

Blockchain zakat in zakat management organizations, is it necessary?

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ABSTRACT

Purpose — *This paper aims to analyze whether zakat management organizations need a blockchain zakat system in maintaining transparency of zakat management which can have an impact on increasing the amount of donations collected from muzakki.*

Method — *This research is a qualitative research conducted with descriptive-analytic method through literature study.*

Result — *Zakat management organizations have a duty to ensure transparent management of the funds they collect as public institutions, and therefore must be trustworthy. By adopting a blockchain-based zakat system, these organizations can enjoy various advantages such as trustlessness, immutability, decentralization, lower costs, peer-to-peer transactions, transparency, and universal banking. This technology can also help address existing issues within zakat institutions.*

Contribution — *This study contributes to the existing literature on blockchain-based zakat system which is still rarely to be discussed.*

Keywords: *zakat, blockchain, zakat management organization*



INTRODUCTION

The World Giving Index 2022 launched by the Charities Aid Foundation (CAF) named Indonesia as the most generous country in the world for the fifth consecutive year with a total score of 68 percent (Bank Indonesia, 2022). This shows the success of Zakat, Infaq, Sadaqah and Waqf (ZISWAF) management agencies and institutions in raising, managing and utilizing Islamic social finance funds. Based on the BAZNAS strategic study center, data on the collection of Zakat, Infaq, Sadaqah in a two-year period by various zakat management organizations was obtained (Puskas Baznas, 2022).

Table 1. National ZIS collection based on OPZ

No	Zakat collecting organizations level	2019 (in Billion)	Share	2020 (in Billion)	Share
1	BAZNAS	IDR 296,23	2,9%	IDR 385,13	3,1%
2	BAZNAS Province	IDR 583,92	5,7%	IDR 489,54	3,9%
3	Regency/City Baznas	IDR 3.539,98	34,6%	IDR 1.735,82	14,0%
4	LAZ	IDR 3.728,94	36,5%	IDR 4.077,30	32,8%
5	OPZ under guidance and unreported zakat fitrah	IDR 2.078,87	20,3%	IDR 5.741,46	46,2%
	Total	IDR 10.227,94	100%	IDR 12.429,25	100%

Source: BAZNAS (2021)

Table 1 indicates that LAZ was the highest fund collector, with a total of IDR 3,728.94 billion, accounting for 36.5% of the total collected in 2019. On the other hand, OPZ collected the highest amount for guidance and unreported zakat fitrah in 2020, amounting to IDR 5,741.46 billion, with a share of 46.2%. In contrast, BAZNAS had the lowest fund collection with a total of IDR 296.23 billion, accounting for 2.9% of the total collected in 2019, and IDR 385.13 billion, accounting for 3.1% of the total collected in 2020. The data from OPZ reveals that the national ZIS collection increased by 21.52% from IDR 10,227.94 billion in 2019 to IDR 12,429.25 billion in 2020.

Public awareness of ZIS payments has begun to increase, which is reflected in the increase in OPZ collection every year in Indonesia. This gives a positive signal for all OPZs in Indonesia to maximize their functions and roles in spreading Zakat in Indonesia. Based on data processed by BAZNAS, the amount of national collection has increased significantly from 2002 to 2020, the data can be presented as follows (Puskas Baznas, 2022).

Table 2. National collection growth 2002 - 2020

Year	ZIS (in Billion)	Growth
2002	IDR 68,39	0,00%
2003	IDR 85,28	24,70%
2004	IDR 150,09	76,00%
2005	IDR 295,52	96,90%
2006	IDR 373,17	26,28%
2007	IDR 740,00	98,30%
2008	IDR 920,00	24,32%
2009	IDR 1.200,00	30,43%
2010	IDR 1.500,00	25,00%
2011	IDR 1.729,00	15,27%
2012	IDR 2.212,00	27,94%
2013	IDR 2.639,00	19,30%
2014	IDR 3.300,00	25,05%
2015	IDR 3.650,00	10,61%
2016	IDR 5.017,29	37,46%
2017	IDR 6.224,37	24,06%
2018	IDR 8.117,60	30,42%
2019	IDR 10.227,94	26,00%
2020	IDR 12.429,25	21,52%
Average		33,66%

