

Application of Blockchain and Smart Contracts in Zakat Management: Perspective of SWOT Analysis and Islamic Law

Farida Fatmawati¹, Nazih Sadatul Kahfi², Nagita Histimuna Aisyah³, Laily Nur Asyifa⁴

¹Walisono State Islamic University Semarang, Indonesia^{1,2,3,4}

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ABSTRACT

Zakat has great potential in improving the welfare of Indonesian society. Despite the huge potential of zakat in Indonesia, the reality is that the amount of zakat collected is still far from the potential, with the lack of transparency and digitalisation in zakat management as the main causes. This research aims to describe the application of blockchain technology and smart contracts as a solution to improve efficiency and accountability in zakat management seen from SWOT analysis and Islamic law. The research method used in this research uses a library research approach by reviewing and/or exploring several articles, books, and documents as well as other sources of data and/or information deemed relevant to the study. The results show that from the SWOT analysis, blockchain technology is a decentralised technology that offers transparency in recording zakat transactions that are secure and cannot be changed, while smart contracts can automate the distribution of zakat according to set criteria, without the need for a third party. This technology can accelerate the distribution of zakat and reduce the operational costs of zakat institutions, as well as increase public trust. However, the application of this technology requires adequate infrastructure and supporting regulations, as well as a better understanding of the benefits of blockchain technology and smart contracts from the public. From the perspective of Islamic law, the use of this technology is acceptable as long as it is in accordance with the principles of maqasid sharia, which emphasise justice, transparency and security.

Keywords: *Blockchain, Smart Contracts, Zakat Management, SWOT Analysis, Islamic Law*
JEL Classification: O2, O3

INTRODUCTION

Zakat has great potential to improve the welfare of Indonesian society and individuals as a whole. Zakat is an obligation to give a portion of one's wealth to those in need. With the majority of Indonesia's population being Muslim, there is a great opportunity to utilise zakat as a means of addressing poverty, reducing

income disparities, and supporting social justice (Musana 2023).

The distribution of zakat covers eight recipient groups (*asnaf samaniyah*), namely fakir, poor, amil, muallaf, riqab, gharim, fi sabilillah, and ibnu sabil. These groups, who are entitled to receive zakat (*mustahik zakat*), have been determined by Allah SWT in the Qur'an in the verse Q.S At Taubah: 60. Zakat is an important instrument in Islamic economics that aims to address the

problem of inequality in the welfare of society by empowering the poor. (Musana 2023).

The agency in charge of managing zakat is BAZNAS (Badan Amil Zakat Nasional) which in its duties is principled on accountability and transparency. Transparency is a crucial role holder in zakat management because it is directly related to accountability and public trust in zakat management institutions. Lack of transparency in the management of zakat has the potential to cause distrust from the public, which in turn can lead to the low amount of zakat funds collected (Yusra and Riyaldi 2020).

Reporting from the kemenag.com page, the potential for zakat in Indonesia in 2023 is far greater than the collected zakat. Based on the results of BAZNAS calculations released in March 2024, the potential for zakat in Indonesia is estimated to reach Rp 327 trillion in 2022. However, the realisation of zakat fund collection in 2023 only reached IDR 33 trillion, or about 10 per cent of the total potential. So there is a gap between the potential of zakat that should be with the fact of zakat funds that have been collected. This statement was reinforced by Gunawan Baharuddin, a postdoctoral fellow at BRIN's Centre for Macroeconomic and Financial Research, who said that zakat in Indonesia has the potential to be a sleeping giant because according to the results of a study, the potential of zakat in Indonesia is 327 trillion but in 2023 it will not reach 10%, only 20 trillion. One of the causes is the lack of transparency in the distribution of zakat funds. The factor of lack of transparency affects the trust of muzakki in paying zakat.

