through this process, the expert must have mutual agreement and agree that the quality must at least be at moderate level. The expert reviews categorized 5 articles as high quality and 5 articles as moderate quality. Thus, all the remaining articles were eligible for the review.

RESULT AND DISCUSSION

Blockchain has benefited zakat in its function toward economic growth, particularly during times of crisis, such as those who require funding to survive during a Movement Control Order (MCO). According to Nor et al. (2021), the emergence of blockchain application in Zakat management during the pandemic facilitated the process of safeguarding safety and health that lead to socio-economic growth. Because most people lose their jobs and have no other source of income during the MCO, they are qualified to qualify as zakat recipients. Furthermore, blockchain has a great impact on Zakat in Indonesia, as mentioned by Nurhalizah et al. (2021), there is validity and legality of blockchain in Zakat practises as long as it follows Shariah norms, however there are still no regulations published in Indonesia about blockchain. As a result, the application of blockchain does not violate any regulations or consequence in Shariah prohibition issues such as gharar, maysir, or riba. The blockchain's attribute was related to transparency.

Additionally, blockchain is not limited to zakat. Zakat is regarded as an effective instrument that uses blockchain in its operations. Blockchain technology can be used in various Islamic Social Finance tools including waqf, sukuk, wills, smart contracts, and so on. According to Chong (2021), blockchain can build confidence and transparency among those involved in the delivery of Shariah-compliant goods and services, hence encouraging responsibility. This would be applicable to Shariah-compliant goods or products, such as smart contracts, particularly Sukuk transactions. However, there are two difficulties: the transparency evaluation can only be applied after the transaction has been completed, and the algorithm protocol used to validate the smart contract. However, blockchain remains a viable application because it will increase productivity, transparency, and the primary priority is user or client satisfaction (Rabbani et al. 2020; Alaeddin et al. 2021). Based on the previously mentioned potential, blockchain is appropriate to be utilized in waqf operations. According to Al Hilali and Shaker (2021), blockchain technology has gained customer trust and is facilitating the creation of distributed agreements in the online digital realm. The majority of people all around the world are embracing digitization in their daily lives. The use of blockchain will simplify all processes while also reducing the amount of time required (Zulaikha & Rusmita 2018). Furthermore, considering blockchain is much more transparent and the accessibility is based on node creation and must pass through a single block before accessing the information, it will increase user trust and reduce insecurity. Appendix 1 illustrated an overview of findings on the potential application of Blockchain in the Islamic Social Finance industry throughout the world.

DISCUSSION ON FRAMEWORK (BLOCKCHAIN) PROPOSED FOR WAQF OPERATION IN MALAYSIA

The growth of the waqf can be considerably aided by blockchain technology and crowdsourcing. Islamic crowdsourcing has recently been employed to support and advance the waqf. For instance, a donation-based crowdfunding model (direct scheme) based on the Figure 4 might be used to redevelop abandoned waqf properties by investing the waqf monies amassed over time to construct mosques, schools, and hospitals there. The flow of this framework begins when 1) the first donor or investor deposits the fund and is located in a crowdfunding platform. Next, 2) the trustee or fund manager will manage the fund in several investments to gain a profit, and later 3) some of profit will go back to the crowdfunding platform and 4) balance will be transfer to developer as a 5) paid cost in developing idle waqf property. Lastly, 6) the benefit developed from waqf land will return to the donor and beneficiaries.

Any participant across the globe can propose the creation of any project on top of waqf properties that needs funding thanks to the waqf blockchain platform. The project idea will be permitted to enter the platform once it has been approved and all necessary conditions have been satisfied. Other people or financial institutions can then adhere to finance these project proposals using fiat money or cryptocurrencies. Tokens are created and distributed to the participating funders via the platform. These tokens stand for the right to an unbreakable project that yields benefits. The following Figure 5 provides an illustration of how this platform works to raise money for the development of dormant waqf.

First, 1) a land asset is identified by the waqf board and made available for development whether by individual or company and a block of data is created. The next step is to a) write a development project document that includes information on the property title, a feasibility analysis, the architecture

