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Waqf Blockchain in Indonesia: at A Glance

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Abstract: The emergence of innovation in the world of digital finance in recent years has received attention from various parties commonly known as financial technology. This innovation is in the form of crowdfunding and blockchain platforms. These two innovations can not only be used for commercial, but also social purposes, including waqf. There is a huge potential of cash waqf in Indonesia. However, the realization is relatively still low. This study aims to analyze at a glance waqf blockchain in Indonesia that can optimize the realization of waqf development in Indonesia. Qualitative research methods is used in this paper through the study of literature. The results of the study show that Indonesia is very likely to implement waqf blockchain because the Muslim population reaching more than 80%, the flexible concept of waqf fiqh and the emergence of the halal industry. The most challenges faced are related to waqf literacy to increase public awareness. Investigating about perceived intention to use waqf blockchain through questionnaire and a deep interview with the stakeholders is important for the future research.

Keywords: technology, blockchain, waqf.

Abstrak: Kemunculan inovasi dalam dunia keuangan digital beberapa tahun terakhir ini mendapat perhatian dari berbagai pihak yang biasa dikenal dengan teknologi finansial. Inovasi ini berupa teknologi penggalangan dana (*crowdfunding*) dan teknologi terdesentralisasi berupa *blockchain*. Kedua inovasi ini tidak hanya dapat digunakan untuk tujuan komersial, tetapi juga untuk kepentingan sosial, termasuk wakaf. Potensi wakaf uang di Indonesia sangat besar. Namun demikian, realisasinya masih relatif rendah. Penelitian ini bertujuan untuk menganalisis sekilas wakaf *blockchain* di Indonesia yang dapat mengoptimalkan realisasi pengembangan wakaf di Indonesia. Metode penelitian kualitatif melalui studi literatur. Hasil penelitian menunjukkan bahwa Indonesia sangat mungkin menerapkan wakaf *blockchain* karena jumlah penduduk Muslim yang mencapai lebih dari 80%, konsep fikih wakaf yang fleksibel dan munculnya industri halal. Tantangan terbesar yang dihadapi adalah terkait dengan literasi wakaf untuk meningkatkan kesadaran masyarakat. Penelitian tentang niat yang dirasakan untuk menggunakan wakaf *blockchain* melalui kuesioner dan wawancara mendalam dengan para pemangku kebijakan penting untuk penelitian di masa depan.

Kata Kunci: teknologi, *blockchain*, wakaf.

ملخص: قد حظي ظهور الابتكارات في عالم التمويل الرقمي في السنوات الأخيرة باهتمام من أطراف مختلفة المعروفة بالتكنولوجيا المالية. تأتي هذه الابتكارات في شكل تمويل جماعي (*platform crowdfunding*)

ومنصات (*blockchain*). لا يمكن استخدام هذين الابتكارين للأغراض التجارية فحسب، ولكن أيضًا للأغراض الاجتماعية، بما في ذلك الوقف. يهدف هذا البحث إلى تحليل لمحة سريعة عن الوقف *blockchain* في إندونيسيا الذي به يمكن تحسين تحقيق تطوير الوقف في إندونيسيا. تستخدم طريقة البحث النوعي دراسة الأدب. تظهر النتائج أنه من المرجح جدًا أن تنفذ إندونيسيا وقف *blockchain* بسبب سكانها المسلمين الذين يصلون إلى أكثر من 80%، والمفهوم المرن لفقته الوقف وظهور صناعة الحلال. وأما التحدي الأكبر زيادة الوعي العام بمحو الأمية الوقفية. يعد البحث عن النية المتصورة لاستخدام وقف *blockchain* من خلال الاستبيانات والمقابلات المتعمقة مع أصحاب المصلحة أمرًا مهمًا للبحث في المستقبل. كلمات رئيسية: التكنولوجيا، *blockchain*، الوقف.

Introduction

The potential developed through the development of information technology is now very likely to occur. The emergence of innovation in digital finance that is widely known by the name of financial technology or commonly called fintech makes all parties connected without space and time limits globally. This innovation can be in the form of crowdfunding platforms through blockchain (BC) technology. Blockchain is a digital and distributed ledger of transactions, recorded and replicated in real time across a network of computers (nodes) (Deloitte Insights, 2018). This innovative concept has been developed by various parties and not only in the form of commercial business ventures but also in developing social funds, one of which is to manage waqf funds.

