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THE POTENTIAL OF USING SMART CONTRACTS IN CASH WAQF ON BLOCKCHAIN

Abdulmajid Obaid Hasan Saleh[i], Deden Misbahudin Muayyad[ii] & Al-Shaghdari Fahd[iii]

[i] (*Corresponding author*). Associate Professor, Institute of Islamic Banking and Finance, International Islamic University Malaysia (IIUM). alamri@iium.edu.my
[ii] Lecturer, Fakultas Ekonomi dan Bisnis, Universitas Trisakti. deden.misbahudin@trisakti.ac.id
[iii] Assistant Professor, Institute of Islamic Banking and Finance, International Islamic University Malaysia (IIUM). alshaghdari@iium.edu.my

Abstract *This paper attempts to explore and analyze the concept of cash waqf using smart contracts. This paper seeks to see to what extent blockchain can be leveraged to more effectively and efficiently mobilize the collection of cash waqf. The method used in this paper is a descriptive-qualitative method using secondary sources. Through research, the results show that to further increase public interest in cash waqf, blockchain technology should become a structured system through smart contracts, and its management should be centralized. The contribution of this research to society is to make it easier for people to pay cash waqf so that the number of cash waqf increases. In addition, this research contributes to the development of technology-based waqf.*

Keywords: *Blockchain, Smart, Contract, Cash, Waqf.*

INTRODUCTION

Waqf is one of the most important provisions of Islamic financial legislation, and it is considered a fundamental principle of the Islamic economic system which has an impact on the social and economic dimension. Furthermore, waqf is the source of potential social funds closely linked to the welfare of the nation in addition to *zakat* and *shadaqa*.

On the other hand, blockchain can be one of the factors that cause people to do waqf, especially cash waqf. This is because blockchain can be applied to many different business aspects of modern society, such as financial transactions, business, Internet of Things, networks, government systems, military, and many other fields; after the second information revolution of the internet, the future may bring humanity three information revolutions (Cho & Park, 2017). It is possible to transform the current Internet from "information sharing Internet" to "Internet value exchange" (Chen G. et al., 2018). In addition, the blockchain is included in the "Future of 10 New Technologies" reported by the UN in the future (Yoo, 2017). Therefore, we believe that blockchain technology has good prospects to solve the problem of cash waqf. Thus, the purpose of this research is to analyze cash waqf collection through blockchain technology.

LITERATURE REVIEW

Blockchain

Blockchain is a digital information recording method capable of recording data using a logbook method (Leon et al., 2017). Blockchain technology is also known as distributed ledger technology (Chen et al., 2018), it is a distributed ledger where participants in a blockchain peer-to-peer (P2P) network, rather than a central administrator, generate blocks (Oh & Shong, 2017). The blockchain is not only a new type of internet infrastructure

based on distributed applications but also a new type of supply chain network and distributed network of computers (nodes) used to maintain an information-sharing source (Chen et al., 2018).

The development of blockchain applications can be divided into three phases: blockchains 1.0, 2.0, and 3.0. Blockchain 1.0 deploys cryptocurrency as a point-to-point cash payment system. Blockchain 2.0 is an extensive blockchain application, not a simple cash transaction, including stocks, bonds, loans, smart property, and smart links. Blockchain 3.0 is developing regional chain applications that go beyond currency, finance, and markets such as government, health, science, culture, and the arts (Swan, 2015).

Blockchain implementations can be either public or private (Pirtle & Ehrenfeld, 2018). In the public implementation, anyone can participate, and the network is open to everyone, usually has some incentives to encourage participants to join the blockchain, an example of the most well-known public blockchain is Bitcoin, which is currently the largest public blockchain in the world. While in the private blockchain, all participants are known, participation in the private blockchain requires an invitation and typically, private blockchains exist on the licensed network to further limit participation in the network, an example of private blockchain implementation is whether the regulator issues a license to participate in the network (Pirtle & Ehrenfeld, 2018 ; A. A. Farah & A.O. H. Saleh, 2023).

