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Article

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EXPLORATION OF A NEW ZAKAT MANAGEMENT SYSTEM EMPOWERED BY BLOCKCHAIN TECHNOLOGY IN MALAYSIA

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ABSTRACT

Purpose — This paper aims to examine the implementation of blockchain technology in zakat management and determine how it will work in the context of Malaysia. Although zakat institutions in Malaysia use technology, confidence in the efficiency of the zakat fund is still an ongoing issue. Therefore, the potential of blockchain technology for improving the zakat management system is examined.

Design/Methodology/Approach — An exploratory study involving two informants with expertise in blockchain technology and Islamic finance was conducted to investigate how the application of blockchain in the zakat management system will accelerate the future implementation and potential of zakat management in Malaysia.

Findings — This research finds an accord between the features of blockchain technology and the objectives of zakat. The features are transparency, traceability and security, which align closely with the goals of zakat. As such, a new model has been proposed for the zakat management system, one empowered by blockchain technology that harmonises with the existing system and enhances these elements.

Originality/Value — This research can motivate zakat institutions in Malaysia to implement blockchain technology in their zakat management systems by using the proposed model. The research shows the synchronisation of blockchain principles with zakat, which would build trust and confidence.

Practical Implications — The discussion on how blockchain can be embedded in the existing zakat management system will contribute towards enhancing zakat management in Malaysia and improve the performance of zakat institutions, enabling them to better serve the community. Given the scarce literature on blockchain adoption in zakat management, this study can spur further research and discussion within this area.

Keywords — Blockchain technology; Fintech; Islamic social finance; Zakat blockchain; Zakat management system

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INTRODUCTION

Zakat is an act of *ʿibādah* (worship), aimed at sharing prosperity and paving the way to a harmonious society. It is undeniably one of the effective social finance instruments in the Islamic economic system that facilitates the development of the Muslim community. Also known as almsgiving, zakat aims to ensure socio-economic justice through fair income distribution and wealth creation. Zakat payers must contribute 2.5 per cent of their wealth to eight unique categories of beneficiaries (*aṣnāf*) (Al-Qaradawi, 2011). These groups comprise the *fuqarāʾ* (poor), *masākīn* (needy), *ʿāmilīn* (zakat collectors), *muʾallafat* (newcomers to Islam), *riqāb* (enslaved people), *ghārimīn* (debtors), *fī sabīlillah* (in the cause of Allah) and *ibn sabīl* (travellers in need) (Qurʾān, 9:60). While the objective of zakat is poverty alleviation, its end goal is also to gradually transform the *aṣnāf* into zakat payers. Thus, an effective zakat management system is needed to ensure efficient collection, management and distribution of zakat.

Efficiency is nonetheless not the only arising issue in zakat management. Johari *et al.* (2015) and Bilo and Machado (2019) also highlighted the issue of transparency and implementation of a systematic zakat management. A crisis of confidence is another problem being discussed among zakat payers, arising from the allegation that zakat institutions mismanage the zakat fund and use it for their own advantage (Owoyemi, 2018). Scepticism about zakat fund management is leading many zakat payers to prefer to pay zakat directly to beneficiaries (Wahid & Sanep, 2014). This may eventually generate leakage in zakat collection, thus leading to an inefficient zakat management system (Abdul Hamid, 2017). Furthermore, zakat distribution is an ongoing problem as most of the poor people in Malaysia come from the Muslim population, raising questions about the implementation of the zakat system, which is not only not helping to reduce poverty but is also ineffective in transforming the zakat beneficiaries to zakat payers. According to the Ministry of Economy of Malaysia (2023), the poverty rate among Malay Muslims is 7.2 per cent higher than among other ethnicities.

Therefore, a new method is necessary to uplift the confidence in zakat management and that can bring about efficient, transparent and systematic zakat collection and distribution. To this end, the use of digital technology is proposed as a solution (Hudaefi *et al.*, 2019; Kailani & Slama, 2020).

Blockchain technology is a system that developed together with the Bitcoin cryptocurrency (Nakamoto, 2008). It is a decentralised ledger for storing and recording transactions, distributed across a blockchain system's network, with the benefits that it is immutable and challenging to hack, and it reduces costs (Sarmah, 2018; IBM, 2022). The use of blockchain technology is growing in many industries and it is believed that zakat institutions can also benefit from this technology as it brings forth competitive advantages and is consistent with the objectives of zakat.

Studies focusing on the potential of blockchain technology in zakat management and its effectiveness in facilitating a country's zakat management system are growing; nonetheless, they rarely discuss how blockchain technology is adapted within zakat management to make it work. Most of the research focus on countries such as Indonesia, and although there is increasing research in Malaysia, in-depth research is still lacking (Marhanum & Chowdhury, 2020). Zakat issues in Malaysia are primarily about the unavailability of data on each state's websites and their unattractive and non-communicative social media platforms (Laldin & Djafri, 2019; Lukman, 2020; Ibrahim & Zakaria, 2021). This shows that Malaysia is currently in need of a better zakat management system for users' convenience. As an immutable, transparent and

traceable technology, as discussed by Crosby *et al.* (2015), blockchain technology will facilitate better and more efficient zakat management. In addition, its adoption will be in conjunction with the capacities for the digital transformation of the Malaysian government.