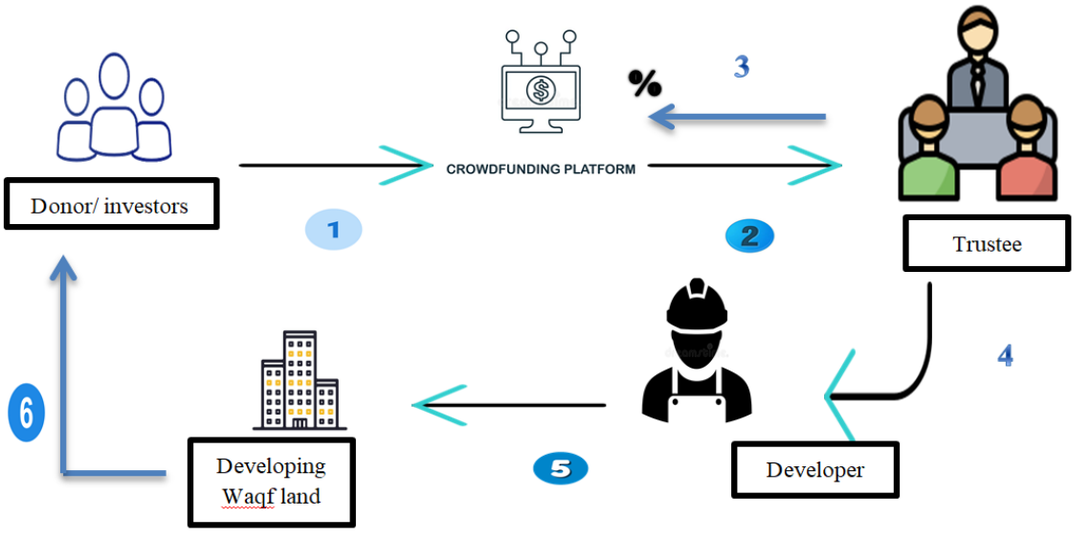


FIGURE 4. Normal Waqf Crowdfunding without Blockchain

Source: Jahangir et al. (2020)

of the building, the project plan, the project cost, the project profit and loss, and suggested financing methods. b) All details and data are located at the block which link with all networking and the access are encrypted c) The development project paper is additionally reviewed and approved by an independent auditor. The development of the specific waqf development project is d) then funded through an Initial Coin Offering (ICO) that will be launched by a licensed fund manager and sell crypto tokens to global pre-qualified investors.

Next, e) the waqf blockchain platform built on top of the blockchain sells unique tokens to investors as a means of raising the money necessary to advance the waqf project. The blockchain use a variety of tools to raise the necessary resources, including cash waqf, Islamic loans, murabah, and sukuk. Once the appropriate amount of money has been raised, the fund manager will then designate a builder to build and develop the waqf asset. Next, f) the fund manager names an operator to oversee and maintain the asset once the necessary funding has been raised. The fund manager's duties involve 2) collecting money generated by asset operation. Finally, according to the underlying contract, 3) investors would receive a portion of the fund manager's earnings.

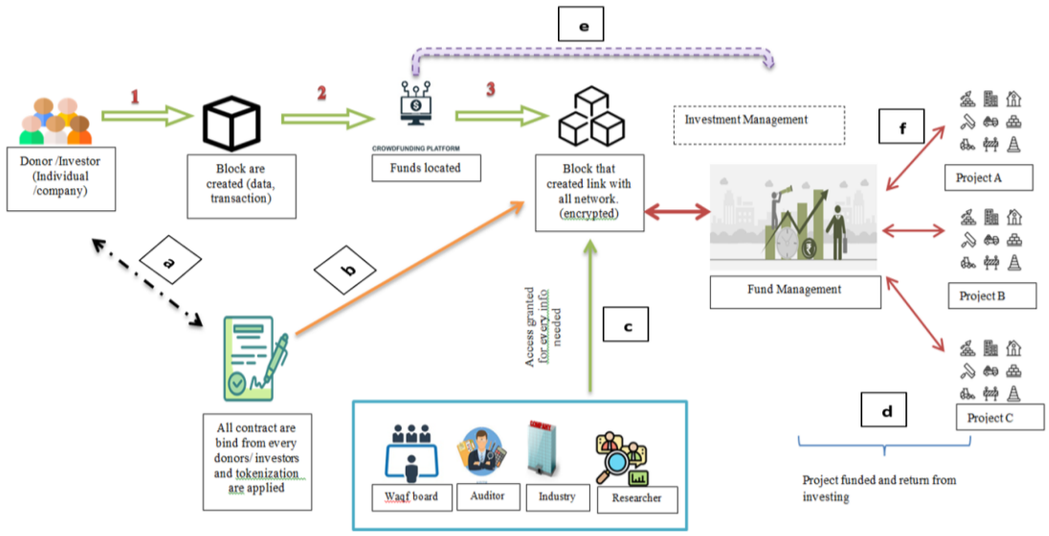


FIGURE 4. Waqf Operation with Application of Blockchain

Source: Mutmainah et al. (2021)

CONCLUSION

Blockchain has created a new system for documenting and managing business transactions that does not require the use of intermediaries. With its growing market dominance, the system is intended to provide a high level of governance at a lower cost than other payment systems and traditional technology. Indeed, with the support and aid of blockchain technology, we can all improve our lives in accordance with the United Nation (UN) long-term goals, including the 17 Sustainable Development Goals.