In general, blockchains have the following key performance characteristics (Murphy, 2016):

1. **Transparency:** The blockchain is highly transparent because each participant has a complete, traceable record of each transaction recorded on the blockchain. Transparency can determine the type of use of the blockchain and is relevant when considering legal and regulatory issues related to that use.
2. **Time-stamped:** Since the timestamp is associated with each block, this allows all participants to know when a transaction occurred by the block occurred. This can be especially useful when it is necessary to prove the history of the transaction (for example, for legal or regulatory reasons).
3. **Immutable:** Data from existing (non-blockchain) systems cannot be changed, so business cases that assess risks associated with blockchain technology can reasonably compare relative data security between blockchain deployments and existing systems. Blockchain technology is immutable for two reasons. On the one hand, all transactions are stored in blocks, where one hash key is linked to the previous block and one hash key points to the next block. Blockchain, on the other hand, is a shareable public ledger that is stored on thousands of nodes, and all ledgers continue to be synchronized in real-time (Tschorsch & Scheuermann, 2016).
4. **No single point of failure:** Because the same copy of the blockchain is downloaded from the World Wide Web to multiple nodes (ie all participants' computers) if any node fails (either for technical reasons affecting a computer or because the participant is out of service), other nodes will continue to provide information to all other participants. This feature can be considered when assessing business continuity, disaster recovery, and (in IT terminology) system "redundancy" issues.
5. **Irrevocable:** Transactions recorded on the blockchain can be unchangeable and irreversible.
6. **Programmable:** Instructions can be included in code embedded in blocks in a blockchain. An example of such programmable logic is the smart contract implementation on the blockchain.

Furthermore, Chen believes that there are at least four advantages to using blockchain technology (Chen et al., 2018), namely:

1. **Reliability**: The decentralized nature of blockchain networks transforms the entire database of transaction records from closed and centralized records managed by

only a few authorized authorities to open distributed ledgers managed by tens of thousands of nodes.
2. **Trust**: The blockchain network acts as a new trust broker for distributed ledgers.
3. **Security**: The blockchain network uses a one-way hash function, which is a mathematical function that accepts a variable-length input string and converts it to a fixed-length binary string.
4. **Efficiency**: All information is automatically processed by a pre-programmed program. Therefore, blockchain technology can not only greatly reduce labor costs, but also improve efficiency.

According to Grech and Camilleri, Blockchain is usually used to store records asset transactions, signatures, and certificates, smart contracts (Grech & Camilleri, 2017).

1. Asset transactions

Asset transaction records usually take two forms (Grech & Camilleri, 2017): (1) Coin; expressed as a currency, each unit of the same currency at any time has the same value as any other individual unit. Currency can also be exchanged internally according to the exchange rate. (2) documentary evidence of ownership; legally known as property. They are usually used to represent intangible assets such as land or tangible assets such as intellectual property.

2. Signature and certificates

In the most important form, certification is the one that tells the other party that a fact is true, the signature proves that the statement was issued from the parties (Grech & Camilleri, 2017). Also, a blockchain can be used to store a cryptographic hash of a certificate ("digital fingerprint") or to store the claim itself.

3. Smart contracts

In general, a smart contract is a computer protocol or program that allows an automated execution/implementation of a contract while considering a set of predefined conditions, for example, a smart contract defines the application logic that will be executed whenever a transaction occurs in a cryptocurrency exchange (Reyna, Martín, Chen, Soler, & Díaz, 2018).