Source: BAZNAS (2021)

Table 2 shows a positive trend in the growth of Zakat, Infaq, Sadaqah, and DSKL from 2002 to 2020, with a 21.52% increase in collection in 2020. Notably, the growth in 2005 and 2007 was attributed to the Aceh Tsunami and Jogja Earthquake, respectively, where ZIS and DSKL collection increased by over 95%. This demonstrates that natural disasters or events can contribute to an increase in collection. Similarly, during the COVID-19 pandemic in 2020, the digitalization of zakat by managers led to an increase in donations. The BAZNAS strategic study center provides data on the shift in muzakki behavior during the pandemic (Kajian & Baznas, 2021).

The above muzaki behavior is supported by shift in the use of donation channels. At before the pandemic, the proportion of use of online channels amounted to 48.31% compared to the use of offline channels, which amounted to 51.69%. This condition shows that before the pandemic, the online/digital donation channel provided by BAZNAS was already available and was quite widely used by muzaki. Meanwhile, during the pandemic, 78.57% of muzaki used the online channels and the remaining 21.43% used offline channels (Sari et al., n.d.). This is supported by Nur Jamaluddin and Siti Aminah's research

which found that the collection of zakat funds is more effective through digital channels ([Jamaludin et al., 2021](#)), and strengthened by Bank Indonesia's report on zakat, infaq, and shadaqah donations through e-commerce ([Bank Indonesia, 2022](#)) as follow there is a fairly good growth in donations in line with the national economic recovery. From January to October 2022, the donation segment recorded a donation value of IDR 13.48 billion, an increase of 5.83% compared to the same period in 2021. The growth of digital donations is predicted to continue to grow along with people's behavior in conducting digital transactions during the pandemic. The ease of donating online is one of the factors driving the increase in donations by the community, in addition to the use of digital means also encourages transparency and accountability in the management of donations.

Accountability in donation management is a major issue that plagues most zakat organizations in Indonesia, both government-run and community-run. Zakat institution is basically a type of public organization because it manages public funds. As a public institution, it is accountable to the public for the funds it manages in a transparent manner. Therefore, every organization that manages zakat must be a trustworthy organization. The successful implementation of zakat management is not only seen from the amount of zakat funds collected, but also the impact of the distribution and use of zakat, namely the implementation of social welfare and community equity. Therefore, zakat organizations need to be able to improve the quality of programs and services that are more targeted and have a broad impact.

Zakat management organizations in answering these main issues certainly need a trusted system, namely blockchain. Blockchain is a chain of user transaction data stored between users stored in blocks, and each block records a certain amount of data encrypted thanks to hashingkriptography. Hashingkriptography is the process of converting the input of letters and characters of an arbitrary size into an output of a fixed size through an algorithmic process so that the data becomes more secure. Blockchain as a management system can be a tool for zakat institutions in planning funding and distributing. The concept of blockchain which is a chain that connects the activities of stakeholders and managers does not contain non-shar'i elements in it. Instead, it can provide masalah for all parties ([Urfiyya, 2021](#)).

Charity Wall is a social marketplace in Italy that is a clear proof of the application of blockchain in social organizations. Blockchain can overcome the problem of declining donations due to traditional collection systems and COVID-19 cases. In addition, blockchain enables greater security and efficiency in a transparent manner, which can lead to greater social impact ([Rangone & Busolli, 2021](#)).

The synergy between blockchain technology and zakat management will increase the transparency of zakat collection and distribution, so that it becomes positive points and benefits, both from a technical point of view and from the Shariah perspective, which strongly encourage the potential application of blockchain in the management of zakat ([Nur Aqmal Bin Khatiman et al., 2021](#); [Omar & Khairi, 2021](#); [Rejeb, 2020](#)).

