The Role of Blockchain Technology on Zakat Institutions, A Way Forward: Literature Review

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Abstracts: Financial Technology (Fintech) is rapidly transforming the financial industry, with advanced features enhancing speed, convenience, and accessibility. Islamic Financial Institutions (IFIs) and Islamic Social Institutions must adopt FinTech to remain resilient and develop innovative products and services. This qualitative study analyzes the function of Blockchain technology in Zakat institutions and the challenges faced in adopting it. It examines recent publications, focusing on Islamic Financial Technology, the financial sector, and non-financial sectors. However, this article search was limited to scholarly works. Using the library's database, Google Scholar, and the Emerald Insight database, the search is conducted for relevant, primarily peer-reviewed articles, using the appropriate filters and keywords. Therefore, the purpose of this article is to identify the role of Blockchain technology in Zakat institutions and therefore analyze the current challenge faced by Zakat institutions when adopting Blockchain technology. Blockchain technology, particularly in the financial sector, offers numerous opportunities for financial institutions. Smart contracts on blockchain technology offer more independent, transparent, and dependable transactions. Technology advancements impact industries, including Zakat, which is a critical concept in Islam. Zakat institutions can leverage blockchain technology to improve funding and distribution processes, overcoming challenges faced by traditional institutions. In Islamic Social Finance.

Keywords: Blockchain and Smart Contracts, Blockchain On Zakat, Islamic Financial Technology, Blockchain Technology, Blockchain In The Financial Sector, And The Non-Financial Sector.

1. INTRODUCTION

In the new business generation, the presence of Financial Technology (Fintech) is going rapidly and driving the financial industry into the digital age. Fintech is a term used by the NDRC (National Digital Research Center) to refer to innovations in the area of financial services. In basic words, it refers to a financial breakthrough involving sophisticated technology. FinTech applications will prioritize the development of advanced features that will make all elements of financial services faster, more convenient, and more accessible. This comprises payment and transfer systems, crowdfunding, assetand loan management, and a variety of additional services. Thus, the efficiency, effectiveness, and practicality of services are the primary draws of this innovation, allowing it to gradually influence people's lifestyles.

In addition, Milian et al. (2019) argue that the presence of Financial Technology (FinTech) will be able to bring about significant changes in the Islamic financial institution industry, where he believes FinTech will play an essential role as a financial intermediary for society and in the daily activities of people worldwide, implying a new era in financial services. Islamic Financial Institutions (IFIs) and Islamic Social Institutions, to remain resilient and compete with the conventional counterpart, by using FinTech, also need to apply and develop more innovative products and services to their consumer. In line with the growth of FinTech around the world, the need to adopt FinTech for Islamic finance and social

institutions are essential. This FinTech is applicable to provide consumer products and services more effectively and efficiently. Moreover, FinTech is also suitable to develop products and services more innovatively. Failure to apply this Fintech would fail to meet the market's demand. Currently, there are several FinTech that offers shariah-compliant services that Islamic financial and social institutions may use. Shariah FinTech companies, such as Beehive, have been delivering Shariah-compliant FinTech services since 2014. Beehive has grown to become one of the world's premier financial technology companies, covering awide range of markets. From Beehive, sharia-compliant Fintech has expanded to other Asian nations, including Singapore, Malaysia, Indonesia, and other Muslim-majority countries. Hello Gold, has also developed in Malaysia, utilizing blockchain technology which is according to Sharia principles. Nevertheless, several Shariah FinTech

platforms in Indonesia continue to grow, including Amartha, Crowdo, Investee, and CoinWorks. One of the Fintech that's been talked about a lot lately is Blockchain technology with tremendous potential.

Blockchain technology has attracted significant attention from financial industry players and is growing rapidly in recent years. Simply stated, blockchain technology is a distributed database system that operates under a consensus mechanism and securely stores transactional data or other kinds of information (Swan, 2015). There are many chances to utilize Blockchain technology, particularly in the financial sector. In the financial industry, blockchain technology is analogous to a digital ledger that anyone can access at any time and without sanction from financial institutions such as banks. This technology automatically makes all transactions more secure and transparent, thereby minimizing data misappropriation such as corruption or bribery. In addition, with the presence of smart contracts in blockchain technology, transactions will be more independent, transparent, and hence less expensive and more dependable, as they are the outcome of a programming process.

In Islamic Social Finance, Zakat is one of the institutions that can utilize blockchain technology to escalate the effectiveness and efficiency of the funding and distribution process and to overcome the challenge faced by many Zakat institutions today. Therefore, the article's main objective is to identify the role of Blockchain technology in Zakat institutions and therefore analyze the current challenge faced by Zakat institutions when adopting Blockchain technology.

2. LITERATURE REVIEW

2.1. General Overview

This research is primarily related to blockchain technology on Zakat. Hence, reviewing theses and articles as well as written books in this field is of inevitable significance. Some of the literature that concerns the digital technology agenda include the following: Article entitled "Pembangunan Ekonomi Melalui Agihan Zakat: Tinjauan Empirikal", translated to "Economic Development through Zakat Distribution: An Empirical Review", Patmawati Ibrahim explains that destitution and poverty are among the social issues that zakat seeks to eliminate. However, the boundary between the two is indeed ambiguous and hazy. Patmawati Ibrahim clarified key points regarding the distribution of zakat, but she did not mention the fundamental solution to these issues. Therefore, the purpose of this study is to determine the optimal method for addressing these zakat-related issues using blockchain technology (Patmawati Ibrahim, 2008).