A smart contract is a contract that is placed in a block of the blockchain, smart contracts are the same as any other contract, and only smart contracts can be executed by the blockchain itself, an example of a smart contract is used for transaction verification and storage purposes (Severeijns, 2017). A blockchain-based smart contract enables regulators to keep track of all changes in the agreement made between contracting parties. Unlike a conventional contract that concludes an agreement, the parties must sign a contract to proceed, and the smart contract is automatically executed-that is, once the instruction is written to the blockchain, the transaction will automatically detect the condition, and the parties to the transaction, as appropriate or other third parties do not need to take further action (Grech & Camilleri, 2017). Smart contracts are expected to simplify physical and visual transactions and reduce transaction costs in the form of existing transactions based on physical exchanges (Yoo, 2017). Smart contracts are faster, cheaper, and fairer than traditional contracts. Smart contracts not only define rules and penalties around the agreement in the same way as traditional contracts but also automate these obligations (Severeijns, 2017).

The difference between a smart contract and a traditional contract can be seen below:

Table 1: The Difference between smart contract and traditional contracts

Traditional Physical Contracts	***Smart Contracts***
Created by Legal Professionals	*Created by Computer Programmers*
Contain Legal Language	*Entirely Digital and Written Using Programming Code*
Vast Amounts of Printed Documents	*Defines the Rules and Consequences*
Heavily Rely on Third Parties for Enforcement	*Stating the Obligations, Benefits, and Penalties*
If Things Go Bad, Rely on the Public Judicial System	*Code Can Be Automatically Executed by A Distributed Ledger System*

Source: (Nor, 2017)

Blockchain uses smart contracts to allow different participants to register through a transaction "statement" about the deposited object (Sicilia & Visvizi, 2018).

Cash Waqf

Waqf is most like the English word 'endowment' or literally means 'detain' in Arabic and was recognized as one of the voluntary charitable acts in Islamic law and was recommended by the Prophet Muhammad of Islam (peace be upon him- hereinafter PBUH) in the early days of Islam (Pitchay et al., 2014). From the perspective of Islamic law, waqf may be defined as holding a *maal* (an asset) and preventing its consumption to repeatedly extract its right to use to represent the goal of justice/philanthropy (Kahf, 1998). In a simple way, waqf means diverting *ayn*/property from private ownership and using its use rights for charitable purposes (Mohsin, 2013; Abulatifa M. M. A. et al., 2023).

Whereas cash waqf is the amount provided by the founder (individual, company, institution, private or public organization) and the commitment to permanently use the social welfare service (Mohsen, 2009). According to Lahsasna, cash waqf sources are based on the permanent collection of funds from donors and their investment in productive assets, providing access or income for future consumption of individuals or groups, taking into account donor contributions, policies, and guidelines (Lahsasna, 2010). The Indonesian Ulama Board/Majelis Ulama Indonesia (MUI) issued a fatwa on cash waqf on May 11, 2002, stating:

1. Cash Waqf (*Waqf al-Nuqud*) is done by individuals, groups, institutions, or legal entities in the form of money.
2. In the monetary sense, including securities.
3. Cash waqf is *jawaz* (possible).
4. Cash Waqf can only be distributed and used for shar'iah allowed things.
5. The main value of cash waqf must be sustainable and must not be sold, donated, and/or inherited.