There are many ways to be able to do kindness; one of the easiest ways is to donate. However, what often happens is that there is doubt about the accuracy of the target of the donation that has been given. The KPMG survey found that 77% of fraud investigations never reached the public domain, and 54% were not communicated internally. In 2014, a fraud survey at an Australian non-profit found 54% of respondents who did not report fraud to the Police because they considered the impact of future funding opportunities and the potential damage to an organization's reputation. While 90% of respondents see this as a problem for the overall nonprofit sector (Sandbrook, 2015). Indonesia has large number of non-profit organization, include zakat and waqf institutions that operate based on syariah law.

One of the sharia financial instruments that have big potential is waqf. The concept of waqf is eternal and its ownership is in Allah, and its benefits are continuously given to the forgiveness of Allah. However, one of the main problems in the management of waqf funds is the low level of efficiency, transparency, and accountability by management, thereby reducing the realization of the potential waqf (Mohsin & Muneeza, 2018). Many waqf institutions are still low in reporting or accounting records so that public awareness does not increase. Besides, the unavailability of data on the development of waqf also affects public trust.

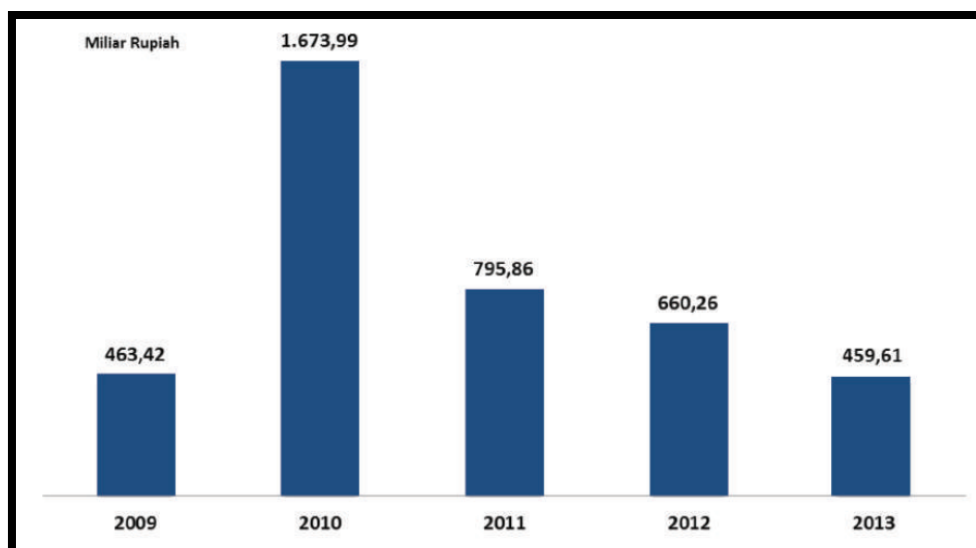
The concept of integration between blockchain and waqf is in the form of collecting waqf money through crowdfunding with cryptocurrency to be developed as productive waqf. It aims to produce sustainable benefits and benefits. It will give the greater benefits and reaching globally effectively and efficiently, with a high level of transparency and accountability.

The implementation of blockchain for waqf must be paid more attention in detail because of the involvement of many parties in the transaction aside from the certainty that the blockchain is the right thing for waqf management (Zulaikha & Rusmita, 2018). Blockchain can be used to build trust in waqf institutions and ensure accountability (Mohsin & Muneeza, 2018). The utilization of this technology is expected to increase the efficiency and accuracy of waqf goals and increase public awareness of being representative.

In history, cash waqf has been widely practiced by the Ottoman Empire in the 16th century, especially in Anatolia and European provinces. At that time, cash waqf was used to fund entrepreneurs in running their business and then the returns were used for public services such as health, education, waterways, bridges, roads and so on. Cash waqf has a significant role in improving the economy of that period. However, the use of cash waqf and other forms of waqf has declined since the end of the 19th century due to mismanagement, colonization, and secularism (Mohsin & Muneeza, 2018). Cash waqf is very relevant in providing a mutual fund model through the mobilization of an endowment fund that is managed through the challenge of trustful professionalism. Waqf of money promise better benefits and expand the reach of waqf and increase the productivity of waqf (Departemen Agama, 2003).