Previous studies showed that blockchain technology brings many advantages and explained how it will work in the general interest of the business sector. Yet, how blockchain technology can be integrated into zakat management is rarely addressed. As such, this paper aims to discuss the potential of implementing blockchain technology and how it can be embedded in Malaysia's zakat management system. This discussion will, hopefully, increase the readiness of zakat institutions to better adapt to blockchain technology.

This research is organised as follows. The next section discusses the relevant literature on the zakat management system in Malaysia, digital zakat, and blockchain technology. The methodology is described thereafter. It is followed by the findings and discussion section. The final section concludes with suggestions for future research opportunities.

LITERATURE REVIEW

The Zakat Management System in Malaysia

Zakat was introduced in Malaysia in the 13th century within the Islamic framework, but detailed data on zakat management was limited, and zakat management itself was governed informally (Aidit, 1998; Ahmad & Mohd Nor, 2002). Initially, religious teachers were the people managing zakat affairs; goods would be delivered to them and then distributed according to the necessity of the *aṣnāf* (Aidit, 1988; Paizin, 2014). However, during the British colonial period, the aspect of religion and customs were gradually segregated and placed under the management of the department known as the State Religious Islamic Council (SRIC) or Majlis Agama Islam Negeri (MAIN). Until today, MAIN is responsible for managing and governing zakat collection and distribution in Malaysia. Specifically, MAIN is responsible for two leading roles in religious and custom affairs: (i) administration of the economic activities of the states, such as *ṣadaqah* (charity), zakat and waqf (Islamic endowment), and (ii) act as the Sultan's (the state ruler) advisor on matters related to Islam and Malay customs (Marhanum & Chowdhury, 2020).

Studies on the zakat management system in Malaysia discussed several aspects, such as administration, challenges and development of the zakat fund in society. For instance, Abd Wahab and Abdul Rahman (2011) discussed the weaknesses and issues faced by zakat institutions that must be addressed to ensure efficient zakat management. Lubis and Azizah (2018) compared the zakat management system in several countries, including Malaysia. They classified Malaysia as one of the countries adopting a decentralised approach, sharing the burden and responsibility in decision-making on equal terms. Meanwhile, Malaysia's zakat administration and management system has grown tremendously, particularly in terms of infrastructure, collaboration between states, and their function in economic development (Sarif *et al.*, 2020; Ab Rahman *et al.*, 2012).

Studies and research are continuously expanding and increasing, particularly with technological advancement, and most are trying to explore the potential opportunity of technology being implemented in zakat management. While several research studies have analysed technological development thoroughly in many countries, such as Indonesia, India and Saudi Arabia, this research will focus on adapting blockchain technology, as the latest available technology, to zakat management in Malaysia, to facilitate the rapid changes in digital zakat and to develop zakat as an effective Islamic social finance instrument to uplift the conditions of the *aṣnāf*.

Digital Zakat

As digital adaptation is growing in daily life, zakat institutions are also attempting to adapt technology for a more effective and systematic zakat management system. Studies analysing digitalisation are increasing nowadays due to the benefits felt by society, particularly the way technology usage facilitates daily tasks (Rohim, 2019; Santoso, 2019). Hence, researchers are inclined to study the technological changes in the financial services area, particularly in zakat affairs, discussing how the growing appearance of technology in zakat management will provide abundant benefits for the zakat payers and beneficiaries and assist in optimising zakat collection (Friantoro & Zaki, 2018; Yahaya & Ahmad, 2019; Hudaefi *et al.*, 2019; Hudaefi *et al.*, 2020).

Some researchers like Rachman and Salam (2018) also recommended developing a strategy that includes fintech in the zakat management system to refine and reinforce the performance of the zakat collector (*ʿāmil*) in collecting zakat. Furthermore, the use of online crowdfunding platforms will assist in maximising zakat collection and alleviating poverty in the society (Manara *et al.*, 2018). It should be noted that Muslim countries, such as Indonesia, Saudi Arabia and even Malaysia, have already welcomed the technological transformation of the zakat system, which is equipped with a zakat calculator, e-payment and zakat reminder, and in Saudi Arabia, an app or e-portal known as ZAKATY was launched to ensure better zakat collection (Bin-Nashwan, 2022). However, some studies debated that the innovation towards digitalisation in actual truth is lower than anticipated, even with the encouragement of technological changes, as trust in the system is still a crucial issue (Schaupp *et al.*, 2010; Uthman *et al.*, 2020; Bin Nashwan, 2022).

In addition, some studies discussed and mentioned the factors influencing digital zakat acceptance in society. For example, Kasri and Yuniar (2021) stated that the factors determining the intention of using digital zakat are performance expectancy, effort expectancy, facilitating conditions, and zakat literacy. This is supported by Tantriana and Rahmawati (2018), who discussed the preferences of zakat payers to use digital zakat, showing that zakat knowledge, the level of certainty, and the level of satisfaction prove effective with the preferences of zakat payers using digital zakat. Meanwhile, Naeem (2019) mentioned that as a growing technology, social media will enhance the service quality among customers. This supports Hudaefi and Beik (2021), who averred that zakat campaigns are affected by the inclusiveness of digital content, and doing digital zakat campaigns will eventually benefit the society. The same goes for Al Anshory *et al.* (2020), who deliberated on the impact of social media and found that digital zakat campaigns will inevitably influence zakat payers in contributing to zakat.