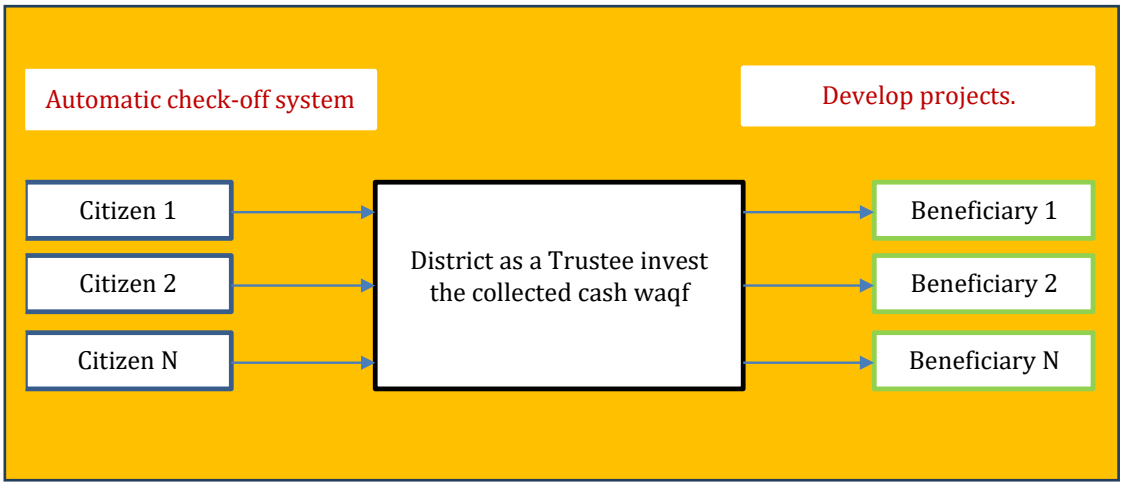
Muslim agree that cash waqf has three main conditions that must be followed, namely (Mohsin, 2013):

1. Irrevocability. This means that once the founder has created a financial waqf, he cannot revoke it. However, he can benefit from the knowledge he produces.
2. Perpetuity. Once a cash waqf is established, it must be permanent. It provides sustainable and continuous support of cash reserves to support various goods and services needed by Muslim societies.
3. Inalienability. This means that once the money is created in the form of waqf, no one can become the owner of the transfer, it becomes a "frozen asset". It cannot be linked to any gift, bequest, or alienation.

Recently, Muslim society has rapidly developed cash waqf, many wealthy Muslims have been providing cash waqf to Islamic religious and community organizations in specific institutions (Kachkar, 2017). Kachkar then explained, due to its unique advantages in

fundraising and its liquidity and flexibility, recent cash waqf resources have been incorporated into several models for improving socio-economic development and alleviating poverty, i.e., for small-and medium-sized enterprises, education, microfinance, economic development, for use by financial institutions, for use by non-profit financial intermediaries, poverty alleviation, microenterprises, and for health care services. Several studies have focused on cash waqf, among them (Çizakça, 1998; Ahmed, 2007; Haneef, et al., 2015 ; Duasa & Thaker, 2016; Siswantoro & Rosdiana, 2016; Mohsin, 2013).

One of the public cash waqf is the co-operative's waqf scheme. The purpose of the scheme is to provide basic needs for each region, each region as a trustee to manage their own cash waqf and provide the services needed in their area, such as the establishment of religious schools, health care, and many economic development projects funds (Mohsin, 2013), as shown in the picture below:



The plan works as follows:

1) As the founder of cash waqf, citizens provide funding for the different projects required in different regions.
2) The designated area acts as the trustee of the Waqf funds collected by the management and investment.
3) Then the investment income is used to develop projects in the region.

METHODOLOGY

The method in this paper is a descriptive qualitative. The data analysis process in this research was carried out by examining all available data from various sources such as reports of relevant agencies, newspapers, journals, online articles, websites, books, and conferences proceeding on blockchain and cash waqf.