Research conducted by Hendri and Yuli Yusnita, showed a positive influence between the transparency of financial reports and the quality of zakat management on the level of muzakki trust. In other

words, the higher the transparency in financial reporting and management of zakat by the institution, the higher the level of trust of muzakki towards Baitul Maal Hidayatullah (BMH) Bengkulu Representative (Yusnita 2024). Based on the research results of Ilham Alivian et. al, there are several factors that cause low Zakat payments, including the need for digitalisation in Zakat, community resources in zakat are still not qualified, to the lack of transparency of zakat management institutions, the absence of mandatory Zakat government policies and the lack of Zakat infrastructure development (Alivian et al. 2023).

Therefore, the most crucial challenge of zakat institutions is to gain public trust by means of transparent zakat management that needs to be realised. In today's digital era, utilising technology for zakat management such as blockchain and smart contract, becomes relevant as a potential solution to improve transparency and efficiency in zakat management system. Blockchain is a decentralised technology that functions as a digital ledger that records all transactions in a network in a transparent and secure manner. In zakat management, blockchain enables permanent and transparent recording of zakat transactions. Every transaction, from collection to distribution of funds to mustahik (zakat recipients), is recorded in data blocks that cannot be changed or deleted. Meanwhile, smart contracts are automated programmes that run on top of the blockchain to execute agreements or transactions without third-party intervention. In the context of zakat, smart contracts can be used to automate the distribution of funds according to predetermined criteria, for example, distributing zakat to eligible mustahik directly and automatically.

From the background above, this research will examine how to analyse the application of blockchain and smart

contracts as a means of improving zakat management in terms of SWOT analysis and Islamic law studies.

LITERATURE REVIEW

Blockchain Technology in Zakat Management

Blockchain is a technology that allows concise data management and storage with a high level of security. This technology consists of a series of data blocks that are connected to each other through cryptographic encryption. As an innovation in the field of financial technology (fintech), blockchain is used for various purposes, such as managing transactions, payments and documents. This technology helps reduce transaction costs, improve operational efficiency, and strengthen transparency (Sulistiyaningsih, Vinia, and Majid 2024).

Blockchain has become widely recognised thanks to its application in cryptocurrency systems, such as Bitcoin. Blockchain is a distributed and transparent ledger of economic transactions that cannot be manipulated. Thus, it is unique in that it does not require an intermediary in every transaction, which makes it more transparent. Blockchain works on a decentralised system, where the ledger is spread across various nodes and eliminates the need for a third party. The advantages of this technology should not be limited to cryptocurrency transactions only (Online 2022).

The main difference between traditional databases and blockchain lies in their data structure. Blockchain stores information in units called blocks. Once data is added to a block, the block is closed and connected to the previous block, forming a series of data known as a blockchain. In contrast, conventional databases organise information in tables, while blockchains

arrange it in interconnected blocks. This structure results in an immutable data flow, especially when used in decentralised systems (AQSHA 2022).

Although zakat institutions are non-profit organisations, the development of a social platform based on blockchain technology is essential in their operations. It can increase transparency and make it easier for all parties to understand the process of zakat collection and distribution. In addition, zakat is one of the wealth accumulation tools available in Muslim countries, so the competence in managing and administering zakat collection should be at an optimal level.

The application of blockchain technology allows the distribution of zakat directly to individuals or families in need without going through complicated and protracted bureaucratic procedures. The verification process and targeting of zakat recipients can be done more accurately, thus ensuring that zakat reaches those who really need it. Blockchain can also automate the distribution of zakat, leading to savings in time, effort, and cost. Thus, transparency and accountability in zakat management can be maintained for more appropriate purposes. This has the potential to increase public trust in zakat management institutions and encourage greater participation in zakat collection. Zakat received can be allocated for small business capital, skills training, as well as activities that can improve the income and living standard of the community, which in turn can stimulate local economic growth.

Smart Contract in Zakat Management

Smart contracts are value transfer mechanisms governed by certain conditions and rules. Unlike traditional contracts, smart contracts are fully digital and consist of pre-programmed code stored on the blockchain. With the growth of blockchain

technology, smart contracts are becoming increasingly compatible with blockchain's decentralised system, allowing them to operate on every node of the network. Transactions using smart contracts are recorded on the blockchain without the need for intermediaries. Once certain conditions are met, the smart contract will run automatically (Musana 2023). So, smart contracts are computer programmes that run on top of blockchain technology and automatically execute agreements or transactions when predetermined conditions are met.