According to Dr. Farrukh Habib, a researcher at the International Shari'ah Research Academy for Islamic Finance, in this modern era, waqf has no significant impact on improving the welfare of the community because of mismanagement of waqf assets (Noordin, 2018). Estimates of the potential for waqf globally reach around \$ 1 trillion (Mohsin & Muneeza, 2018) and land waqf assets reaching more than US \$ 3 trillion (Finterra, 2018b). While Indonesia has the potential for cash waqf reaching 77 trillion rupiahs (Syafiq, 2017) with waqf land area reaching 49,465.39 hectares spread over 365,098 locations (Siwak, 2019). However, the realization of cash waqf in Indonesia, in reality, did not reach that number. The following are trends in collecting cash waqf from 2009 to 2013 (Figure 1):

Figure 1. The Trend of Cash Waqf Fundraising between 2009 to 2013



Source: BAPPENAS (2016)

The graph in Figure 1 illustrates that in 2010 there was a significant increase to reach 1,209.58 billion rupiahs or 261% compared to 2009. This was due to the launch of the "Waqf Movement" conducted by the President at that time. However, the impact of the movement was not sustainable because in the following years the number of awqaf was decreasing (BAPPENAS, 2016)

The fundraising of cash waqf in Indonesia is relatively still low. The collected fund is still far from the potential. Based on data from Indonesian Waqf Board, the cash waqf collected in the 2011-2018 period was only 255 billion rupiah from its potential of 180 trillion rupiah (Indonesian Ministry of National Development Planning, 2019; Waqf Research Team of The Fiscal Policy Agency, 2019). In addition, as of December 20, 2020, the total cash waqf collected and placed in Islamic banks was only IDR 328 billion, while project based waqf reached IDR 597 billion (Ministry of Finance, 2021).

In addition to collecting cash waqf by Islamic banks, cash waqf can also be collected and managed by cooperatives. The data of cash waqf collected by savings and loan cooperatives and sharia financing (Koperasi Simpan Pinjam dan Pembiayaan Syariah/KSPPS) and cooperative savings and loans and sharia financing units (Unit Simpan Pinjam dan Pembiayaan Syariah/USPPS) is as follows (Figure 2):

Figure 2. The Recapitulation of Cash Waqf in KSPPS/USPPS Cooperatives

No	Provinces	Number of Cooperatives	Number of Cooperatives (Report)	Number of Cooperatives (Do not Report)	Amount of Fundraising (Rupiah)
1	Central Java	64	44	20	10,087,163,379
2	East Java	36	31	5	10,543,024,071
3	West Java	19	10	9	1,354,956,009
4	DI Yogyakarta	13	10	3	748,644,986
5	DKI Jakarta	3	3	0	113,731,000
6	Banten	4	2	2	8,514,851,993
7	Lampung	10	8	2	3,023,118,363
8	West Nusa Tenggara	5	5	0	26,595,000
9	West Sumatra	3	1	2	19,605,917
10	Central Sulawesi	1	1	0	54,976,870
11	Riau*	1	0	1	-
12	South Sulawesi**	2	0	2	-
	Total	161	115	46	34,485,667,588

*Registered September 2019

**Registered February 2020

Source:Ministry of Cooperatives and SMEs (2020)

Figure 2 shows the realization of cash waqf until December 2020 from KSPPS/USPPS. The total of cash waqf collected from 161 KSPPS/USPPS Cooperatives in 12 provinces/Special Regions worth 34.4 billion rupiah. This collection increased by 11% from previously 154 KSPPS/USPPS Cooperatives in 11 provinces/Special Regions cumulatively worth 30.7 billion rupiah (Ministry of Cooperatives and SMEs, 2020). Central Java is the province that has the most numbers of cooperatives. However, the fundraising amount is below the East

Java. Banten has only 2 cooperatives that report, but the collected fund reached out 8.5 billion rupiah.

The integration of blockchain technology with waqf is expected to eliminate the gap between the potential and realization of this waqf fund. According to Hamid Rashid, founder of Finterra, the blockchain was discovered nine years ago, but the real application only began four years ago, when the Ethereum blockchain was introduced. Since then, the development of the real use of blockchain technology has been carried out, especially after the launch of the Ripple blockchain (Noordin, 2018).

Research related to the use of blockchain technology for waqf is still very limited (Muneeza et al., 2018; Rashid, 2018; Zulaikha & Rusmita, 2018). Also, the application of the waqf blockchain is still limited in several countries because it is related to different regulations in each country. Therefore, this study analyse at glance in implementation planning of waqf blockchain in Indonesia.