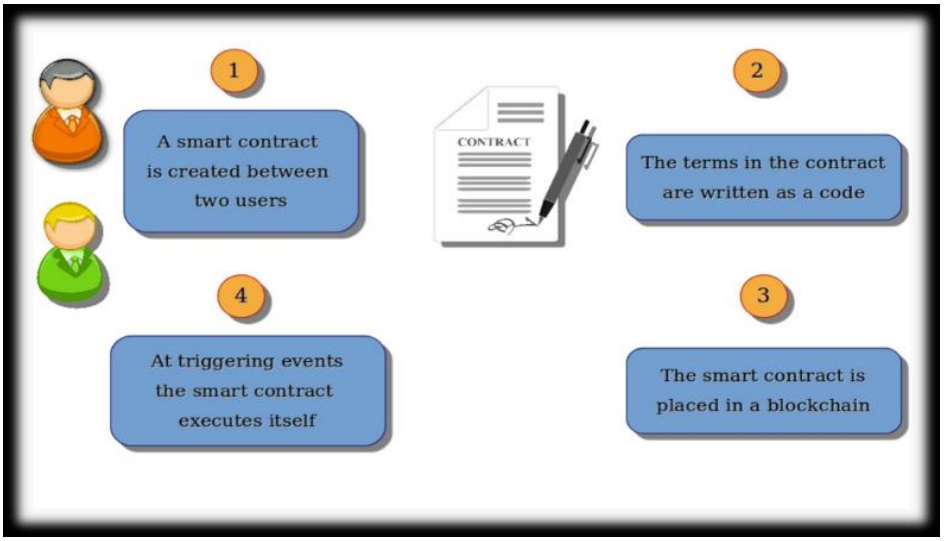
RESULT AND ANALYSIS

As explained above, one of the functions of blockchain technology is that it can record smart contracts. Among the benefits of a smart contract are establish contract law through e-commerce agreement and designing business practices between people through computer programs on the Internet.

The problem of cash waqf mobilization which has been one of the obstacles in optimizing cash waqf management can be solved through a smart contract. The reason is that the smart contract is more effective, efficient, and transparent for the parties who carry out the contract. This is in accordance with the principles of the Islamic contract which requires willingness and honesty. Specifically, the advantages of smart contracts are (Mohsen, 2018):

1. Easier to choose the waqf scheme a donor would like to contribute.
2. Fast sending waqf contribution to the specified beneficiaries
3. Accurate and transparent tracking any contribution send to any scheme.
4. Easier tracing of the social impact of that contribution on community and the society at large
5. Encourage the good doing and translate the act of infaq into reality through regular contribution.

In general, a smart contract in cash waqf can be seen in the picture below:



Source: Habib, 2018

From this picture, a waqf contract can be converted into an algorithm or code, and then the algorithm or code can be entered into the blockchain platform in the form of a smart contract. After that, the implementation of the smart contract is automatically carried out, and the smart contract can avoid the use of waqf assets that violate the provisions of the waqf provider, thereby protecting and complying with the waqf contract (Habib, 2018). This contract can be executed by several parties, so that at a certain time the waqf contract can be executed from two parties to several parties.

In addition, Oh & Shong's (2017) case studies of several financial institutions can be used as a reference for blockchain-based cash flows. In the first case study of the Kookmin Bank (KB) Financial Group, in 2016, KB Financial Group developed a blockchain-based overseas remittance service. The test of overseas remittance services and technical verification between KB National Bank headquarters and overseas branches was completed. The blockchain-based overseas remittance service uses the blockchain network as the remittance information network, rather than the SWIFT (Society for Worldwide Interbank Financial Telecommunication) network currently in use (through the intermediate bank's overseas remittance network). Using blockchain technology, it established a "non-face-to-face real-name evidence material storage system".

The second case study is NH (NongHyup) Bank, NH Bank has entered into a cooperation agreement with the bitcoin trading center KORBIT (Korbit is a centralized crypto exchange located in South Korea) to take measures to incorporate blockchain technology into certification and remittance. The blockchain-based fingerprint authentication service has been provided by NH Bank since 2016. The service records fingerprints on smartphones and allows customers to trade online bank accounts without a separate self-identification process. If customers follow their guidelines to scan their fingerprints on their smartphones, they can make all transactions, including checking

accounts, transfer and register financial products without having to go through a separate self-identification process (Oh & Shong, 2017).

As can be explained from the above example, the smart contract automatically enforces the contractual obligation when fulfilling the agreement. They can be executed without human intervention, saving time and effort. In the above transaction example, a lot of time and effort is saved through smart contracts.