Conceptually, there are several studies related to blockchain zakat, while the difference with this research is that this research tries to adjust the needs of the business model of zakat collection organizations in Indonesia with an existing model.

Therefore, this paper aims to analyze whether zakat management organizations need a blockchain zakat system in maintaining transparency of zakat management which can have an impact on increasing the amount of donations collected from muzakki.

METHOD

This research is a descriptive research because it describes or explains the combination of zakat and blockchain. The research method used is qualitative. The focus of this research is on zakat collecting organizations in Indonesia. The subject of this research is the mechanism between Muzaki and Mustahik in Indonesia. This study focuses more on the mechanism of creating a blockchain zakat because the author sees that the management of zakat is still not optimal and efficient and easy for all people. With the help of this model, the national zakat institution should become more credible, responsible, and professional. The source of this research is secondary data, including previous research, books on blockchain, and national and international journals on zakat and blockchain. Descriptive analysis is conducted to analyze the relationship between zakat and blockchain and connect zakat with blockchain as well as create a blockchain zakat model that can be used for zakat stakeholders.

RESULT AND DISCUSSION

Blockchain overview

The evolution of Islamic finance, especially Islamic Fintech a few years ago, has become a success factor in the industrial revolution 4.0. Fintech is the intersection of technology and finance applied in the context of financial services in the era of disruption ([Allen & Overy LLP, 2019](#)). Through this fintech, several technologies have emerged, one of which is blockchain technology. The

definition of blockchain comes from a combination of several technologies, including the blockchain data structure, cryptography, distribution of ledgers (records of all transactions), and the overall way of working.

Blockchain is a peer-to-peer public ledger managed by a distributed network of computers that does not require a central authority or third-party intermediaries. It consists of three main components: transactions, transaction records and a system that verifies and stores transactions.

This Blockchain network was created by Satoshi Nakamoto ([Nakamoto, 2008](#)) in early 2008. He introduced the hash function method to create blockchains. The main goal was to enhance the development of blockchain to move away from traditional financial transaction services. His implementation was to build a network for cryptocurrency known as bitcoin. The bitcoin network is a publicly available ledger that is used to record all transactions.

In his research work, block and chain are two words that are combined and known as blockchain where getting the bitcoin network its file size and transaction records reached 20 GB in 2014, which increased to 30 GB between the last quarter of 2014 to 2015. The bitcoin network was boosted from 50GB to 100 GB in January 2017.

Blockchain is used in financial transactions or cryptocurrency applications because it can improve the quality of various applications with regards to speed, security, ease of use, and confidentiality.

To explore the possible applications of blockchain technology in various industries, many companies have established their research centers for the growth of this technology. For example, IBM has a research center in Singapore that was inaugurated in July 2016. In November 2016, the world economic forum group discussed the development of a governance model for blockchain technology. The global blockchain forum introduced a digital trading room in 2016 by trading group Accenture. Emma Macclarkin suggested the use of blockchain to improve trade executed by the European parliament trade in 2018.

The Blockchain revolution from the beginning to the present are as follows ([Bodkhe et al., 2020](#)):

1) Blockchain 1.0

The first generation of technology began with the bitcoin network in 2009, known as blockchain 1.0. In this generation, the creation of the first cryptocurrency was introduced. The idea was about payments and its function was to generate cryptocurrency.

2) Blockchain 2.0

In the second level of blockchain technology, smart contracts and financial services for various applications were introduced in 2010. In blockchain 2.0, the development of blockchain with Etheruem and Hyperledger framework was proposed.