"Managing Zakat Fund in Malaysia" is the title of a second study by a team of authors (Zainal, Hafizah, Omar, and others, 2016). They discussed the zakat fund in Malaysia, specifically the zakat distribution. They noted that numerous problems exist in zakat institutions, including inefficiency in zakat funds management, which entails zakat collection and distribution. In their study, they also addressed the aspects of justice, rights, channels, and methods of zakat distribution, which had attracted the Muslim community's attention in a significant way due to the large number of complaints received annually against zakat institutions, particularly regarding the method of zakat fund distribution. Although the zakat collection is getting better every year, zakat distribution remains a contentious topic of discussion. This study aims to show how new approaches to distributing zakat funds efficiently, such as checking in on recipients to see how they're doing after receiving zakat, can help alleviate some of the tensions surrounding zakat distribution. It exemplifies how Islamic finance may help achieve the SDGs since it provides innovative funding options. contributing zakat or sadaqah (charity) through official institutions and investing in Islamic bonds is a more strategic and long-term solution than contributing to individuals.

Nevertheless, there are a number of obstacles in this regard, such as inefficiency, a lack of transparency in how the funds are gathered, managed, and distributed, and the differing viewpoints of Islamic scholars on how things should be handled in terms of the judgments or fatwas. All of these factors contribute to a lack of trust in the system. The author of this piece fails to highlight blockchain as a novel means of managing Islamic finances, such as the Zakat administration on the blockchain. The use of blockchain technology, however, boosts donor confidence and removes opaque processes. As reported by (Gratiyana Ningrat, 2018)."Legal Information Management" is another work by Rust Kimberley. The potential for blockchain,

probably the most studied and upbeat movement in finance technology, to revolutionize legal technology (Legal service) is described. Furthermore, the technology supporting cryptocurrencies has been designated as distributed ledger technology (DLT). Blockchain, a form of distributed ledger technology (DLT), enables the safe decentralization of irreversible peer-to-peer transactions and offers an indelible, transparent record of each transaction. The security and dependability of blockchain for the distribution of zakat funds are increased by noting that Rust Kimberley does not mean that the technology is indestructible and erasable. (Rust Kimberley, 2019).

To better collect Islamic philanthropic contributions, the International Shariah Research Academy for Islamic Finance (ISRA) is looking for relevant partners to test out a blockchain initiative called ZakatTech blockchain. ISRA and SysCode Sdn. Bhd., a software development company specializing in the development of customized cloud-based business solutions, has teamed up on a project that will allow donations to be traced from the time they are received until they are dispersed.

The primary objective is to boost community confidence in order to boost revenue and successfully distribute zakat in order to raise society's economic standing. Since cooperation is crucial to the success of this platform, we are certain that it may complement existing Islamic FinTech or Halal projects rather than competing with them. SysCode's CEO, Reza Ismail, stated, "We are developing a platform that we believe could bring an unprecedented level of trust and transparency to the entire ecosystem." On the other hand, the researcher wants to show off some novel ways to use blockchain technology to distribute zakat funds, like helping the needy and poor by providing for their basic needs like health care and education through the use of a technological management platform like blockchain. (ISRA, 2019).

The literature research made clear the difficulties and hindrances that zakat organizations face, notably the inefficiency with which zakat money is dispersed. Consequently, many of the techniques were still undiscovered. There isn't enough material out there that explains how to deal with problems linked to the distribution of zakat funds, which might hinder future zakat administration. Nevertheless, the authors of the present study aimed to provide a novel zakat management strategy that makes use of blockchain technology. With regards to establishing entire ownership or talk (Ownership), shifting zakat money, and transferring zakat funds directly without a ruler or government intervention, using blockchain for zakat administration creates a variety of fiqhi (Islamic jurisprudence) challenges.

2.2. Islamic Financial Technology

According to Aaron et al. (2017), financial technology (FinTech) refers to the use of digital technology to address problems with financial intermediation. Banks and other financial institutions are entering a new age of financial services as a result of the growth of FinTech (Milian et al., 2019). As a financial middleman for society and in people's day-to-day lives all across the world, fintech is important. With a population of almost 1.8 billion, Islam is the fastest-growing religion in the world. According to Lipka and Hackett (2017), in the next few years, Muslim populations will surpass those of Christian denominations. With a growing population comes a growing need for all goods that follow the Quran and hadith as the sources of Islamic law. One of the breakthroughs in Islamic finance was made possible by technical and internet developments in Islamic financial technology (Fintech). In order to reach as many people as possible with financial inclusion, fintech promotes itself as a solution. Due to its Sharia compliance, transparency, and mutually beneficial nature, Islamic Fintech differs from its traditional equivalent (Kelana, 2018).

Indonesia is positioned to become the hub of Islamic finance technology since it is the most populous Muslim nation worldwide. Only three Islamic Fintech P2P lenders were among the 64 Fintech businesses that the Financial Service Authority of the Republic of Indonesia (OJK) registered. Aldila (2018) provides a list of these businesses, which include PT Ammana Fintek Syariah (Ammana), PT Dana Syariah Indonesia (Dana Syariah), and PT Investree Radhika Jaya (Investree). There haven't been many academic studies on Islamic Fintech up to this point due to the relative youth of Fintech in general. The academics who have studied Islamic Fintech include Alaabed and Mirakhor (2017), Firmansyah and Ramdani (2018), and Ulya (2018), to name a few. Alaabed and Mirakhor (2017) looked at how Fintech may be used to speed the

adoption of Islamic finance that is based on risk sharing. They said that because financial technology reduces uneven maturity and leverage—two major threats to the banking industry—it is more in line with the spirit of Sharia. Firmansyah and Ramdani examined the Indonesian Islamic Fintech firm Angsur in 2018. They said that Angsur and Islamic Fintech provide cutting-edge solutions to advance financial inclusion and address important societal challenges. Peer-to-peer lending in particular is not yet sufficiently regulated by Islamic Fintech, according to Ulya (2018). There is a chance for future regulation improvement as a result.