So, with smart contracts, zakat management can be done digitally, automatically, and without the need for many intermediaries, thus accelerating the process of distributing zakat to mustahik (zakat recipients).

METHODOLOGY

This research is a qualitative descriptive research by conducting an exploratory study of the analysis of the application of blockchain in zakat management in Indonesia along with its Islamic legal studies. According to Abdussamad, qualitative research methods are research methods used to study the state of natural objects where the main instrument is the main instrument, the data collection technique is triangulated, the data analysis is inductive, and the results of qualitative research emphasise meaning rather than generalisation (Abdussamad, 2021).

The type of data used in this study is secondary data. According to Sugiyono (2017), secondary data is data derived from literature, such as books and records relevant to the research being conducted. The data collection technique in this study uses the literature review method or literature study. Literature review has an important role as the basis for all types of research. It can act as a foundation for

knowledge development, set guidelines for policy and practice, and provide evidence of impact. In addition, if done well, it has the potential to generate new ideas and directions in the field (Snyder 2019).

RESULTS AND DISCUSSION

SWOT Analysis of Blockchain and Smart Contract in Zakat Management

SWOT analysis is a strategic planning tool used to evaluate internal factors consisting of strengths (Strengths) and weaknesses (Weaknesses), external factors consisting of opportunities (Opportunities) and threats (Threats) of an organisation, project, or specific situation. This analysis helps in understanding the internal and external factors that can affect the success or failure of a strategy or initiative (Freddy Rangkuty, 2016). Thus, SWOT analysis is a flexible tool that can be applied to a wide range of topics, including technology. By using SWOT for blockchain and smart contracts, it can identify various aspects of the application of these technologies, both in terms of opportunities and challenges faced. Here are the internal and external factors:

1. The Internal
 - a. Strengths:
 - 1) High Transparency

High transparency in zakat management with blockchain technology lies in its decentralised and open nature. Blockchain records every transaction permanently in a publicly accessible ledger. This means that all data related to zakat collection and distribution is stored in a network that can be audited by anyone without requiring special permission. Every donation, payment and distribution of zakat funds is recorded in immutable

blocks once verified, ensuring that the records are accurate and cannot be manipulated. In addition, by using smart contracts, the distribution of zakat funds can be set to take place automatically when certain conditions are met. This helps to minimise the risk of misuse of funds, as the distribution process becomes more transparent and guaranteed based on agreed terms.

2) Strong Security

Blockchain is encrypted, so the data stored on the blockchain is very difficult to change or falsify, so data security is more guaranteed. There are three main advantages of blockchain compared to other masking media: (1) it is anonymous and free to join, which means that communicating parties have free access; (2) transmitted data cannot be altered and, in particular, integrity guarantees are not provided by any centralised party, but rather the consensus of the entire network; and (3) published data cannot be deleted, which means that no authority can impose censorship on data that has been published. Since the blockchain is immutable, alteration of obfuscation messages is almost impossible, and the embedding of obfuscation information is free to be fragile (Tijan et al. 2019).

3) Cost Efficiency

The use of blockchain and smart contracts can reduce the need for intermediaries, thereby reducing operational costs. In industry, blockchain technology transactions can be initiated and conducted directly 'peer to peer'. As a result, industrial companies can cut costs

and speed up their processes to become more flexible.

The cost efficiency in zakat management using blockchain technology is based on blockchain's ability to reduce or even eliminate the need for intermediaries. In traditional systems, the collection and distribution of zakat often requires a third party, such as a bank or financial institution, to process the transaction. The presence of this intermediary can increase operational costs due to administrative fees, commissions, or other additional costs. With blockchain, all transactions can be done directly and decentralised. Every zakat payment and distribution is recorded in a secure and transparent blockchain network without the need for third-party verification. This lowers operational costs, including transaction and data management costs, and reduces the risk of human error in data processing. In addition, blockchain also facilitates real-time fund tracking and auditing, eliminating the need for time-consuming and costly manual audits.