The increasing number of studies on digital zakat show that technology is unavoidable and that zakat institutions should aim towards more digitalisation of their processes. Still, most research discusses general apps, social media or e-portals, and they do not include blockchain technology, which will be the focus of this paper. To achieve a more efficient and systematic zakat management system, blockchain technology, as stated, must be explored, and this paper will fill in the gap by examining how blockchain technology works in the zakat management system.

Blockchain Technology

Blockchain technology, known as distributed ledger technology (DLT), is a decentralised public ledger recording every transaction that will be distributed across every network existing in the blockchain system in an immutable, difficult-to-hack, secured, transparent and traceable way (Crosby *et al.*, 2015). This technology does not involve any third-party intermediary in the

recording of transactions and can thus facilitate the objectives of zakat, which are driven by the goals of fostering trust in the society, enhancing transparency and traceability, and managing security. Without third-party intermediation, blockchain technology will also help to build trust among users since human error will be eliminated (Mohamed & Ali, 2019).

It should be noted that blockchain technology was initially established as the foundation of Bitcoin, but nowadays, it can be confidently said that it is expanding beyond that into many other sectors (Nakamoto, 2008; Swan & de Filippi, 2015; Underwood, 2016; Rauchs *et al.*, 2018). Moreover, it is advancing by adopting data storage, smart contracts and resource management (Abojeib & Habib, 2019). The potential of its implementation can be spread in many industries, such as trade finance, capital markets, insurance and investment management (Mohamed & Ali, 2019). There is growing research globally on blockchain technology in various sectors, including Islamic finance instruments (Muneeza *et al.*, 2018; Chong, 2021; Dahdal *et al.*, 2021), healthcare (McGhin *et al.*, 2019; Dimitrov *et al.*, 2019), the music industry (Sitonio, & Nucciarelli, 2018), media content (Velasco, 2016), the diamond industry (Smits & Hulstijin, 2020), supply chain (Azzi *et al.*, 2019; Longo *et al.*, 2019), and governance (Van der Elst & Lafarre, 2017; Yermack, 2017).

Two main principles support blockchain technology, namely cryptographically signed transactions (Yaga *et al.*, 2018) and peer-to-peer (P2P) or shared data storage (Mainelli & Milne, 2016). Blockchain technology is a distributed system for capturing and storing a consistent, immutable, linear event log of transactions between networked actors cryptographically (Radius & Spohrer, 2017). As such, it can be deduced that blockchain technology is a transaction ledger that can be accessed and approved only by authorised parties. It guarantees high accuracy, as none of the entered transactions can be erased once approved (Rabbani *et al.*, 2020). Various studies discussed the advantages of implementing blockchain technology. For instance, Fanning and Centers (2016) stated that the system could function continuously without interference, and every transaction would be clear, trustworthy and transparent. In addition, Yermark (2016) mentioned how real-time blockchain transactions would benefit the corporate governance sector. Blockchain technology also provides a cost-saving benefit, eventually increasing the organisation's profit and allowing supervision and reducing information asymmetries among participants. Similarly, Ko *et al.* (2018) stressed that reduced cost and surveillance could be achieved using blockchain technology in the manufacturing sector. These studies show that blockchain technology brings many benefits if implemented in any industry. Therefore, zakat institutions, as organisations which are built on trust, can equally benefit from reduced organisation costs and supervision through blockchain implementation. These costs savings allow funds to be used for other purposes, such as marketing and awareness about zakat payment.

Simultaneously, implementing blockchain technology necessitates a comprehensive assessment of the challenges faced by zakat institutions to guarantee a seamless integration of blockchain technology within zakat management. According to Alaeddin *et al.* (2021), the lack of clear laws or policies is one of the main challenges of blockchain implementation. It has made financial institutions reluctant to adapt the technology into their system, as there are still no rules to regulate the technology to ensure it is safe to use. Besides, blockchain technology is a system that uses the internet as its main source, while in some countries, the unavailability of internet services is an ongoing issue, and when blockchain is implemented, it requires much effort and cooperation between parties to provide the service (Bakar & Rosbi, 2018). Other than that, the main concern in implementing blockchain technology is the cost, either in terms of infrastructure

cost (Gaur, 2020) or the cost in shifting from the existing system to the new system using blockchain technology (Schmidt & Wagner, 2019). For that reason, comprehensive research is important to ensure smooth adoption of blockchain technology in the area of zakat management.

The growth of the intention to adopt blockchain technology worldwide can be seen particularly in the Islamic finance sector. As one of the Muslim-majority countries, Indonesia has aggressively transformed its financial ecosystem by implementing blockchain technology in the use of various Islamic financial instruments. For instance, the Indonesian Islamic microfinance cooperative BMT Bina Ummah launched the first *ṣukūk* transaction with blockchain technology through the Smart Sukuk platform of Blossom Finance (Blossom Finance, 2018). Another example is the case of Masjid Ramadan, or Shacklewell Lane Mosque in London, which was the first to accept donations in cryptocurrencies using blockchain technology. Later, the digital currency had to be converted into Sterling Pounds to avoid volatility (CNN Indonesia, 2018). These implementation stories prove that blockchain technology has already begun to emerge in the financial markets; thus, the possibility of being implemented in the zakat management system is increasing, and more studies should be conducted, especially in the context of Malaysia.