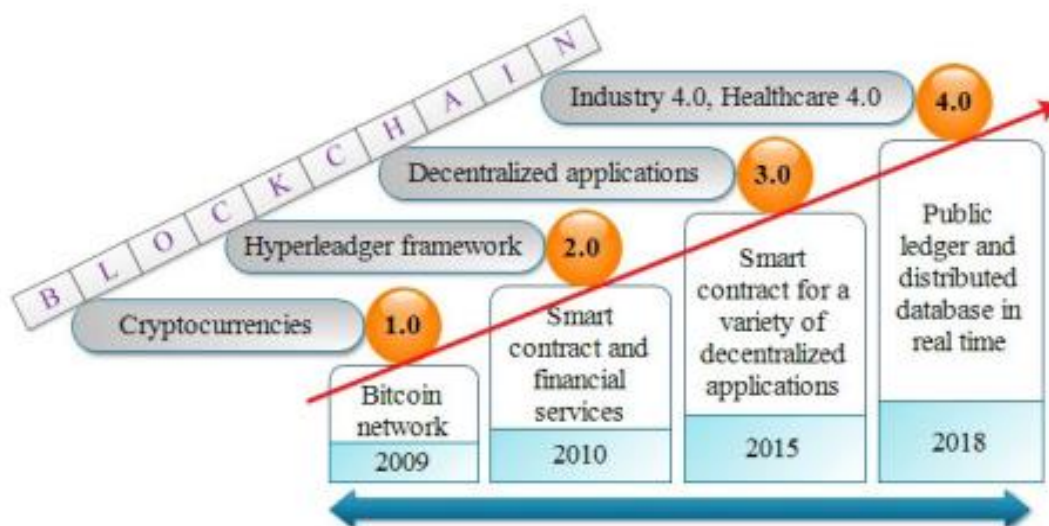
3) Blockchain 3.0

In this generation of blockchain, the convergence is towards decentralized applications. Various research areas such as healthcare, governance, IoT, supply chain, business, and smart cities are considered to build decentralized applications. (Vora et al., 2019). At this level, etheruem, hyperledger, and other platforms are used to code smart contracts for various decentralized applications. (Yu et al., 2018).

4) Blockchain 4.0

In this generation, the main focus is on services such as public ledgers and databases that are distributed in real-time. At this level, blockchain is integrated from Industry 4.0-based applications. It uses smart contracts that reduce the use of paper (Holland et al., 2018).

Figure 1. Blockchain revolution



Source: Bodkhe et al. (2020)

Overview of blockchain zakat

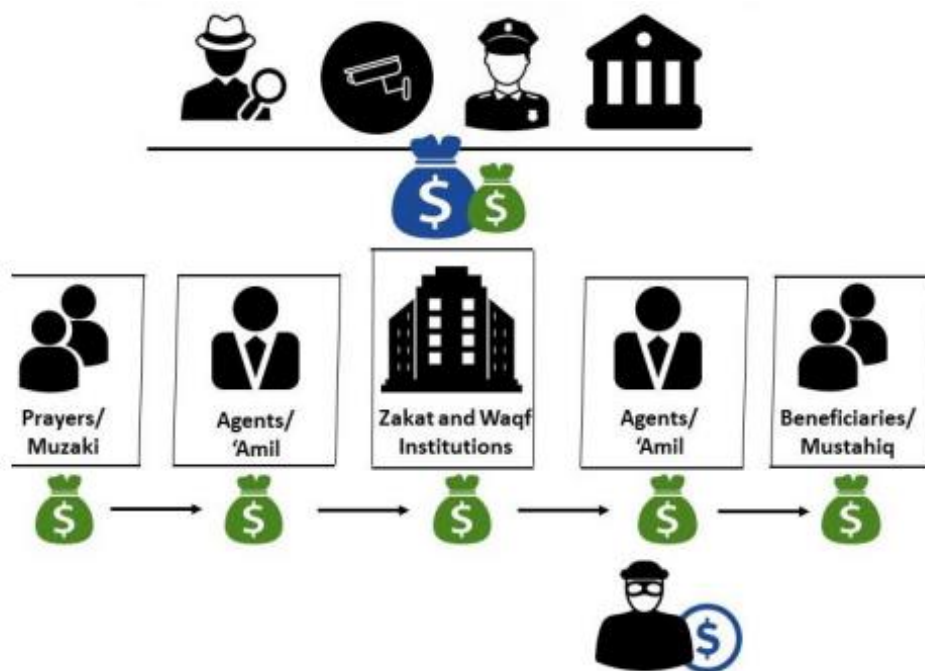
Zakat is one of the means of Islamic philanthropy, practicing the principles of justice in Islam. In the history of Islam, zakat is not only based on the Qur'an and As-Sunnah, but also plays an important role as a source of national income and a means of worship. Zakat also serves as a means of income distribution, growth,