Blockchain, as a revolutionary technology, has achieved substantial global prominence. It has developed a system that allows corporate management and transaction control with only a few intermediaries. The low number of intermediaries means it may be the safest means of payment, eliminating the possibility of corruption and being more cost-effective than older technologies. These advantages have ushered in the usage of Blockchain in the Islamic system, particularly in funding waqf, which was founded for social welfare and the well-being of the underprivileged in society. Blockchain has emerged as the best choice for administering waqf. It assists in the eradication of potential corruption, increases transactional transparency, and serves as an integrated property management system in which all stakeholders may participate and make contextual decisions. Blockchain can be useful in preserving waqif transactions in a trustworthy manner. A blockchain secures each transaction record and prevents data loss or modification. Our investigation revealed that incorporating blockchain into the waqf management system will increase the system's trustworthiness and effectiveness. Donors will gain faith in a waqf management system if the data is transparent and easily trackable for each transaction. Waqf management systems using blockchain technology can prevent donor criticism and help charity organizations enhance donor trust and revenue.

However, in the background of the debate by scholars and opinion leaders, there have been continuous and deliberate efforts to introduce this technology in different Islamic finance sectors, particularly Islamic social finance. In fact, several countries have started applying blockchain models in their waqf operations. This study thus claims that waqf institutions in Malaysia as well need to start considering for blockchain model in waqf operations in order to gauge waqif trust and interest to continue participate and contribute to waqf fund for assisting the agenda to alleviate poverty and sustainable development of socio-economic of the needy citizen.

Therefore, incorporating innovative blockchain and waqf will enable parties involved in waqf to place their trust in the waqf chain to raise funds and continue the development of the Islamic community. This is because blockchain might be used in waqf as a device for easily accumulating funds from all over the world. According to this assertion, the blockchain facilitates the provision of perpetual money for improved waqf management. Previous several studies have also shown that blockchain can be used in WAQF as a tool for collecting funds across the globe in an efficient and timely manner. Simultaneously, it eases information collection within the system by improving the elements of trust and reliability of activities undertaken. Through blockchain, the project stakeholders can monitor transactions to enhance the level of trustworthiness and reliability. It is necessary to collaborate with relevant professionals to make sure that the benefits of waqf reach the right target communities. Finally, the study holds that blockchain has the potential to solve many current challenges in waqf management by enabling easily auditable transactions and costless verification of a device's properties. Because of this and other characteristics, blockchain may play an important role in tracing supply chain sources as well as handling and dealing with numerous transactions.

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AUTHORS' CONTRIBUTIONS

Balkis Kasmon; Writing original draft preparation and conducting data analysis, Siti Sara Ibrahim; Provides main supervision, conceptualization and writing review, Sharfizie Mohd Sharip, Asmak Ab Rahman, Nurul Fadhly Habidin; Provides co-supervision and writing review. All authors have read and agreed to the published version of the manuscript.

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APPENDIX

No.	Title	Country	Journals	Tools	Findings
1.	The Role of Blockchain Technology in Enhancing Islamic Social Finance: The Case of Zakah Management in Malaysia	Malaysia	Foresight	Zakat	In an effort to explore how Fintech might contribute to Islamic social finance, the examination of zakah institutions' and society's intentions toward the use of blockchain technology in zakah administration. It also serves to assess how zakah institutions see the use of blockchain technology. There are reasons why zakah organizations should use blockchain technology to handle their operations. Zakah is a crucial Islamic mechanism for social financing that supports socioeconomic growth. It is past due that zakah institutions adopted blockchain, particularly in light of the current pandemic issue, which calls for a more contactless strategy to safeguard health and safety.