Moreover, adapting blockchain technology in the zakat management system in Malaysia will be in tandem with the capacities for the digital transformation of the Malaysian government and realising the potential of the Industry Revolution 4.0 (IR4.0). As a matter of fact, there has been an attempt to implement the technology into the zakat management system in Malaysia, such as the collaboration of ISRA and SysCode in 2019 to launch ZakatTech, involving blockchain technology in zakat collection and distribution (Lubis & Azizah, 2018; ISRA, 2019). However, as of 2023, ZakatTech is yet to be launched for several reasons, especially because of legislative barriers since zakat affairs are bounded by state laws in Malaysia.

While many studies focused on the general concept as well as the advantages and challenges of blockchain technology, there remains a gap in the exploration of its implementation in zakat management. As stated, blockchain can be the alternative to achieve more systematic and better management in zakat affairs; thus, how it is embedded needs to be discussed and explained to guide future implementation. This research will focus on how the model of the zakat system empowered by blockchain technology is proposed to ensure a better and public-assured zakat management system.

METHODOLOGY

As blockchain technology is still new in Malaysia and, in fact, is still being proactively studied, the use of exploratory research is a preferred way to analyse how it works in the zakat management system. As qualitative research is inquisitive in nature, Creswell (2009) suggests the exploratory research design to explore the phenomenon. Moreover, exploratory research will be helpful to investigate a specific issue when studies delve into a novel and undefined topic or issue (Morse, 1991; Dudovsky, 2011). Therefore, a comprehensive exploratory approach, with interview as the primary instrument, is imperative to address the limited implementation of blockchain in zakat institutions in Malaysia.

Therefore, this research adopts in-depth interviews to conduct an effective observation and analysis of blockchain technology implementation in the zakat management system. It also applies the exploratory research design to inspect how blockchain technology will positively impact zakat management and how it will be integrated to benefit zakat collection and distribution, besides examining the blockchain phenomena thoroughly (Miles *et al.*, 2014).

Collection Methods

This research started with reviewing the literature on blockchain management, zakat management systems, and cases of zakat blockchain, if they existed, to identify the research gaps and observe the potential of blockchain implementation in the zakat management system. The following research questions were formulated to fill in the research gaps:

1. How will blockchain technology benefit the zakat management system in Malaysia and impact the society?
2. How can blockchain technology be integrated and work in the current zakat management system in Malaysia?

In-depth interviews were conducted with two informants who are experts in blockchain technology and Islamic finance to explore how the technology can be implemented in the zakat management system. The interviewees were chosen based on the objective of the research to understand blockchain implementation in the zakat management system from a technical perspective. The interview sessions were carried out in November 2022 at the Kulliyah of Information and Communications Technology (ICT) of the International Islamic University Malaysia (IIUM), Gombak. Each session lasted for approximately two hours. **Table 1** lists the details of the informants.

Table 1: List of Informants for In-depth Interview Sessions

Experts	Area of Specialisation	Informants Coding
IT1	• ICT applications: Finance and insurance; Fintech; Blockchain; E-Government; E-commerce; ICT issues and Islam • ICT policy and social impact: ICT ethics; ICT and Islamic ethics	Informant 1
IT2	• ICT: Emergent information technology; Knowledge base; Distributed computing; Cloud computing; Grid computing • Economics, business and management: Management information system; ICT & Islam; Green computing	Informant 2

Source: Authors' own

During the interviews, the informants were asked critical research questions and further probed with sub-questions. The interviews involved IT experts to ensure correct and accurate information can be obtained on the integration of blockchain technology in the zakat management system. It ensures that the proposed model of a new zakat system can guide zakat institutions during the implementation process. The following are the interview questions asked during the in-depth interviews:

1. What is your understanding and knowledge of blockchain technology? What is your opinion on the suitability of implementing blockchain technology in the zakat management system? How will it affect zakat management in Malaysia?
2. How will the use of blockchain technology contribute to increased trust of zakat payers?
3. What is your opinion on the transparency and traceability elements that blockchain technology will provide, and how does it work in the zakat management system?
4. What do you think of the data-sharing process in blockchain technology, since it is a decentralised database or distributed ledger across the network that will manage the payment and zakat distribution?
5. What safety precautions must be taken to prevent data loss or hacking issues in the zakat management system?

FINDINGS AND DISCUSSIONS

Attributes of Blockchain Technology in Zakat Management

Transparency

Building the society's trust in zakat institutions will be related to transparency. Various studies focused on transparency as their core study, either in organisational governance or the financial market (Bloomfield & O'Hara, 1999; Jordan *et al.*, 2000; Bushman *et al.*, 2004; Nicolaou & McKnight, 2006; Potosky, 2008). Transparency is defined as the availability and disclosure of accurate organisational information in real-time so that it can be verified and accessed by the public and act as a communication channel between that organisation and society (Potosky, 2008). Transparency is necessary to ensure that organisations work at their best, enhancing the public's confidence. Schnackenberg and Tomlinson (2014) stated that effective management would lay stress on three main elements to ensure transparency: information disclosure, clarity and accuracy. Furthermore, some studies emphasised that transparency would escalate the aspect of good governance in an organisation as it would provide clear and readily available information about its activities, structures and performance to stakeholders, which will eventually lead to confidence and reputational building in society (Piotrowski & Van Ryzin, 2007; Carroll & Shabana, 2010).