4) Decentralization

Data is not centralised on one server, so the risk of system failure is lower and management can be done in a more decentralised manner. One of the main advantages of blockchain technology in zakat management is its decentralised nature. In the traditional system, data and information related to zakat collection and distribution are usually stored on a central server managed by zakat institutions. This centralised data management is at

risk of various problems, such as system failure due to server damage, cyber attacks, or potential data misappropriation due to centralised control. With blockchain, data is not stored on one central server, but rather distributed across various nodes or computers connected in a network. Every transaction related to the collection and distribution of zakat is recorded in a block, which is then propagated to all nodes in the network. Since the data is stored in multiple locations, blockchain ensures that the data remains secure and accessible even if there is a failure of one or more nodes in the network (Suryawijaya 2023).

b. Weaknesses:

1) Complex Infrastructure Needs

The implementation of blockchain and smart contracts requires sophisticated technological infrastructure and high initial costs. This high infrastructure requirement may discourage zakat institutions, especially small-scale ones, from transitioning to blockchain technology. The cost and complexity of the technology can be a major barrier, especially if the institution does not have access to the necessary financial resources or expertise (T 2024). Therefore, blockchain technology requires a sophisticated technology ecosystem, ranging from hardware, software, to technical expertise, which can add to the initial cost burden for zakat institutions that want to adopt this system. The lack of expertise makes this technology quite costly (Arwani and Priyadi 2024).

2. The Eksternal

a. Opportunities:

1) Increased Public Trust

The application of blockchain technology and smart contracts in zakat management offers great potential to increase public trust in zakat institutions. Blockchain, which allows the recording of transactions in a decentralised and immutable manner, guarantees that all transactions can be tracked and verified by the public. This provides a high level of transparency, which is one of the crucial aspects in increasing public trust, especially in the context of zakat fund management.

In addition, with smart contracts, zakat transactions can be processed automatically without third-party intervention, reducing the possibility of data misappropriation or manipulation. Smart contracts also ensure that the distributed zakat funds actually reach the rightful recipients, in accordance with the predetermined conditions, without any changes in the middle of the road. Musana, supporting this view, in his research, on the application of blockchain to zakat management argues that the use of blockchain can increase the transparency and accountability of zakat institutions, which ultimately encourages increased public trust (Musana 2023). Therefore, with the transparency, security and efficiency offered by blockchain and smart contracts, there is an opportunity to increase public trust in zakat institutions.

2) Efficient Fund Management

Blockchain can facilitate the management of zakat funds globally, allowing faster and more accurate distribution to mustahik in various

regions. Because with smart contracts, zakat management can be done digitally, automatically, and without the need for many intermediaries, thus accelerating the process of distributing zakat to mustahik (zakat recipients)

b. Threats:

1) Regulatory Uncertainty

In the Indonesian context, although zakat has enormous potential to improve social welfare, blockchain technology-based zakat management still faces difficulties in terms of supporting regulations. Without strong regulations, legal and compliance aspects become a major issue, especially in ensuring that the implementation of this technology is in accordance with sharia principles and acceptable to both zakat institutions and muzakki (zakat payers).

The application of blockchain and smart contracts, which has the potential to increase transparency and efficiency in zakat management, requires a clear legal basis so that zakat institutions can operate with full legitimacy and not face legal problems in the future. So far, there is no regulation that specifically regulates the utilisation of blockchain and smart contracts in the zakat sector, although there have been discussions related to more transparent zakat management through digital technology (Urfiyya 2021). The lack of clear regulations regarding the use of blockchain in philanthropic institutions such as zakat may create legal uncertainty and negatively impact the adoption of this technology.

2) Lack of Community Understanding

Research on the application of blockchain and smart contracts often reveals that one of the main obstacles faced is the general public's lack of understanding of these technologies. Although blockchain has been widely recognised in the financial sector, especially through the use of cryptocurrencies such as Bitcoin, knowledge of how blockchain works, its benefits, and its application in various sectors is still limited among the public. Moreover, blockchain technology and smart contracts are still relatively new to most people, especially in the context of zakat management, so more intensive education and socialisation are needed (Casino, Dasaklis, and Patsakis 2019).