Islamic banking is gaining popularity among both Muslims and non-Muslims worldwide. 2018 (Reuters) The development of Islamic finance is projected to be significantly impacted by the availability of financial technology (FinTech). According to the Dubai Islamic Economy Development Centre (2018) throughout the world, technology and automation have taken on significant roles in the financial services industry. Information and communications technologies (ICTs), according to Marszk and Lechman (2018), have a significant impact on the economic and social climate of the modern world. FinTech, according to (Huei et al., 2018), has significantly altered how individuals manage their finances. This is evident from the fact that funding for FinTech firms globally has increased, reaching $4,256,202 million in 2018. The total value of all transactions is anticipated to rise by 17% annually to $7,971,957 million by 2022 (KPMG, 2019).

According to Asmy et al. (2018), the increased use of technology in financial services is due to a number of factors, including increased bank efficiency due to decreased opportunity costs and increased customer satisfaction because people can access financial services whenever they need them and from any location as long as they have internet access. Additionally, a number of studies—including those by Solomon et al. (2013), Huei et al. (2018), Gupta and Xia (2018), Ryu (2018), Zhang et al. (2018), and Asmy et al. (2019)—show that FinTech improves transparency, accessibility, flexibility, risk management, and shareholder returns. The number of people who have access to mobile services is increasing, which also adds to FinTech's rapid expansion. By 2025, the number of mobile internet users is expected to approach five billion, according to the Global System for Mobile Communications Association (GSMA); as a result, the FinTech sector is expected to grow rapidly (Beyene Fanta and Makino, 2019).

The biggest Muslim nation in the world, Indonesia, is predicted to become a hub for Islamic finance and a FinTech hub. (Hendratmi and others, 2019) Indonesia, which is acquiring a positive reputation as a country with digital economic potential among international investors, is seeing tremendous growth in the fintech sector. The Islamic FinTech Association of the nation has 93 firms registered with it, 31 of which have their headquarters there, making Indonesia the country with the most startups globally, according to the Dubai Islamic Economy Development Centre (2018). According to KPMG (2019), Indonesia is home to over 167 FinTech companies that have received a total investment of $182,3 million. A total of $176.75 million in reported FinTech investments were made in 2017, $22,338 million in transactions were made in the FinTech business in 2018, and a 16.3 percent yearly increase is predicted for transaction value (Fintechnews, 2018).

2.3. Blockchain Technology

A blockchain is a distributed database that uses encryption and a consensus process to record and verify transactions and other types of data (Swan, 2015). Bitcoin is a digital currency built on a data structure called a blockchain, which was developed in 2008 by Satoshi Nakamoto, an anonymous author of the Bitcoin white paper. Participants in the chain maintain an electronic distributed ledger or list of entries using a distributed computing network. To handle and validate ledger transactions, blockchains employ cryptography. One major benefit of this decentralized structure in a business setting is that it allows for greater transparency and responsibility among stakeholders whose interests may not be perfectly matched. The requirement for time-consuming and error-prone reconciliation with each party's internal records is eliminated when data that is significant to all parties may be updated in real-time (Casey and Wong, 2017).

As a result, all participants in the network have access to more complete and timely information about all network activity. Scholars in the field of Operations and Supply Chain Management (OSCM) are beginning to pay more attention to it since it can be a source of large data that is useful to businesses and supply

chains (see, for example, Kache and Seuring, 2017). Transparency, efficiency, and confidence in information sharing are all boosted by a blockchain's encoding and encryption of data (Misra, 2018). According to the research of Pattison (2017), four primary elements make up a blockchain.

First, it's perfect for business networks that involve multiple companies, like supply chains or financial cooperatives, because its decentralized and synced nature encourages data sharing among them. Second, smart contracts, which are agreements between parties and are recorded in a blockchain, are present in blockchains. Smart contracts are computer protocols designed to digitally enable, verify, or enforce the agreed-upon conditions of a contract, so enabling trustworthy transactions with no need for intervening third parties. Depending on the protocol, certain actions, including payments, may be allowed or disallowed (Pilkington, 2016).

In addition to the payment itself, smart contracts can establish other functions and criteria, such as the validation of assets in a range of transactions including non-monetary factors (Reyna et al., 2018). These functions and criteria can be satisfied by a cryptocurrency. As a result, participants in the network can be assured that everyone is acting lawfully. Third, since the blockchain is established utilizing P2P networks, all necessary parties must agree that a transaction is valid for it to be recorded. This helps to prevent fraudulent or erroneous transactions from being recorded. Fourthly, immutability ensures that all transactions are documented and cannot be changed after they have been agreed upon. This allows for the provenance of assets, or the ability to trace the whereabouts and history of a certain possession at any given time. Blockchains can be either public (like Bitcoin) or private (with user permissions). The primary distinction is in the network's membership requirements and restrictions. Anyone can access and take part in a public blockchain because of its open nature. In most networks, joining is rewarded in some way to increase the number of users.

Bitcoin is one of the most widely used public blockchain networks currently being developed. A public blockchain has the disadvantage of requiring a lot of computing power to keep a big, distributed ledger operational. In order to verify that all nodes are in sync, consensus requires that each node in the network solve a difficult cryptographic task known as a "Proof of Work" (PoW). Alternatively, the blockchain's permission structure and the nature of the protocol itself determine whether a Proof of Stake or Proof of Authority (PoA) should be utilized (Angrish et al., 2018). Private blockchains, on the other hand, are invitation-only and need user verification before participation. Private, permission-based networks are preferred by businesses (and their supply chains) over public, open networks (Pilkington, 2016).