Considering that zakat institutions are classified as an organisation primarily based on public confidence, transparent reporting is necessary and crucial for public access to ensure that the zakat fund is being used and managed appropriately. Therefore, some research (e.g., Naz'aina, 2015) has highlighted the importance of internal control and the capability of the *ʿāmil* to manage the zakat fund, proving the necessity of accountability and transparency of zakat institutions. Lewis (2006) stressed the importance of accountability in zakat institutions, either from the perspective of zakat collection or distribution. Furthermore, transparency is not only a way to be accountable to the public; ultimately, it is a means of being accountable before Allah. Thus, each zakat institution must be transparent in providing sufficient, accurate and available information about the zakat fund for tracking purposes to achieve transparency towards the society and consequently to Allah (Abd Wahab & Abdul Rahman, 2011). This fact is supported by the experts, who stated how zakat payers seek and desire transparency in the zakat management system, particularly on the aspect of zakat fund management:

> 'What I want to know regarding zakat is where my zakat payment would go. I believe this expectation can be met using blockchain technology compared to other available digital platforms. I will give you an example. Let's say we contribute RM10,000 to the zakat institution; by using blockchain, the payment trail can be known; the digital fingerprint firstly goes to the *ʿāmil*, then the zakat institution, and more. So, from the zakat amount of RM10,000, I will know that RM1,000 will be distributed to this…another RM1,000 will go to somewhere else…I do not want to be proud and arrogant about my contribution, but I want a transparent process in the zakat institution…transparency can build trust…" (Informant 2).

> 'If I am paying my zakat, and we have the blockchain platform, that would be a chance for us to know where our money goes...because we can trace the movement from A to Z…' (Informant 1).

Informant 1 further added:

> 'In a transparent system, let us say when I pay RM1,000…at the end of the day, I will know the amount that goes to the *faqīr* or *miskīn*…I do not care if the zakat is being distributed in Kelantan or Terengganu…as long as it is going to the intended *mustahik*… indirectly, we, as zakat payers, will be more confident with the management…I can be assured that the zakat funds are not being accumulated and are being distributed appropriately…' (Informant 1).

Blockchain technology serving as a public distributed ledger can be the tool to ensure transparency due to its principles, such as transparency, immutability and traceability. Besides, the element of decentralisation and eliminating third-party interference in blockchain technology will play an essential role in achieving transparency, and in fact, it can indirectly minimise the risk of human error, fraud and issues in managing data (Fischer, 2018; Hambiralovic & Karlsson, 2018). This is because blockchain technology will provide real-time updates of each transaction, which will consequently eliminate human error, deliver reliable processes and ensure accurate information (Deloitte, 2016; Demirkan *et al.*, 2020). This process is especially needed in the zakat collection and distribution process to enhance trust in the society. It is much required for zakat institutions that manage the public contribution for survival.

The distributed ledger in the blockchain technology and the consensus algorithm will warrant each transaction to be accountable and transparent as it will be built and gathered as a block. Therefore, the possibility of it being manipulated and disguised is close to zero, and this will safeguard the contribution from zakat payers. Furthermore, blockchain technology will assure zakat payers that their zakat payments are intended for the *aṣnāf*'s well-being. Currently, each zakat institution depends on its own server and database, which will not be the case under blockchain technology. Besides, as it is a distributed ledger, all data will be recorded simultaneously on every blockchain network, and everyone in the network will be able to see the transactions which have been carried out. Thus, implementing this feature will instil assurance and build confidence among zakat payers, who can trace the end-to-end process from the zakat collection to its distribution. The experts also emphasised how the implementation of blockchain technology in the zakat management system will change the dynamics of zakat collection and distribution. The following statements were recorded from Informant 2:

> '...that is why most people hesitate to let people know what they have done in an organisation…they do not like transparency as if people will question them, but the way blockchain technology functions is to provide transparency…blockchain will help…' (Informant 2).

> '...blockchain transaction is, of course, in real-time, and to see this element of transparency of blockchain technology can be related to the story of Prophet Sulaiman on how the throne of Balqis from Saba' can be brought in real-time to Baitul Maqdis...' (Informant 2).

In addition, as blockchain technology practises decentralisation and an open system, everyone permitted in the system can access the data. It will encourage accountability of zakat institutions and ensure that the zakat fund is governed according to Islamic principles. Furthermore, it can also act as a tool to avoid any misuse, mismanagement and dishonesty in the course of the collection and distribution process; in fact, blockchain solutions will empower zakat payers to receive zakat distribution data that would match with their payment.

Consequently, integrating blockchain technology will lead to better and more efficient zakat management as it will increase accountability and transparency. This is supported by Al-Shbail & Aman (2018) who confirmed that using technology would surely increase accountability and transparency.

Traceability

Traceability is usually related to the food and supply chain industry and the agricultural sector (Montet & Dey, 2018). It is commonly discussed in the context of disease outbreak prevention, and thus, most of its definitions are found in those industries (Olsen & Borit, 2018). For instance, Opara (2003) stated that traceability requires six components to ensure its comprehensiveness: product, process, genetics, input, disease, and measurement.