and general welfare. The potential of zakat as a way to alleviate poverty is very potential if zakat is still paid with the awareness of every Muslim and successfully distributed to those in need.

Zakat needs people or institutions that manage it, this is in accordance with the Governance Law No. 23 of 2011, zakat management is an activity that includes planning, organizing, implementing, supervising the distribution, and utilization of zakat. The purpose of zakat management is to improve the efficiency of services in the management of zakat and increase the benefits of zakat in realizing common welfare and poverty reduction.

There is a gap in the traditional zakat fund operation system for the emergence of information asymmetry and moral hazard. Multisystem operation with many parties of Muzak, Amil, Mustahiq and supervisory authority makes it difficult to track the correctness and unconditionality of each transaction step. Centralized data systems make this possible. Indeed, practices that open up opportunities for dishonesty and negligence that can harm an institution or organization, especially Islamic organizations that manage zakat funds, should be avoided.

Figure 2. Traditional model of zakat fund distribution



Source: Urfiyya (2021)

In the traditional multi-system model, data is technically entrusted to a person, so that zakat fund transactions cannot be tracked by various parties. This can allow the risk of manipulation or hacking on the system or funds. In addition,

zakat institutions also require expensive monitoring costs because there needs to be supervision from various parties such as external auditors, OJK supervision, BI and security forces.

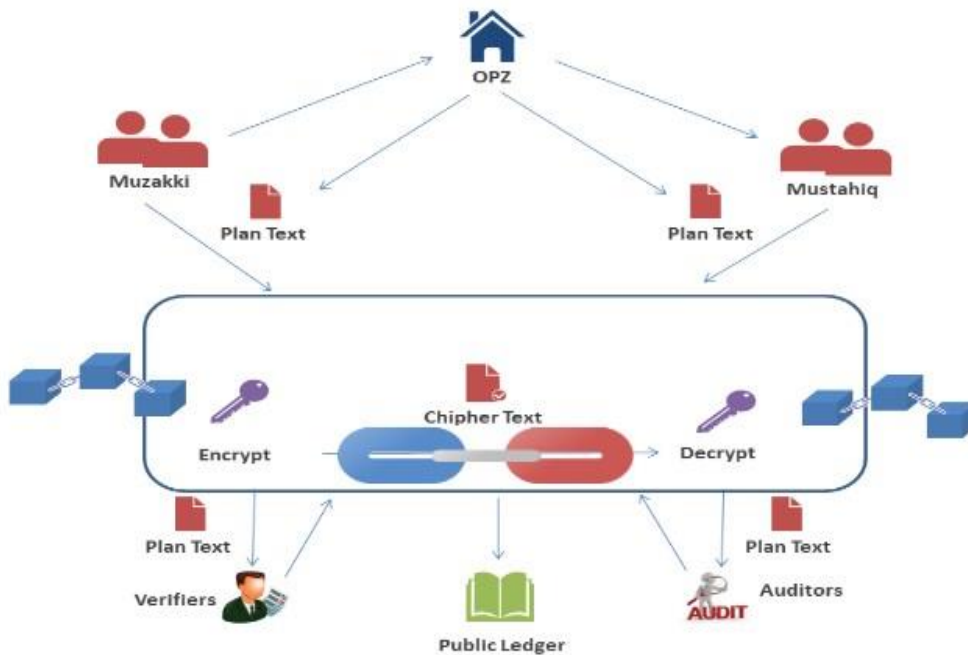
Blockchain is a technology used as a digital storage system or data bank connected with cryptography where one device will be connected to other devices to record and check existing data. The blockchain system itself requires several primary databases to be inputted into the blockchain system, namely, muzakki data, mustahik data, collected zakat data, zakat distribution data, and amil data that manage it. This technology makes all transactions transparent and safe from fraud. In addition, transactions with blockchain are also more secure because the possibility of interference is very small and this system is not easily broken into.