Islamic Law Study on the Application of Blockchain and Smart Contract in Zakat Management

The implementation of blockchain technology in the financial sector and digital transactions has attracted the interest of Islamic scholars and jurists to examine its legality from a sharia perspective. Blockchain, which is a decentralised technology, stores data securely and transparently without the need for a central authority such as a bank. In the perspective of Islamic law, fundamental aspects such as *riba* (interest), *gharar* (uncertainty), and *maslahah* (benefit) are the main elements in determining the validity of a financial system. The authority plays a role in providing guidelines, fatwas, and certifications related to the application of blockchain technology in the context of Islamic economics (Muhammad Syahrul Hidayat, Agus Eko Sujianto, and Binti Nur Asiyah 2023). Supervision and endorsement by sharia authorities play an important role

in enhancing public confidence in blockchain-based financial systems. Meanwhile, hadiths relating to sharia principles in the financial system also provide relevant guidelines underpinning this practice,

From Abdullah bin Umar, the Prophet Muhammad said: ‘Two types of transactions are haram: gharar (uncertainty) and istibdal (gambling).’ (HR. Abu Dawud).

In terms of blockchain, the use of cryptocurrencies such as Bitcoin raises concerns for some scholars due to its speculative and volatile nature. This results in gharar as the fluctuating value of crypto assets has the potential to cause significant losses to users. However, blockchain, as a secure data storage technology, is considered to have significant potential to improve the level of transparency in financial transactions, especially through the use of smart contracts that can be aligned with sharia principles. From a Shariah perspective, technology has the potential to strengthen the security, transparency and efficiency aspects of financial transactions. Islamic banking, which is based on Islamic principles, prohibits the practice of usury (interest), speculation, and activities that are contrary to sharia provisions. These principles include fairness, transparency, compliance with the law, and validity of transactions. The application of blockchain technology in Islamic banking can enhance transparency and security, which in turn supports compliance with sharia principles in financial transactions (Bahanan and Wahyudi 2023). Security is an important aspect in financial transactions, especially in Islamic banking which is responsible for the management of customer funds.

In addition, the application of smart contracts in blockchain technology for Islamic financial transactions currently does not have a clear legal basis, in the form of fatwa guidelines from the Indonesian Ulama

Council (MUI). However, related to the mechanism of financial technology, MUI has issued guidelines through Fatwa No. 117/DSN-MUI/II/2018 regarding Information Technology-Based Financing Services Based on Sharia Principles. This fatwa serves as a guideline, but it is not legally binding like a law enacted by MUI (Maw Azmi 2023). Like any other technology, smart contracts need to be designed in line with Shariah principles to avoid doubts. Especially among Muslims, the implementation of smart contracts must be based on the principles of the Qur'an, Sunnah, al-Ijma', and al-Qiyas. In general, smart contracts must be free from the elements of maysir (gambling), gharar (uncertainty), and riba(usury). The implementation of blockchain technology in Islamic finance has the potential to increase transparency, as the decentralised nature and openness of transaction records allow all interested parties to track and verify transactions directly. This can strengthen trust and reduce the risk of fraud in the Islamic financial system (Arwani and Priyadi 2024). Blockchain also facilitates fast and low-cost money transfers, making it an efficient solution in financial services.

On the other hand, blockchain technology also provides opportunities for the application of Shariah principles in modern business models and financial transactions. One of them is through asset tokenisation, where real assets can be broken down into digital tokens that are easily traded securely and interest-free. This tokenisation supports Islamic finance as it enables asset management that is more scalable, transparent and accessible to a wide range of people, thereby reducing dependence on interest-based systems. In addition, smart contract technology that functions automatically through programming code can help fulfil the contractual provisions in Islamic

transactions, such as musyarakah (co-operation) and mudharabah (profit sharing), without intervention that is prone to manipulation. Blockchain consists of a ledger that records all transactions in a decentralised manner within a peer-to-peer network, allowing participants to transfer any desired amount. In addition, blockchain technology serves as a digital record that records every transaction spread across various computers (nodes). This system processes transactions without involving any particular party or organisation, thus increasing efficiency in transaction processing (Musana 2023). In this context, blockchain technology can serve as an effective tool to ensure that the Islamic financial system remains compliant with sharia principles.