Nevertheless, traceability is becoming an important risk management tool beyond those industries, such as in the medical, electronics and automotive industries. Therefore, some modern scholars have defined it as 'the ability to access any or all information relating to that which is under consideration, throughout its entire life cycle, employing recorded identifications' (Oslan & Borit, 2013, p. 148). Meanwhile, some studies discussed the difference between traceability and trackability, such as Stefansson and Tilanus (2000) and Schwägele (2005), who stressed that tracking is the movement of data from a starting point to its destination. However, tracing is more towards finding and identifying the origin of that data to ensure it is constantly updated. Relating to that, traceability is the combination of where the source of particular data is recorded, followed from the beginning to the intended location, to ensure its provenance, thus building consumer trust.

When discussing zakat institutions, it is essential to note that traceability is one of the significant ongoing issues, as zakat payers still need more confidence in the management of zakat institutions. Accordingly, blockchain technology will create an audit trail of the transaction, specifically the movement in the zakat fund. It will ensure that at every step of the process, from the payment to the distribution stage, zakat payers and stakeholders can trace and track the fund, instilling the confidence of zakat payers. Studies highlight that when blockchain technology is integrated with the existing platform or process, it indeed traces and tracks each transaction so that everyone in the network can trace every step of the transaction (Tsai *et al.*, 2016; Ismailisufi *et al.*, 2020; Elghaish *et al.*, 2020). Therefore, zakat payers can be assured of the use of their funds and can trace the proceeds, regardless of their geographical location, through the provided platforms or websites, at their fingertips.

It should be noted that while blockchain technology will instil traceability, it will simultaneously allow the system to identify zakat payers and *aṣnāf*, respectively. It will ensure the smooth execution of zakat collection and distribution, and eventually, prevent mismatched data, double-spending and mismanagement of the zakat fund. Our experts also highlighted this, stressing the significance of traceability in the zakat management system, as the zakat fund is from the public, and zakat institutions must manage it with due care and diligence. Regarding zakat as *ʿibādah* to Allah, everyone, whether zakat payers, *aṣnāf* or zakat institutions, bears responsibility for their actions and will be held accountable in the hereafter. Informant 2 highlighted the following:

> 'Blockchain technology can be described as an app…when I go to the zakat institution's platform, I can click on the website…some sort of interface…where my money will go… this is because I want to know, up till now, how much I contribute to the society and where

that money goes, and thus I can re-evaluate myself and motivate myself to do better in the future…this is where the trust will be enhanced…' (Informant 2).

'Yes...blockchain technology can trace money….Why are you hesitating to use this technology?...You are supposed to be proud of the advancement…What is it that you want to hide?…The zakat fund is from the society, and in the hereafter, you will be asked how you managed the fund….It would be best if you were responsible, while blockchain technology will facilitate to ease your responsibility.' (Informant 2).

'…Blockchain technology, Internet of Everything (IOE) and artificial intelligence (AI), all of this technology is supposed to bring us closer to Allah and to do good deeds as it will ensure us to be transparent and traceable...' (Informant 2).

Security

Ensuring data security in an organisation is essential. Especially with the rapid exposure of technology used by society, security has become a major issue. Accordingly, blockchain technology can be one instrument warranting security in any platform because it is immutable and built on a cryptographic algorithm. It will make it nearly impossible for hackers to alter any information in the network since they need to hack each of the blocks available in the system, which is a computationally intensive task. Therefore, tampering with data stored in blockchain technology is almost impossible, thus, making it safe and providing better security for any organisation. Our experts also encouraged the use of this technology to provide a better system and avoid cybersecurity issues since blockchain technology uses the algorithm and cryptographic key that help build better and immutable transactions of that blockchain across every ledger in the network. Informant 1 stated:

'As of now, because of blockchain technology…and the algorithm they are using...the cryptography seems to be unbreakable...so this helps on the aspect of security.' (Informant 1).

The element of decentralisation in the blockchain technology operating on a consensus mechanism will require every participant involved in the network to agree on the validity of a transaction or any information before it is added. This will prevent data manipulation as the blocks are related and will ensure that the network operates securely and transparently. Thus, every transaction recorded in the cryptographically distributed database will allow all stakeholders to verify and validate the accuracy of all information and prevent available information from being removed and tampered with (Chong, 2021). Furthermore, operating a system authorising every participant in the blockchain network to trace and view every transaction in real time will be beneficial, particularly regarding a secure and transparent charity model (Beik *et al.*, 2019).

Therefore, implementing blockchain technology in the zakat management system is becoming necessary and can facilitate better security of the zakat fund, either at the stage of collection or distribution. Furthermore, when blockchain operates on cryptographic and consensus algorithms, it enhances the resilience of zakat organisations by providing a secure and immutable system for managing contributions from the society. Since it works on a decentralised network, there will be no third-party interference, and every piece of data in the network will be immutable, thus, avoiding attacks and data breaches. While it provides a secure method of data

management, the verification by every participant involved will ensure that every step of the process is transparent, immutable, tamper-proof and traceable. The security element will assure zakat payers' confidence and trust in the security of the zakat management and eventually encourage them to pay their zakat to zakat institutions. The informants accordingly highlighted the following:

> '...when it comes to blockchain technology, it should be noted that it cannot be changed. It means...or is described as a debt book (*Buku 555*) in a restaurant that records each transaction where you cannot change the recorded details. However, this can be tampered with by someone who records the transaction, and in fact, the record is limited to that particular place. This is different with blockchain technology, where it is almost impossible to tamper with and much better as the records are updated and go beyond a particular place. If the restaurant is in my village, Permatang Pauh, using blockchain will ensure the transactions are being updated everywhere, whether in New York, Australia or anywhere else…it never changes…This helps build trust because people know it can never be changed…' (Informant 2).