This research is expected to be able to add literature related to waqf blockchain and in practice can be a recommendation for regulators, practitioners and the general public in viewing technology for developing waqf realization by the needs of the Indonesian people. Further research is expected to conduct in-depth interviews with stakeholders related to waqf blockchain. Besides, subsequent research can also broaden the scope of the area in terms of people's perception of using waqf blockchain.

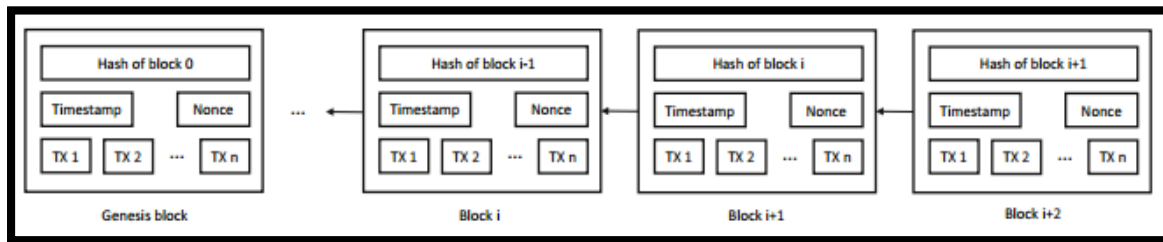
Literature Review

Blockchain and Smart Contract

Blockchain operates as a distributed ledger technology (DLT) that is secured by cryptography and is guarded by a giant computer network (node) (Binance, 2019). Distributed blockchain and ledger technology are interesting things to discuss today and trigger sharing projects in diverse industries. However, the financial industry is one of the main users of this blockchain concept (Nofer et al., 2017). Blockchain technology is a distributed ledger on a peer to peer (P2P) network whose transactions cannot be deleted or edited. When new transactions occur and are verified, they will be duplicated to all ledgers (Strawn, 2019; Walport in Zhu & Zhou, 2016). Blockchain originated from Bitcoin as the initial level of technology (Nakamoto, 2008).

Blockchain consists of a set of data that is composed of a series of data packages (blocks) where the block consists of various transactions. The Blockchain is expanded by each additional block and then presents a complete ledger for recording transactions. The block can be validated by the internet using cryptography (Nofer et al., 2017). Blockchain allows a single ledger to be distributed to all companies associated with the transaction, thus providing several security characteristics. First, the ledger is copied on all participating computers, which does not allow data loss. Second, when a transaction has been approved, it cannot be changed or deleted. This gives a new level of technological confidence, which traditionally has to go through third parties (Strawn, 2019). The following is an example of a blockchain scheme:

Figure 2. Blockchain Scheme



Source: Zheng et al. in Nofer et al. (2017)

A smart contract is a contract that makes the system provide certain results and paid according to the results. Smart contracts automatically execute contract terms in a transparent manner (Crosby in Zulaikha & Rusmita, 2018). The smart contract combines computer protocols with fellow users to execute contract terms. With blockchain, smart contracts are becoming more popular since smart contracts can be utilized more easily through blockchain applications than when this technology became available 20 years ago. Smart contracts can be used to control the ownership of both tangible and intangible assets (Nofer et al., 2017).

The complexity of corporate governance practices makes blockchain unable to fully solve governance problems and protect all the interests of shareholders. However, theoretically, blockchain is an efficient and low-cost solution in crowdfunding mechanisms, preventing legal risks related to funding management and helping regulators supervise and understand the current crowdfunding market (Zhu & Zhou, 2016).

Based on (Deloitte Insights, 2018) report, blockchain technology grows because of some driven factors, they are: 1) lower costs of bandwidth, data storage, and computing; 2) more efficient to maintain trust; and 3) prevalence of decentralized business models. However, some of the challenges to be tackled in adopting this technology are low awareness and understanding, lack of standards and best practices, and uncertainty of regulatory and legal.

The use of blockchain for waqf through smart contract provides a new experience for its users with a high level of security and trust. With this trust, it can raise a higher awareness of the public to trust the waqf institution. This, in turn, can encourage efforts to contribute to a wider waqf. The real implication is that the benefits of waqf can be more broadly given to the community to improve the welfare of the people. Managing society again is the main thing in poor countries. Welfare can be protected more effectively through blockchain (Nofer et al., 2017).

Waqf Blockchain

In the Islamic economy, there is a sector that does not exist in the conventional economy, namely voluntary sectors such as waqf. Waqf is strongly encouraged to distribute some of its wealth in the way of Allah. The waqf is not explicitly stated in the Qur'an, but experts use the legal basis of the waqf in several verses (Q.S Al-Hajj: 77 and Al Baqarah: 55-56). Some hadits are also grounded in the same law as the one narrated by Abu Hurairah.