Existing participants may decide future entrants based on a set of rules established by the network initiator; a regulatory authority may grant licenses for participation; or a consortium may make the decisions instead. After joining the network, each participant will independently contribute to the blockchain's ongoing decentralized operation.

2.4. Blockchain In the Financial Sector

Unsurprisingly, given that this is where technology began, the financial industry has seen the greatest number of blockchain uses. To enable the decentralized P2P digital money network Bitcoin, for instance, was developed. Bitcoin makes it possible for anonymous, unregulated transactions to take place on a multibillion-dollar worldwide scale. There are various regulatory difficulties involving national governments and financial organizations that must be resolved because there are no middlemen or intermediates, such as banks. Each Bitcoin transaction is verified before it is broadcast to all network nodes and added to a public ledger (Crosby et al., 2016).

Additionally, the use of smart contracts and blockchain technology is becoming increasingly widespread to monitor financial transactions, manage bank guarantees, and prevent fraud. These distributed ledgers may record many different types of digital assets, which enables them to serve many different purposes.

2.5. Blockchain Technology in The Financial Sector

Blockchain applications are starting to spread outside of the financial industry, and technology is starting to change a number of other businesses. For example, electronic medical records kept on a blockchain are used to improve authentication, confidentiality, and data exchange in the healthcare industry (Armstrong, 2018). Blockchain is also used to track the status of patients after they are released from the hospital. In the meanwhile, Forbes highlighted a wide range of additional businesses that have already benefited from the blockchain or may do so in the future (Marr, 2018). For instance, with the charity (Zakat, Sadaqat) sector under examination, blockchain can increase the openness of charitable donations and make the connections between charitable giving and project success more obvious.

According to Marr (2018), blockchains have the potential to monitor the complicated legal process that, in the case of property (Waqf), adds complexity and expense to the process of transferring real estate. (Chakrabarti & Chaudhuri, 2017) Blockchain technology is being implemented in the retail industry to improve track-and-trace processes, intricate loyalty schemes, and even decentralized marketplaces, which are places where products and services may be traded without the involvement of intermediaries.

The removal of middlemen is being explored in the tourist industry for real-time transportation and car sharing, as well as for effectively tracking and trading empty hotel room stocks. Blockchain technology allows for the monitoring of intellectual property rights as well as payments made to artists working in the media and entertainment industry. According to Dutra et al. (2018), they can also make it simpler to keep a record of who owns which artworks created by artists. According to Osgood (2016), the use of blockchain technology in the public sector has the potential to strengthen identity verification and raise voter trust, therefore improving the democratic process.

Global examples of extensive governmental interactions with blockchain include Dubai's ambition to become the first blockchain-powered state and its exploitation of opportunities in the areas of health records, shipping, and business registrations (Dutt D'Cunha, 2017); Estonia's establishment of a new data center that moves public records onto the blockchain (e-estonia, 2018); and South Korea's use of blockchain to manage public safety and transportation applications (Plunkett, 2017).

Many proponents of blockchain technology have highlighted its advantages. For instance, blockchain promises to increase transparency, speed, and responsiveness, is adaptable, i.e., usable for any transaction, operates on consensus with no disputes because everyone has a copy of the ledger, and automatically initiates payments. However, there are also skeptics of the technology who are pessimistic about its potential.

2.6. Blockchain Technology in The Non-Financial Sector

With blockchain applications starting to move outside the banking industry, technology is starting to change a number of other industries. For example, electronic medical records kept on a blockchain have been utilized to improve authentication, confidentiality, and data exchange in the healthcare industry (Armstrong, 2018). Blockchain is also used to track the development of patients after they are discharged from the hospital. Meanwhile, Forbes has listed several other businesses that have benefited from blockchain technology or may do so in the future (Marr, 2018). In the case of the under-review charity (Zakat, Sadaqat) sector, blockchain can make charitable donations more transparent and make the connections between charitable giving and project outcomes more obvious. Blockchains in the realm of property (Waqf) can track the convoluted legal procedure that, in the absence of such technology, causes friction and expense during real estate transactions (Marr, 2018). In 2017 (Chakrabarti and Chaudhuri). Blockchain technology is being used by the retail sector to enhance complex loyalty programmes, track-and-trace procedures, and even decentralized markets where goods and services are traded without middlemen.

Blockchain technology implementation costs are viewed with scepticism. For instance, Hackius and Petersen (2017) found that logisticians have trouble locating scenarios that sufficiently illustrate the benefits of blockchain to justify the cost and duration of the deployment. Finally, smart contracts have come under fire. They are only as good as their creators and ignore social contexts vital to the kind of sustainable supply chain management that blockchain is supposed to facilitate. For example, the quality of a blockchain's

immutability depends on the quality of the underlying contracts, which can be compromised by incorrect coding. Values and aspirations are more difficult to reach a consensus on than objective facts. Since blockchain has both supporters and critics, a more neutral assessment of its value is required.

Blockchain technology is predicted to be very valuable and have a bright future for overcoming the Zakat institution problem. To protect their constituents, especially those receiving muzakki and Mustahiq zakat, zakat institutions now have a rudimentary security system in place. Some Muzakki provides zakat personally as opposed to through institutions because they don't trust zakat institutions. Therefore, it is believed that the adoption of blockchain technology would boost public confidence in Zakat organizations. In addition, if fintech or blockchain can offer a monitoring system that can control the distribution of zakat monies, it would surely improve the efficiency and organization of zakat administration.