> 'When someone tries to hack the system, the aspect of decentralisation will help…in a general perspective, if we have 14 databases…similar to 14 states…once I made a payment in the blockchain environment, those payments will be safe as what they call a block. So those blocks will be copied into all those 14 stations. Under the current practice, if you want to tamper with the data at a certain station, you can go to one point only, but not with the blockchain network…in the blockchain network, if you want to change even one transaction in the network, you have to go to every station and change it. Can you imagine if you have 1,000 stations and the tampering must be done in a short time?…The tampering can be difficult because the transaction will keep changing, and this is the security of blockchain.' (Informant 1).

Implementing blockchain technology in the zakat management system will provide a better security and tamper-proof system for governing the zakat fund and will ensure that its misuse is avoided. In addition, having a multiple verification and validation system will ensure every zakat payer or *aṣnāf* is identified correctly, ensuring the fund is distributed and managed appropriately. Zakat is a contribution from the society, thus, requiring zakat institutions to provide the best management system. If blockchain technology can provide an immutable, secure, transparent and traceable system, it should be explored and executed at the soonest for the zakat fund to play its role in the society.

Model of a New Zakat System Empowered by Blockchain Technology

Considering the benefits brought about by blockchain technology, this study leverages on blockchain technology to propose a more effective model of the zakat management system in Malaysia. Blockchain technology in this model will function as an underlying technology facilitating zakat institutions to manage the data of zakat payers and *aṣnāf* appropriately and to improve zakat collection and distribution services.

When a zakat transaction is entered into a blockchain network, it will be identified and verified by the participants involved and added as a block. It will be combined with the existing blockchain creating a chain of blocks. It should be noted that the entered transaction cannot be altered, as it is immutable and secure from any alteration. As it is operated on a decentralised

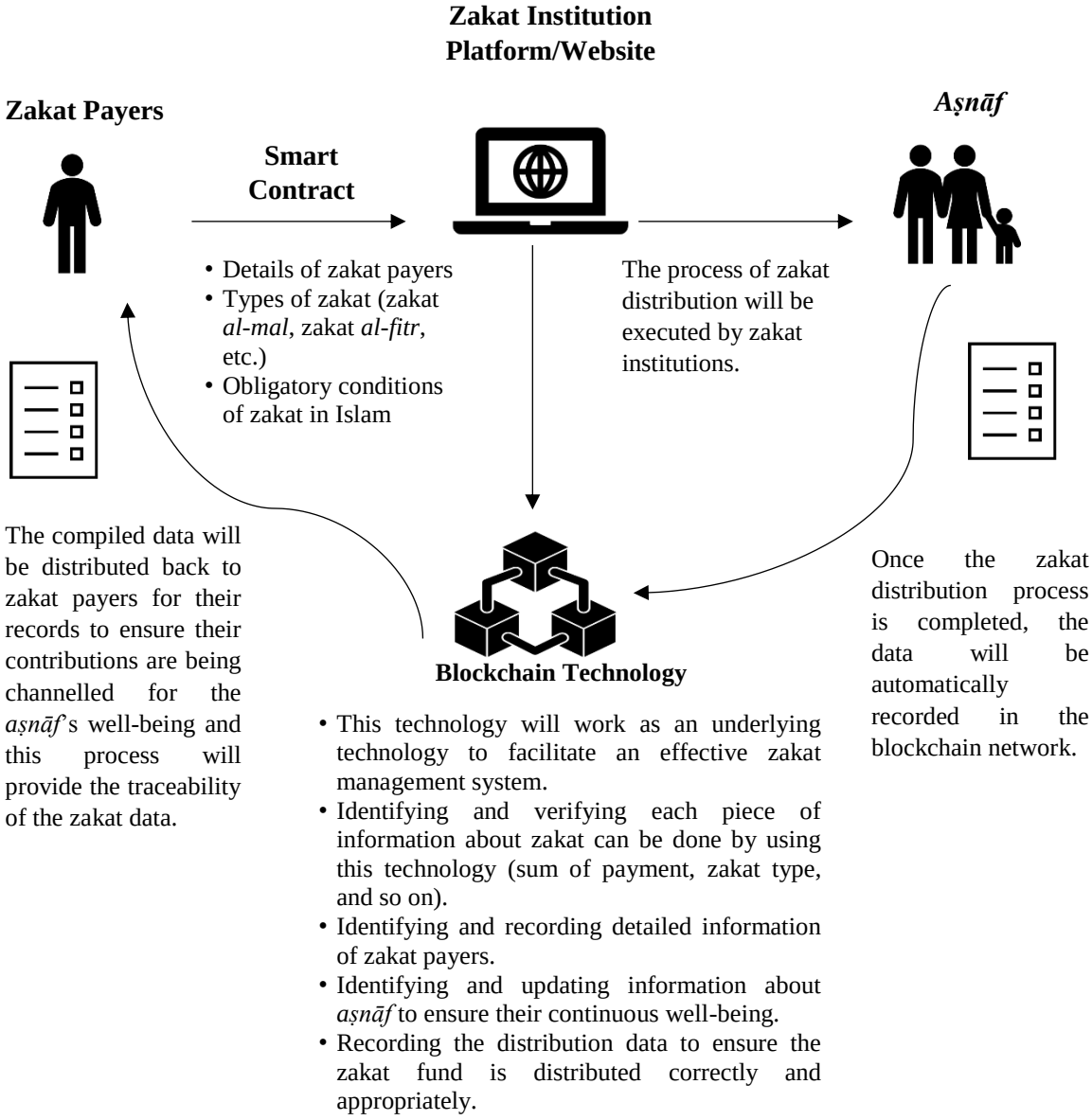
system, from and to the end users themselves, the transaction will be transparent as it does not require the involvement of third parties. Simultaneously, the zakat transaction will be traceable as the end-users can directly track its movement from A to Z. Thus, the data history from the collection point to the distribution will be given back to the zakat payers to safeguard and ensure the zakat fund is being used appropriately and for the intended purpose of the *aṣnāf*'s well-being.