Previous studies proposed blockchain technology as an instrument to increase trust in Charity Organizations that Blockchain technology is able to bring transparency and auditability in charity collection, and it works almost the same way as Zakat (Kassim & Hawariyuni, 2021). Lushi (Lushi, 2019) proposes blockchain technology be used in Charity Organizations as it is able to bring transparency and traceability possibilities of every transaction. In his paper, he proposes charity tokens to develop a platform on which every project that requires donations will generate verification tokens and offer donors the opportunity to keep updating which projects they are actually donating to and track the allocation of donations. This is also reinforced by (Sukmana, 2020) which states that blockchain-based zakat fund management is arguably more optimized and effective (in terms of transparency and affordability). In this case, the ZMO, mustahiq, and muzakki belong to the same blockchain system which promotes better access and ease of monitoring. In addition, the blockchain system can reach muzakki seamlessly and globally, allowing muzakki in one country to donate their funds to another country, thus potentially raising greater funds, Zakat Donation Platform Muzakki Blockchain Zakat Project Mustahiq (beneficiaries) Economic Environment Social Benefits Amil Zakat Agency (BAZ) Amil Zakat (LAZ) wider coverage, and greater multiplier effect.

With the blockchain system in zakat management is very important, because in the blockchain zakat system there are already some data from mustahik and programs from zakat institutions that have been provided and verified by the zakat institution itself. In this blockchain zakat system, the process of muzakki who will pay zakat can channel their zakat directly through programs and mustahik whose data is already in the system. Furthermore, the transaction process will be verified by a verifier that has been determined by the zakat institution regarding the correctness of the transaction made by the mustahik. In

addition, the existence of auditors contained in the system also increases the trust of muzakki to make zakat payments to the institution through the blockchain zakat system implemented. The process of payment and distribution of zakat funds using the blockchain system can be seen in the following figure.

Figure 3. Blockchain zakat



Source: Hamdani (2020) & author's compilation (2022)

Blockchain as a warehouse of interconnected data chains, requires several primary databases to be inputted into the system, namely, (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 managers. Furthermore, in the process, the data that has been collected will be approved online and entered into the blockchain platform.

The parties involved in blockchain zakat include Muzakki is a person who is obliged to pay zakat, Mustahik is a person who is entitled to receive zakat, zakat collection organization (OPZ) is a zakat collection organization, auditor is a person in charge of auditing, and verifier is a person in charge of verifying data from the zakat payment process in the blockchain zakat system.

Muzakki sends zakat funds to zakat collection organizations, namely BAZNAS and LAZNAS, because only these two institutions have a database of Mustahiq Zakat. Contains information whether the zakat obligor is in accordance, with the

nisab or not when verified and Amil zakat sends funds in the form of cryptocurrency. Then the Muzakki data is formed in the form of a text plan consisting of identity, location, type or purpose, time, and amount of donation. The next process this plan text will be encrypted into cipher text. Then it will be decrypted again into a text plan to each party or stakeholder, namely to OPZ, auditor, and verifier.

The purpose of implementing blockchain is to break down the walls between different stakeholders and provide a single source of information, a database/system that everyone can trust so that it is more transparent. In addition, trust in Amil is growing. Zakat institutions also do not charge expensive verification fees, and zakat supervisors are assisted with a simple verification system. On the other hand, the funds can be channeled properly until they reach the mustahiq recipients of zakat. In addition, the zakat system on the blockchain has significant potential by accelerating the value and receipt of funds.