Zakat is indispensable to Muslims. Allah SWT has emphasized the necessity of zakat payment by mentioning it 82 times alongside prayers in the sacred Quran. The administration of zakat includes its planning, organization, distribution, and utilization. (Razimi et al., 2016) In Malaysia, zakat is regulated and administered by State Islamic Religion Councils (SIRCs), whose main objective is to centralize all Islamic religious activities at the state level. SIRCs also join Sultan's advisory councils for Islamic affairs (Owolabi Yusuf et al., 2013). Restrictions are preventing the federal government from interfering with state-level decisions and zakat collection. Privatization of the zakat institution aims to maximize the use of state-mandated administration by employing a specialized computer software platform to allocate asnaf into a database and reducing the bureaucracy that could delay the zakat distribution process. (Razimi et al., 2016).

Zakat is an essential aspect of Islamic almsgiving. As the third pillar of Islam, zakat mandates all Muslims who qualify (Muzakki) to purify their possessions by distributing zakat to those who deserve it (Mustahiq). In addition to aiding the Mustahiq economy, the primary purpose of zakat is to function as a balancing force in a country's economic sector. The primary objective of the zakat administration is to entirely convert Mustahiq (zakat recipients) into Muzakki (zakat givers). It demonstrates that zakat can assist a nation in eradicating economic disparity and destitution. (2016), Publication Division and Puskas BAZNAS Network. Implementing a cryptocurrency-based zakat payment platform must be following a valid fatwa issued by a qualified mufti. In Malaysia, zakat institutions are compelled to adhere to fatwas issued by state muftis. If the relevant fatwa stipulates that zakat payments can be made using cryptocurrencies, zakat institutions must consult with religious scholars and technical experts to determine if it is feasible to establish such a payment mechanism. If a decision is made to move forward, the team may then develop the implementation plan (Yusof, 2021).

Zakat, as a highly successful tool for poverty reduction and social problem solving, can be used and optimized within the context of possible blockchain technology use, just as digital wallets should be used and optimized. (Salleh, Abdul Rasid, & Basiruddin, 2019). In 2019, the ISRA and SysCode launched a collaborative project called "Zakat Tech." This project enables the tracking of funds from collection to distribution through the Zakat administration process. (IFN Fintech, 2019) Based on digitalization, information management technology can be utilized to monitor and control the operations strategy, planning, problem-solving processes, and management control (Laudon, 1995), Included in the management of social finances such as zakat as inputs to production to ensure efficiency and optimization, adopting applications, online zakat payments, and Zakat computer systems can increase performance and assist the zakat management process (Razimi et al., 2016), and encourage innovation and modernization.

Zakat, as an Islamic model of social finance, is going to be moving toward financial technology in order to facilitate the collection and distribution of zakat funds (Salma Al Azizah & Choirin, 2019). Through an online portal, zakat payers will be able to compute their zakat amount, make payments, and track their payments via an online platform (Ahmad et al., 2014). As a result, financial technology will give its users a flexible and friendly system that is effective, efficient, transparent, and speedy (Salma Al Azizah & Choirin, 2019). Finally, it may contribute to the financial industry's innovation in terms of goods and services. Salma Al Azizah and Choirin (2019) have found that the deployment of technology improves the collection and

redistribution of zakat funds in Indonesia. As a result, the use of technology to manage zakat funds is becoming more prevalent, as it can enable both best practices and the effective implementation of Islamic social finance (Nur et al., 2019).

Blockchain technology has considerable promise for usage in Islamic philanthropy because it delivers the following benefits: (1) Transparency: Blockchain enables the origin, traceability, and transparency of transactions; (2) Control: The whitelist is accessible only to recognized people. (3) Security: Once data has been input, the digital ledger cannot be altered or tampered with. The possibilities of fraud are extremely slim and easily detectable; (4) Real-time information: When information is added, it is updated simultaneously for all users on thenetwork (Hamdani, 2020).

3. METHODOLOGY

This is a qualitative investigation. Using a comprehensive literature review, it identifies and analyses the function of Blockchain technology in Zakat institutions, as well as the current challenge encountered by these institutions when adopting Blockchain technology. The systematic review of the literature focuses on blockchain technology's application to Zakat. Consequently, it is essential to review theses, articles, and books written in this discipline. This study examines recent publications on blockchain technology, Blockchain on zakat, Islamic Financial Technology, Blockchain technology, Blockchain in the financial sector, Blockchain technology in the financial sector, and Blockchain technology in the non-financial sector to conduct a systematic literature review. The article search was limited to scholarly works. Using the library's database, Google Scholar, and the Emerald Insight database, the search is conducted for relevant, primarily peer-reviewed articles, using the appropriate filters and keywords. The paper examines the function of Blockchain technology in Zakat institutions from 2018 to the present. The analytical outcome of this literature review generates numerous funding-related discussions.

4. FINDING AND DISCUSSION

4.1. Blockchain And Smart Contract

Technological advances are accelerating in the industrial era 4.0, driving the financial industry into the digital age. Additionally, financial sector developments have transformed the financial business into a technology-driven industry. As Milian et al. (2019) mention, the presence of Financial Technology (FinTech) will be able to bring about significant changes in the Islamic financial institution industry, where he believes FinTech will play an essential role as a financial intermediary for society and in the daily activities of people worldwide, implying a new era in financial services. However, not only is conventional FinTech advancing; but Sharia-compliant FinTech is also growing and evolving. Due to the significant growth of the Muslim market globally now, FinTech startups in several countries are leveraging this opportunity to develop Islamic Fintech innovations. As with the non-technology financial market, these two FinTech have distinct contrasts. Because Sharia FinTech transactions must adhere to Sharia standards for both rules and contract conditions.