Figure 1 illustrates the proposed model of how blockchain technology will be integrated into the zakat management system in Malaysia. The model has been developed based on the data analysis and literature review. Under the proposed model:

1. The system will be initiated when the zakat payer contributes his/her fund. The zakat payer can effect the zakat payment through the platform of preferred zakat institutions.
2. While the zakat payment is being processed, a smart contract that comprises an agreement with the zakat payer will be executed to ensure that the transaction can be smoothened. The smart contract will include the details of the zakat payer, the zakat type, and obligatory conditions of zakat in Islam. Therefore, to activate the zakat system, the zakat payer must fulfil every condition.
3. The zakat institution will complete the zakat fund distribution to the intended categories of *aṣnāf*. Under certain circumstances, the zakat institution as the distribution authority may prioritise specific categories of *aṣnāf*, especially the poor and needy, to ensure social justice in the society.
4. Meanwhile, blockchain technology will serve as the underlying technology of zakat institutions' platform to manage transactions transparently, with traceability and security. The blockchain network will identify, verify and record each transaction entered through the platform as an immutable block. The identity of zakat payers and the *aṣnāf* can be verified and recorded through blockchain technology to ensure data authenticity and ensure the data will be constantly updated. While zakat institutions are executing the zakat distribution process, blockchain technology will also record the transactions and information of distribution, and this will ensure transparency and accountability of zakat institutions as no changes or alterations can be made using the blockchain technology in the system.
5. Therefore, as the transactions of collection and distribution are recorded and verified using blockchain technology, complete details will be provided to zakat payers for their record and safekeeping. This record ensures the traceability of the zakat fund movement and will enhance public confidence in the zakat management system.

Zakat institutions can execute the proposed model as it does not bring about much change to the existing system that uses online zakat payment either through the websites of zakat institutions or by using zakat agents such as online banking and e-commerce platforms. The proposed model is user-friendly as zakat payers will not be affected by the new system. Rather, it will offer an improved system that will enable zakat payers to track and trace their payment records and the details of the zakat distribution. Moreover, as the system records and updates detailed information on the *aṣnāf*, the zakat collection and distribution processes will always maintain accuracy and avoid mismatched, mismanaged, and double-spending issues.

Figure 1: Proposed Model of a New Zakat System Empowered by Blockchain Technology



Source: Authors' own

CONCLUSION

To sum up, it is undeniable that blockchain, a decentralised public distributed ledger, will bring various benefits when implemented in an organisation; the same goes for zakat institutions. As confidence of zakat payers towards zakat institutions is the main issue that needs to be resolved, blockchain technology may facilitate in building trust in the zakat management system. Therefore, this research proposes a new model of zakat management, empowered by blockchain technology. This model leverages on blockchain as the underlying technology to ensure transparency, traceability and security of each zakat transaction within the zakat management system. This study facilitates the understanding of how blockchain technology can be embedded within the existing zakat management system to enhance its performance and effectiveness.

This study is limited to coordinating the blockchain core elements with the zakat management system while proposing a new model of the zakat management system empowered by blockchain technology. Further research should focus on the empirical data and measure the readiness of the society and zakat institutions to use blockchain technology. Additionally, further research on other suitable models of blockchain zakat should be undertaken to diversify the available model and provide zakat institutions with choices to accelerate blockchain implementation in the zakat management system.

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DECLARATION

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- Amelia Nur Natasha Nazeri: Conceptualization, Write up, Methodology, Interviews, Project overview, Presentation of findings, Analysis, Writing-original draft, Review and editing.
- Shifa Mohd Nor: Conceptualization, Write up, Methodology, Interviews, Project overview, Presentation of findings, Analysis, Writing-original draft, Review and editing.
- Aisyah Abdul-Rahman: Methodology, Interviews, Validation, Review and editing.
- Mariani Abdul-Majid: Methodology, Interviews, Validation, Review and editing.
- Siti Ngayesah Ab. Hamid: Methodology, Interviews, Validation, Review and editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interest or personal relationships that could have influenced the research work.

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Data Availability

None

Appendix

None