There are several advantages in using Blockchain compared to traditional financial services for zakat management organization, including ([Darlington, 2022](#)):

- 1) Trustless. Blockchain is immutable and automates trusted transactions between counterparties who do not need to know each other. Transactions are only executed when programmatic conditions are met by both parties.
- 2) Unstoppable. Once the conditions programmed into the blockchain protocol are met, the initiated transaction cannot be reversed, changed, or stopped. It will be executed and nothing - no bank, government, or third party - can stop it.
- 3) Immutable. Records on the blockchain cannot be changed or tampered with - Bitcoin has never been hacked. New blocks of transactions are only added after calculation problems are solved and verified by the relevant institutional mechanisms. Each new block has a unique cryptographic key generated from the information of the previous block and the key added into the formula.
- 4) Decentralized. There is no single entity that maintains the network. Unlike centralized banks, decisions on blockchain are made through deliberation. Decentralization is essential as it ensures people can easily access and build on the platform.
- 5) Lower cost. In the traditional financial system, we pay third parties such as banks to process transactions. Blockchain eliminates these intermediaries and reduces costs, with some systems returning fees to owners and stakeholders.
- 6) Peer-to-Peer. Cryptocurrency, like Bitcoin, makes it possible to send money directly to anyone, anywhere in the world, without intermediaries like banks charging transaction or handling fees.

- 7) Transparent. Public blockchains are open-source software, so anyone can access them to view transactions and their source code. They can even use the code to build new applications and suggest code improvements. Suggestions are accepted or rejected through the deliberations of the relevant institutions.
- 8) Universal banking. 2 Billion people around the world do not have bank accounts. Since anyone can access the blockchain to store money, this is a great way to open a bank account and protect against theft that can occur from storing cash in a physical location.

CONCLUSION

Blockchain is a success of the 4.0 revolution. Blockchain zakat seeks to answer existing social problems by increasing the transparency of zakat fund management to increase public trust. Thus, this program offers a more modern and comprehensive management of zakat by facilitating ease of transactions and access to financial products and increasing financial literacy which will ultimately create a multiplier effect for the economy.

This blockchain zakat illustrates Indonesia's zakat governance model that uses blockchain-based zakat payments where zakat payers can directly track the funds channeled to beneficiaries. This system provides traceability, which satisfies zakat payers and leads to a certain level of trust in BAZNAS. The zakat model implemented by blockchain aims to help OPZ improve transparency and increase Muzaki's trust in OPZ and other zakat institutions, increase Muzaki's collected funds to Asnaf using blockchain technology, allowing Muzaki paying zakat paid can track and know the specific Asnaf received zakat wealth.

This research is expected to add to the literature related to blockchain zakat and in practice can be a recommendation for regulators, practitioners and the general public by utilizing technology to develop zakat realization that suits the needs of Indonesian society.

Future research is expected to conduct in-depth interviews with stakeholders related to blockchain zakat. In addition, future research can also expand the coverage area in terms of people's perceptions of the use of blockchain zakat.