Blockchain technology has attracted significant attention from financial industry players and is growing rapidly in recent years. To put it simply, blockchain technologyis a distributed database system that securely records transactional data or other types of information and is governed by a consensus protocol (Swan, 2015). Blockchain technology is adata format that consists of a chain of data recordings called blocks. The chain is a distributed electronic ledger or a list of entries maintained by users or participants via a network of computers. Blockchains rely on cryptography to process and validate transactions on the ledger. Hence, blockchain technology will promote efficiency and transparency by ensuring that all parties involved in the technology perform the same function and role and that no single party holds absolute control over the system.

According to the definition above, one of the primary characteristics of blockchain technology is its decentralized structure. It is indisputable that both businesses and financial institutions are currently adopting a centralized data management system in which the institution maintains complete control over all

data and only a few clients or parties have access to it. As a result, blockchain technology was born in response to a variety of stakeholders' worries about the operation of a centralized system. To store blockchain data, blockchain technology makes use of a distributed network of nodes. This means that the majority of blockchain data will be kept on thousands of unique devices connected to a large network. This approach assures that data is very resistant to technical failures and that all entities in the system have equitable access. In its applicability to financial institutions since it is nearly impossible to reverse verified blocks. Once company data (financial/personal/and other data) has been recorded in the system, it is very hard to erase or reverse. Therefore, blockchain is often regarded as one of the most secure and efficient systems for storing financial information. Financial institutions can also utilize this technology to store other types of data that require an audit trail since each step is permanent and recorded in a distributed public ledger.

Another aspect of blockchain technology that should be addressed is smart contracts. As is commonly known, a contract is one of the legal requirements for commercial and financial transactions. Contractual agreements are the critical facilitators of commerce and trade because they record mutually agreed-upon rules to execute or resolve disputes (Hazik & Hassnian, 2019). Generally, the legality of any traditional contractual arrangement is confirmed through the approval of each party involved, either through a signature or through other written records that are binding on all parties to the contract. Certain parties contend that traditional contracts written on physical paper are susceptible to non-transparency, fraud, and slowness (Rejeb, 2020). As a result, some articles (Chong, 2021; Rejeb, 2020; Hazik & Hassnian, 2019) argued that by using smart contracts on blockchain technology, transactions will be more independent, transparent, and hence less expensive and more dependable, as they are the outcome of a programming process.

Nick Szabo introduced the idea of smart contracts in blockchain technology in 1997. In its simplest form, a smart contract is an agreement between two parties written in computer code. And since smart contracts operate on the blockchain network, they are permanently kept in a public database. Additionally, smart contracts are automated transactions (validated using blockchain technology), a type of digitized legal contract that is computationally confirmed using counterparty digital signatures. It is legally binding over all parties involved in digitally authenticating these contracts. In contrast to traditional contracts, since transactions in a smart contract are handled by the blockchain, the smart contract may be implemented automatically and without the involvement of a third party. Furthermore, Hazik & Hassnian (2019) noted that smart contracts based on distributed ledger technology (blockchain) have the potential to boost efficiency and performance while reducing expenses associated with traditional contracts.

Furthermore, smart contracts are computer mechanisms used to facilitate, authenticate, and enforce the negotiation digitally. It is a computer protocol that facilitates, validates, and executes an agreement digitally and arbitrates the contract's consensus (Chong, 2021). Now, several institutions across a variety of industries are implementing smart contracts, including the financial industry, insurance services, credit authorization, legal processes, and even crowdfunding. Several insurance organizations, like Atlas Insurance in Malta and Axa in France, tested their smart contracts in 2017. They have developed prototypes that compensate airline customers who experience flight delays. Additionally, smart contracts are frequently used in the health industry, such as Encrypgen. This is an application that utilizes a smart contract to securely send patient data, preventing third-party access.

4.2. Blockchain on Zakat

The advancement of technology through innovation and digitization is affecting nearly every industry, as well as financial institutions, including Zakat (Salleh & Chowdhury, 2020). Zakat is a critical concept in Islam and is included in the five pillars of Islam. Zakat is also an important factor in financial concerns. By and large, paying zakat indicates that a Muslim has used the excess wealth they possessed for a year. The law of paying zakat itself is mandatory. Every Muslim who satisfies the conditions are required to pay Zakat. Apart from carrying out Allah Subhanahu wa Ta'ala's commands, the goal of zakat is to aid Muslims in need. Therefore, Islamic law gives great attention and provides a high position to the worship of zakat. The application of financial technology into Zakat institutions would give its users adaptable and user-friendly

solutions, as well as effective, efficient, transparent, and rapid services.

Accordingly, the use of technology to manage zakat funds is popular at the moment, as it can support best practices and successfully implement Islamic social finance (Salleh & Chowdhury, 2020). Public and private organizations like charities, endowment funds, and zakatfunds are embracing technology to promote robust financial inclusion. Additionally, the use of financial technology in transaction processes and zakat receipts does not violate Islamic principles under certain circumstances (Utami, Basrowi, & Julianas, 2019). As a result, variousZakat organizations have integrated technology into their operations, including collecting and distributing Zakat funds.

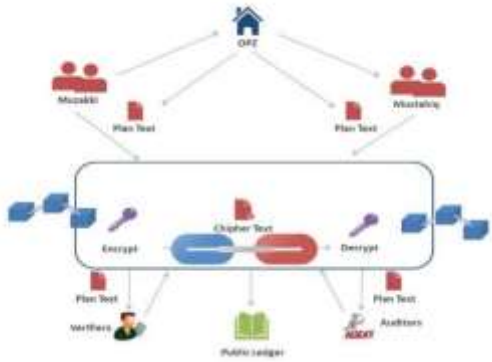

Figure 1: Blockchain on Zakat

Source: Hamdani (2020) & author's compilation (2023).