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2.	Enhancing Trust Through Digital Islamic Finance And Blockchain Technology	Malaysia	Qualitative Research in Financial Markets	Smart Contract (Sukuk)	Discussion of the various blockchain applications in Islamic finance that can be used to promote responsibility amongst parties engaged in the delivery of Shariah-compliant goods and services by fostering trust and transparency. Additionally, it examines the advantages of blockchain in Islamic finance and uses a smart Sukuk as an example. The use of blockchain in i-Fintech faces two difficulties. The first difficulty relates to the degree of computational encoding of Shariah principles. Blockchain makes all transactions visible, making it easier to assess if they comply with Shariah and are of an Islamic nature, but this assessment can only be made after the transaction has taken place. The second difficulty has to do with the algorithmic protocol that is used to verify smart contracts (including smart Sukuk).
3.	Implementing The Blockchain Technology in Islamic Financial Industry: Opportunities and Challenges	Malaysia	Journal of Information Technology Management	Waqf, Zakat and Sukuk	Examining some of the cutting-edge blockchain uses in Islamic financial organizations. Additionally, it highlights the best ways to deal with the main potential and difficulties associated with the deployment of blockchain technology in the Islamic banking sector. It affirms the significant potential of blockchain technology for use in a range of Islamic financial applications, including Waqf, Zakat, and Sukuk. On the other hand, the complexity of Islamic banking products combined with the application's opacity pose the biggest obstacles to deploying blockchain in this sector, leading to confusing rules and a lack of standards.
4.	Fintech, Blockchain and Islamic Finance: An Extensive Literature Review		International Journal of Economics and Business Administration	Smart Contract	The division of Islamic FinTech into three major categories: potential and difficulties, sharia compliance of cryptocurrency and blockchain, and law and regulation. The largest problem that Islamic FinTech firms are facing is determining the sharia compliance with regard to cryptocurrencies and blockchain technology. According to the research, Islamic FinTech companies should be treated more favourably by Islamic Financial Institutions (IFIs) than their rivals. Islamic financial institutions must adopt FinTech and collaborate with FinTech firms if they wish to boost productivity, transparency, and client happiness.

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5.	Blockchain Technology's Status of Implementation in Oman: Empirical Study	Oman	International Journal of Computing and Digital Systems	Waqf	With the introduction of the first blockchain application, namely bitcoin, the world began to use this technology. It is a type of virtual money used for online transactions similar to how real-world currency is used. Blockchain technology has garnered customer trust as a result of the popularity of Bitcoin and is now being used in a variety of industries and services, such as monetary institutions, the Internet of Things (IoT), supply chains, elections, and the handling and storage of medications. The primary concept behind the blockchain is to create distributed agreements in the online digital space. The possibility of the digital economy being more scalable than the current centralised one is greatly increased. Due to the significance of this technology, the intends to evaluate how Oman is doing with regards to adopting blockchain technology.
6.	Waqf Blockchain in Indonesia: at A Glance	Indonesia	Jurnal Wakaf dan Ekonomi Islam	Waqf	Indonesia is very likely to adopt waqf blockchain due to the country's high percentage of Muslims, the flexibility of waqf fiqh, and the growth of the halal market. The biggest difficulties encountered are raising public knowledge about waqf. Future research must examine perceived intentions to use the waqf blockchain using questionnaires and in-depth interviews with stakeholders.
7.	Blockchain For Waqf Management Zulaikha, S., & Rusmita. (2018)	Indonesia	KnE Social Sciences	Waqf	The core idea behind a blockchain is that its users can access the ledger independently of a third party. As a result, waqf could use Blockchain as a tool to conveniently accumulate funds all over the world. Accordingly, Blockchain makes it easier to provide permanent funds for improved waqf management. As a result, this study examined BC's technological advancements through the lens of waqf management in relation to movable and immovable assets. The findings from this work provide a platform for additional research on Blockchain, which might be used as a new type of waqf management paradigm.

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8.	What Blockchain Technology Can Do to Contribute to Waqf Vidiati, Hendra, Santoso, & Faturrizky. (2021).	Indonesia	Journal for Islamic Studies	Waqf	The research supports the government's decision to employ blockchain for waqf. In order to examine how blockchain influences the role of trust in waqf transactions. This study defines key terms and concepts related to how blockchain functions and theoretical trust. The outcomes of the SWOT analysis are discussed, along with the implications for waqf of blockchain technology. Based on a conceptual framework, the study's conclusion addresses how blockchain can benefit waqf instruments.
9.	The Legality of Zakat Blockchain in Indonesia: In the Perspective of Islamic Law and Indonesian Positive Law	Indonesia	Laa Maisyir-Jurnal Ekonomi Islam	Zakat	The legitimacy and legality of the blockchain for zakat in Indonesia. It demonstrates that using blockchain technology for zakat management is acceptable as long as it complies with Shari'ah standards and has no adverse effects. However, Indonesia has not yet issued regulations defining the zakat blockchain technology, and some challenges to its use still exist as a result of the various regional conditions in Indonesia.
10.	Using Blockchain in Waqf, Wills and Inheritance Solutions in the Islamic System	UAE	International Journal of Economics and Business Administration	Waqf and Will	The study demonstrates that the biggest obstacle impeding the Waqf system's restoration to its former splendour has been a lack of data, compromised historical records in the event of the Founders' passing, a lack of transparency, and improper audits. Waqf institution performance and the achievement of the founders' goals are guaranteed thanks to smart contracts on the Blockchain.