REFERENCES

1. Allen & Overy LLP. (2019). *Fintech*.
2. Bank Indonesia. (2022). *KAJIAN EKONOMI & KEUANGAN SYARIAH SINERGI DAN INOVASI: MENINGKATKAN KONTRIBUSI EKONOMI DAN KEUANGAN SYARIAH 2022*.
3. Bodkhe, U., Tanwar, S., Parekh, K., Khanpara, P., Tyagi, S., Kumar, N., & Alazab, M. (2020). Blockchain for Industry 4.0: A comprehensive review. *IEEE Access*, 8, 79764–79800.
<https://doi.org/10.1109/ACCESS.2020.2988579>
4. Darlington, N. (2022). *Blockchain For Beginners: What Is Blockchain Technology? A Step-by-Step Guide*.
5. Hamdani, L. (2020). Zakat Blockchain: A Descriptive Qualitative Approach. *EkBis: Jurnal Ekonomi Dan Bisnis*, 4(2), 492.
<https://doi.org/10.14421/ekbis.2020.4.2.1270>
6. Holland, M., Stjepandic, J., & Nigischer, C. (2018). Intellectual Property Protection of 3D Print Supply Chain with Blockchain Technology. *2018 IEEE International Conference on Engineering, Technology and Innovation, ICE/ITMC 2018 - Proceedings, June*.
<https://doi.org/10.1109/ICE.2018.8436315>
7. Jamaludin, N., Tinggi, S., Syariah, E., Village, I., & Aminah, S. (2021). Efektifitas Digitalisasi Penghimpunan Dana Zakat pada Badan Amil Zakat Nasional (BAZNAS) Kota Tangerang. In *Management of Zakat and Waqf Journal (MAZAWA)* (Vol. 2, Issue 2).
8. Kajian, P., & Baznas, S. (2021). *OUTLOOK ZAKAT INDONESIA 2021*. Pusat Kajian Startegis BAZNAS. www.baznas.go.id;
9. Kassim, S., & Hawariyuni, W. (n.d.). Proposing Blockchain Technology Based Zakat Management Model to Enhance Muzakki's Trust in Zakat Agencies: A Conceptual Study. In *Journal of Accounting Research* (Vol. 4, Issue 2). www.jurnal.unsyiah.ac.id/JAROE
10. Lushi, T. (2019). *Czech Republic Perspectives of Business and Entrepreneurship Development in Digital Transformation of Corporate Business*.
11. Nur Aqmal Bin Khatiman, M., Salikin Bin Ismail, M., & Yahya, N. (2021). Blockchain-based Zakat Collection to Overcome the Trust Issues of Zakat Payers. In *International Journal on Perceptive and Cognitive Computing (IJPCC)* (Vol. 7, Issue 1).
12. Omar, N., & Khairi, K. F. (2021). *ZAKAT AND BLOCKCHAIN: A REVIEW* (Vol. 4, Issue 2).
13. Puskas Basnaz. (2022). *Outlook Zakat Indonesia 2022*.

14. Rangone, A., & Busolli, L. (2021). Managing charity 4.0 with Blockchain: a case study at the time of Covid-19. *International Review on Public and Nonprofit Marketing*, 18(4), 491–521. <https://doi.org/10.1007/s12208-021-00281-8>
15. Rejeb, D. (n.d.). Blockchain and Smart Contract Application for Zakat Institution: A Conceptual Study. In *International Journal of Zakat* (Vol. 5, Issue 3).
16. Sari, A. P., Anggraini, D., Kusuma, A., & Ringkasan Eksekutif, Z. (n.d.). *MENJADI OPZ PENYINTAS DI MASA PANDEMI*.
17. Sukmana, R. (2020). Peluang dan tantangan penggunaan blockchain dalam perwakafan nasional. *Forum Kajian Wakaf Seri 01 Tahun 2020*.
18. Urfiyya, K. (2021). Digital System Blockchain Sebagai Strategi Untuk Optimalisasi Pengelolaan Dana Zakat: Studi Konseptual. *Jurnal Studi Agama Dan Masyarakat*, 17(2), 83–95. <https://doi.org/10.23971/jsam.v17i2.3157>
19. Vora, J., Nayyar, A., Tanwar, S., Tyagi, S., Kumar, N., Obaidat, M. S., & Rodrigues, J. J. P. C. (2019). BHEEM: A Blockchain-Based Framework for Securing Electronic Health Records. *2018 IEEE Globecom Workshops, GC Wkshps 2018 - Proceedings, March*, 1–6. <https://doi.org/10.1109/GLOCOMW.2018.8644088>
20. Yu, T., Lin, Z., & Tang, Q. (2018). Blockchain: The Introduction and Its Application in Financial Accounting. *Journal of Corporate Accounting and Finance*, 29(4), 37–47. <https://doi.org/10.1002/jcaf.22365>