As a repository of interconnected data chains, Blockchain necessitates the incorporation of multiple primary databases, including (1) muzaki data, (2) mustahiq data, (3) reports on donations of collected funds, (4) reports on the distribution of funds, and (5) data on amil administrators. In addition, the collated data will be validated online and added to the blockchain platform.

Several Zakat organizations, such as the Indonesian National Zakat Agency (BAZNAZ), theIslamic Religious Council of the Federal Territory of Malaysia (MAIWP), the Australian National Zakat Foundation, and many others in other countries, have implemented FinTech technology into their business. Most of these Zakat authorities have integrated FinTech into their fundraising, distribution, and fund management operations. Numerous FinTechs have been employed to manage Zakat funds, including Internet banking, mobile banking, online platforms, crowdfunding, and collaboration with several FinTech institutions. Hence, the presence of FinTech in Zakat institutions is an advantage and a plus that may be leveraged to maximize Zakat's potential absorption. Additionally, the responsibility of Zakat institutions in following FinTech development trends is vital, as failing to do so would have a significant impact on the success of Zakat fund management.

When it comes to blockchain technology, the characteristics of blockchain technology, such as transparency and smart contracts, enable businesses in a wide variety of sectors to continue growing and accelerate economic activity effectively and efficiently (Salleh & Chowdhury, 2020). This innovation encompasses not only the economic and financial sectors but also the private and public non-financial sectors, such as Zakat institutions (Islamic social finance), to achieve optimal collection and distribution via an online platform. As a very successful instrument for reducing poverty and resolving social problems, Zakat may be utilized and maximized through the potential use of blockchain technology (Salleh, Abdul Rasid, & Basiruddin, 2019).

Several institutions have recently developed a blockchain-based zakat management model. In 2019, the International Shariah Research Academy for Islamic Finance (ISRA) launched the "ZakatTech" project in collaboration with SysCode (ISRA Report, 2019). ZakatTech is a blockchain-based, shariah-compliant Zakat platform. ISRA-Syscode's mission isto create a blockchain platform to strengthen Shariah compliance. The blockchain platform is built on a federated blockchain environment powered by the Hyperledger Fabric, with

its rootnodes running on Microsoft's Azure Cloud Platform. This platform will act as a trusted intermediary in inter-party transactions. Each environment is configured with a unique set of assets and smart contracts that govern the creation and transaction of those assets. The purpose of the ZakatTech Blockchain is to enable the tracking of funds throughout their entirelifecycle, from donation to distribution.

Along with ISRA, FInterra, a technology startup focused on developing blockchain-based Islamic apps that address global challenges, has developed a blockchain-based Zakat platform. Finterra Zakat Chain is the platform that was developed. It is a blockchain-based platform. The platform will manage the complete series of zakat fund management activities on a cloud-based platform, from fund collection to fund distribution, zakat computation, zakat payment, and zakat monitoring. The platform's use of blockchain technology enables it to give transparency and traceability to all parties involved. Additionally, The Zakat Chain will provide periodic reports to all users.

Based on several blockchain-based Zakat platforms above, we can see that blockchain technology is well suited to the Zakat institutions that require effective tools in the process of collecting and distributing Zakat funds. As is well known, despite the enormous potential of Zakat funds, particularly in Muslim countries, many Zakat organizations continue to struggle to realize this potential, with the reality of Zakat fund collection being extremely low. For instance, as the nation with the most prominent Muslim population and one of the top ten economies globally, Indonesia has tremendous potential for advancement in a variety of areas, one of which is in the field of Zakat. Numerous studies on Zakat's potential have been undertaken. Although the capacity for zakat collection differs, the overall analysis concludes that the potential for zakat collection in Indonesia exceeds IDR200 trillion, as conveyed by Dr. Irfan Syauqi Beik, Director of Distribution and Utilization of BAZNAS RI. However, despite the enormous potential, the national realization of zakat funds remains extremely low. According to a BAZNAS study published in 2019, the entire national realization of zakat funds has reachedonly 4.36 percent. Moreover, the distribution of Zakat funds is another problem that many Zakat institutions also experience.

As a result, numerous academics have attempted to develop several models for integrating blockchain technology into the modus operandi of charities and donation industries to address issues with the current management of Zakat funds by leveraging the features and benefits of blockchain technology. An & Seo (2018) created a blockchain-based contribution system to overcome the present donation system's security flaw. Additionally, the concept includes a fundraising organization and details an organized mechanism for converting Bitcoin to fiat cash. (Farooq, Khan, & Abid, 2020) created a management platform for charity collecting and distribution by utilizing a blockchain network and its components, including initial coin offerings (ICO), crypto wallets, the IPFS protocol, and smart contracts. Lee, Seo, Kim, and Jeong (2018) developed a blockchain contribution framework that aims to increase transaction security by encrypting stakeholders' personal information. They accomplished it by establishing a privacy protection mechanism using the P2P mixing approach. And Hu & Li (2020) presented the platform's design concept, architecture, and operational method in order to establish a token-based blockchain charity system. These contributions, which are built on numerous components and techniques of blockchain technology, enable the construction of dynamic, digital, dependable, and transparent donation systems that inspire donor confidenceand trust (Rejeb, 2020).

Therefore, the idea of applying blockchain technology to the management of Zakat funds is currently being developed. There are several reasons why blockchain technology can help manage funding and distribution of zakat funds more effectively and efficiently, in the following table:

Table 1: Reasons why blockchain technology can help manage funds.