The blockchain can be identical to the bank. Smart contracts can replace any existing contract if we can put it in the blockchain. For example, Company Z agreed to execute the project for Company W. They agree that the contract pays half of the cost of completing half of the work and half of the other costs when the project is completed. Z's interest is to get the cost of the first half as soon as possible. The W company's interest is to ensure that the project is executed correctly, so be careful to transfer funds. To avoid any dispute between the two in the future, project rules are set in smart contracts because they are recorded in the blockchain and cannot be changed. Because everyone can easily get the contract rules in the blockchain.

The second example we will discuss is cash waqf. Usually, when we are going to make cash waqf, we must go to the bank or other institutions designated as Nazir cash waqf and interact with the program, cash waqf policy, and so on. The bank will review or provide information related to these matters. The time-consuming step in this process is the interaction between people. When someone pays in cash, the employee will perform the process and there may not be an employee who checks and records the cash waqf contract. After checking and recording the contract, the employee sends it to another part, and so on, until it is completed. Repeat these steps for each section. This wastes a lot of time and resources. It's easier to check smart contract records; smart contract records can check records faster than employees and keep the cash waqf book distributed throughout the company. If we incorporate these steps into a smart contract, we can go to another bank or Nazir to confirm ourselves and complete the cash conversion within five minutes.

The blockchain-based cash waqf mobilization model that uses smart contracts is basically almost the same as the co-operative's waqf scheme. The fundamental difference is whether there is a third party at the time of signing the contract. In the cooperative's waqf program, the regional leader's function is to act as nazir or trustee, and nazir is responsible for managing or investing in cash waqf. Below is a detailed explanation of how the cooperative waqf model works (Pitchay et al., 2018):

1. Step 1: Donors pay the waqf money to the waqf institution through several available payment methods, such as salary deduction (automatic deduction according to a pre-agreed amount) or over-the-counter payment to the waqf institution (based on personal financial ability). The waqf institution issues cash waqf certificates to donors, which specify the specific development projects to which cash waqf money will be directed, for example financing mosques, schools, etc. In the current practice of cash waqf, the role of donors stops at stage 1. The donor has no idea how their cash will be used and they have no incentive to give money to waqf except to expect a reward and benefit from Allah (SWT) of their general income tax deduction.
2. Step 2: The Waqf Authority continues to develop the projects.
3. Step 3: Waqf institution issues membership cards to donors. The element of membership between the donors and the waqf institution is based on the concept of a cooperative (Farah A.A et al., 2023)
4. Step 4: The purpose of this membership is to provide donors with a discounted or discounted price when they stay at any waqf-based business service project or buy agricultural products, for example.

Likewise, blockchain-based cash waqf, the waqif or the waqf party will provide waqf via the blockchain platform using a smart contract. Islamic financial institutions will provide this platform which is used by the community in waqf. The ease of transactions or waqf contracts is what is expected to increase the mobilization of cash waqf.

CONCLUSION & RECOMMENDATION

Blockchain technology can be used by various institutions, including business financial institutions such as banking or social financial institutions such as waqf. So the motivation for this research is so that waqf which has been carried out conventionally can be done through smart contracts with blockchain technology, the contract process between the waqif (the party who donates the waqf) and Nazir (the party who manages the waqf) can be completed quickly, transparently and reliably. To make it easier for anyone who wants to donate waqf, it also increases people's self-confidence, especially for people who investing in the waqf sector (Gamo, S.F. et al., 2023).

Therefore, the authority of business and social financial institutions as regulators plays a very important role in regulating blockchain-based cash waqf by issuing regulations. The first strategic step taken was to conduct research and analysis of the possibility of blockchain-based cash waqf, both internally and externally. Apart from that, the government through the relevant Ministries and the Waqf Board must be pioneers in the realization of blockchain-based cash waqf. The contribution of this research to society is that it makes cash waqf easier for people, so the number of cash waqf will increase. In addition, future research can examine the potential use of blockchain in various financial and non-financial transactions. .

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