Blockchain in the view of Islamic law does not contradict the maqasid principles of sharia which include aspects of preserving religion, soul, mind, offspring, and property (Musana 2023). The utilisation of blockchain to contribute is part of the preservation of religion and property. The Quran also senses the need for witnesses in transactions between two parties, with a minimum of two witnesses. Blockchain technology enables the existence of more than two witnesses in every transaction, as all users can monitor the changes that occur in the transaction. One of the main challenges is the complexity in managing transactions involving various financial instruments that are in accordance with sharia principles.

Therefore, an in-depth study and comprehensive understanding of the sharia aspects of financial transactions are required to ensure that the application of blockchain does not contain elements that contradict sharia principles. In addition, the development of standards and frameworks governing the use of blockchain technology in the Islamic economic system is also

crucial. These standards will set clear parameters and guidelines to ensure conformity with Shariah principles (Muhammad Syahrul Hidayat et al. 2023). Based on the comparative analysis between smart contracts and contracts in Islamic law, it can be concluded that smart contracts can fulfil the principles of agreements under Islamic law, provided that the contracts prioritise efficiency, security, and convenience, and ensure that the objects traded in the smart contracts are halal objects. Thus, the Islamic law analysis of blockchain underscores the need for a careful and selective approach, taking into account its specific applications and whether they are aligned with the core principles of sharia, namely fairness, honesty, and security for all parties involved.

RECOMMENDATIONS

The results of this study show that blockchain technology, with its decentralised and transparent nature, offers significant benefits in improving the transparency, security, and efficiency of zakat management. The implementation of blockchain in zakat institutions can reduce the need for intermediaries, reduce operational costs, and speed up the process of zakat distribution to the right recipients. By recording every transaction permanently and openly, this technology ensures better accountability, thus increasing public trust in zakat institutions.

Smart contract, which is an automated feature in blockchain, allows zakat transactions to be made directly based on certain conditions without the need for intermediaries. This provides an opportunity to distribute zakat efficiently and in a timely manner to mustahik (zakat recipients). Smart contracts also help to avoid data manipulation as any stipulations set in the contract can be processed automatically in

accordance with the desired principles of transparency and reliability.

However, there are challenges such as complex infrastructure requirements and public unfamiliarity with this technology. Therefore, there needs to be collaboration between zakat institutions, government, and technology providers to provide infrastructure support and socialise the benefits of this technology to the public. Regulations that support the application of blockchain in zakat management are also needed to ensure compliance with sharia principles and provide legal clarity for related parties.

In the context of Islamic law, the utilisation of blockchain and smart contracts can be allowed as long as their use is in accordance with the maqasid principles of sharia, which emphasise fairness, security and transparency. Through clear guidelines and fatwa from sharia authorities, the application of these technologies in zakat management can be further developed to support the improvement of social and economic welfare in the community.

CONCLUSION

Blockchain technology in zakat management brings significant innovation by improving transparency, security, efficiency, and decentralisation. Based on the SWOT analysis, the strengths, weaknesses, opportunities, and threats of the application of blockchain and smart contracts in zakat management are that with its distributed and transparent nature, it is able to store zakat transaction data permanently and can be accessed by the public, thus increasing public trust in zakat institutions. Smart contracts, which work automatically when certain conditions are met, allow for more efficient zakat distribution without the involvement of intermediaries, saving time and operational costs. Although this technology faces

challenges in the form of complex infrastructure requirements and regulatory uncertainty, its advantages in accountability and resilience to data manipulation make blockchain potentially support more optimal and sharia-compliant zakat management. Its application in Islamic finance needs in-depth study to be in line with sharia provisions, given the importance of maintaining the principles of fairness, transparency, and compliance with Islamic law in financial transactions.

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