(1) Decentralization	The management of the Zakat database so far is still mostly centralized in Zakat institutions. With blockchain technology, this technology will use a distributed network of nodes to store blockchain data. This means that most of the Zakat blockchain database will be stored on thousands of different devices in a widely distributed network. This system makes the Zakat database highly resistant to technical failures and ensures that the Zakat database remains safe from malicious attacks.
(2) Transparency	One of the things that often gets a lot of criticism in Zakat funds management is the transparency of Zakat funds. Every Zakat transaction history will become more transparent when using blockchain technology, whether it's the collection or distribution process. This is because Blockchain is a decentralized ledger system; everyone on a network has the same list of data. This shared data list can only be updated through a consensus mechanism, where everyone must agree if there is a change. Thus, the Zakat database stored on the blockchain becomes more accurate, consistent, and transparent when compared to current technology. This data can also be accessed by everyone who has access permission.
(3) Security	Blockchain technology has several features that make it more secure in terms of security than other recording systems. Transactions on the Blockchain must be approved before a transaction can be recorded. Once a transaction is approved and accepted, it is then encrypted and linked to the previous transaction
(4) Effectiveness and Efficiency	The process of managing Zakat funds so far requires a long process and time from the collection process to the distribution of Zakat funds to Mustahik. By smoothing the flow and automating the process of managing Zakat funds with Blockchain technology through smart contracts, transactions can be completed more quickly and efficiently. Because the information recording system is carried out using a digital ledger owned by many people in the network.
(5) Improved Traceability	Another advantage possessed by blockchain technology is Traceability, where all parties involved in managing Zakat funds from the government, zakat institutions, muzakki, and Mustahik will easily track how Zakat funds are managed and distributed.

4.3. Current Challenge

Apart from the development, potential, and advantages of blockchain technology in its application to Zakat institutions, the technology is still in its infancy and has several problems that must be addressed. In an ideal scenario, the blockchain industry would develop similarly to the cloud computing platform, in which core infrastructure components such as connectivity, processing, storage, and management systems were quickly defined and implemented to allow the industry to focus on developing value-added services rather than core infrastructure (Hazik & Hassnian, 2019). As a result, the use of blockchain technology in Zakat institutions will also confront several challenges. The following are some of the concerns that Zakat institutions will engage in implementing and managing Blockchain technology in the process of managing Zakat funds.

4.3.1. Regulatory Issues

The regulatory concern is one of the most significant obstacles to implementing innovations in financial institutions and non-bank financial institutions, including Zakat institutions. As is well known, financial institutions and non-bank financial institutions, including Zakat, are today faced with more complicated transaction developments because of ongoing technology advancements. To continue meeting increasingly complicated consumer needs, Zakat institutions must also innovate to grow and compete with other non-governmental organizations. As such, this global economy's dynamism requires a dynamic and innovative set of rules to promote and govern the Fintech industry following fair play, the rule of law, and best practices (Hazik & Hassnian, 2019). Thus, the development of products and services within the Zakat institution, such as blockchain

innovation, must be accompanied by appropriate regulation, whether on an international or national level, to maximize potential and renewable innovations.

Regulatory assistance creates an ecosystem that fosters and promotes the development of Zakat institutions' innovative business models. In a few Islamic countries, such as Malaysia and Indonesia, central banks and other relevant institutions will play a significant role in regulating blockchain technology. Similarly, it is possible that other organizations, such as international Islamic financial forums and influential organizations such as AAOIFI, IsDB, IFSB, ISRA, and IRTI, should start to discuss new ideas and collaborate with Islamic startups to improve regulations that will support the continued growth of Islamic Fintech ecosystems globally. Another critical aspect is the function of Shariah authorities. These institutions must also establish legislation governing FinTech and, more specifically, blockchain technology to ensure that all services and products offered by financial institutions and, more specifically, Zakat institutions, are shariah compliant.

4.3.2. Lack of Talent

Another major issue confronting the financial industry and social institutions such as Zakat is human resource issues. The issue of a shortage of skilled personnel is not new in this business. Islamic financial organizations and social organizations have frequently encountered this issue since their early establishment. Fintech is a sector of the financial services business that brings together information technology (IT) specialists, data analysts, businessmen, and programmers. This inflow of new and different qualified individuals into the financial and social services business diversifies and innovates the Fintech business and adds complexity. The inclusion of Shariah's expertise and knowledge of Islamic economics, finance, and society further constrains talent availability.

Thus, the Zakat institutions require someone knowledgeable about business, economics, finance, and Shariah and technical knowledge of modern technologies, particularly blockchain. One strategy to address the current need for qualified and professional human capital is to improve skilled human capital output through effective intellectual capital education in academics and research. Additionally, it is vital to connect academic courses to industrial demands in order to provide much-needed answers to real-world challenges. Although a few universities have begun offering courses as part of degree programs in conventional Fintech, Islamic finance degrees are still extremely rare. This is truly a grave situation that demands immediate response. When Fintech and innovation initiatives are implemented, industrial attachment programs for university students should be established. These programs should take the shape of internships, project partnerships, and exchange programs.

CONCLUSION

Blockchain technology is suitable for implementation in zakat institutions because it has the potential to significantly alter the landscape of zakat institutions. In this scenario, the role of amil zakat and Muzakki is critical in implementing zakat that is quality, accountable, professional, and efficient in distributing zakat to asnaf using blockchain technology. Since all data sources are tracked, blockchain technology is the answer to time and financial efficiency, and cryptocurrency technology gives Muzakki increased confidence in the zakat management carried out by amil.

Zakat institutions may partner with other financial technology (fintech) firms to raise zakat funds. The convenience of digital zakat payment and the rapid advancement of financial technology combine to create significant strength and potential.

However, Muslim scholars would need to make clear and precise conclusions about the Shariah compliance of certain technical features such as smart contracts and cryptocurrencies to establish future models for zakat or any other field of Islamic finance.

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