Historically, waqf contributed significantly to the welfare and development of Muslim community education. At present, the Muslim community expects much of the waqf institutions to take responsibility for answering social and educational problems. The challenge faced is how to mobilize and manage resources to improve educational institutions, social-economic development and help protect current assets from loss in the circulation of endowment funds (Shulthoni & Saad, 2018). Many waqf assets are managed by incompetent people, causing inefficiencies in their management. In some countries, there are also rules and legal restrictions such as individuals being allowed to build trust, but not waqf (Noordin, 2018).

Blockchain uses technology that ensures data security, transparency, and integrity that cannot be tampered with or falsified, so this has great potential for the financial industry (Muneeza et al., 2018). Farrukh explained that the blockchain is a digital ledger that holds a lot of information that can be stored in a digital format, including transactions, contracts, assets or identities. Recording on a digital ledger is permanent, transparent and searchable. This makes blockchain technology useful for waqf asset management (Noordin, 2018). Smart contracts on the blockchain can also ensure that donations are given only to be channeled to the organization when they can prove that what they are doing can have a good impact. Failure to reach targets can even lead to revocation of donations (Rizqia, 2018).

The World Economic Forum estimates 10% of global Gross Domestic Product (GDP) will be stored in blockchain technology in 2027 (IslamiChain, 2019). This shows the inevitability of the development of the age which allows the massive utilization of technology. According to Obaidullah (2018), waqf must be invested in a way that allows being able to maximize results, so that it can directly provide benefits for the sake of forgiveness. The blockchain database has great potential for enterprise applications. Experts explain that the blockchain eliminates the need for third parties, such as government officials (whose credibility tends to be low).

The limited availability of comprehensive data and historical records results in low transparency and disclosure by waqf to the public. Also, there is little scope for adequate auditing and compliance practices. Planned governance and development structures and business strategies are ignored by some institutions. Blockchain has transparency in its main system, has a variety of features needed by waqf (Habib, 2018).

Waqf blockchain as technology can be referred as technology that can encourage the waqf ecosystem to be more transparent, tracked, and trusted by using blockchain system from the fundraising, recording, developing, and channeling to the programs for *mauquf 'alaih*. Meanwhile, waqf crowdfunding is fundraising of cash waqf from public using digital platform that can be accessed by everyone, faster, and easy.

Previous Research

Several studies related to blockchain technology and waqf blockchain have been done before, but are still limited. While researches on issues concerning transparency and accountability of waqf institutions have been carried out. The difference between this research and the previous one is the focus on analyzing the opportunities and challenges of the

implementation of waqf blockchain in Indonesia so that it can overcome the problem of transparency in waqf institutions.

Zhu & Zhou (2016) examined the analysis of blockchain applications in capital crowdfunding in China. This research explores practical applications that show that blockchain is a safe, efficient and low-cost solution. Besides, the blockchain can also simplify capital transactions and transfers allow for P2P between investors and entrepreneurs and resolve legal compliance and security issues of fund management so that it helps regulators monitor and support current market activities.

Research conducted by Muneeza et al. (2018) regarding blockchain applications in crowdfunding shows that crowdfunding can be used to encourage financial inclusion and blockchain technology can help mitigate problems faced by platform operators. This study is also the first study to analyze crowdfunding in Malaysia and its sharia compliance. Zulaikha & Rusmita (2018) researched the blockchain-related to waqf management. This study aims to focus on blockchain technology in managing waqf assets that connect movable and immovable waqf assets. The results of the study offered a framework for further research related to the blockchain that can be used as a new model of waqf management. Blockchain technology works with the right level of accuracy and can detect data manipulation so that it can reject problematic applications.

Rashid (2018) in his research related to the potential of waqf in the contemporary world discusses enough detail related to various waqf issues including waqf development, better use of waqf money, debates related to waqf conservation, state intervention and also the origin of trust lies in waqf and the model of waqf management futuristic with the separation of religious waqf and secular waqf to limit government intervention to secular waqf only.

The use of blockchain technology is expected to increase transparency, accountability, and efficiency of waqf management to optimize its realization and provide benefits on a global scale. Blockchain also allows data that is decentralized and can be controlled by all users through a global computer network. The existence of a strict monitoring system, data security, transparency, and integrity, as well as the efficiency of waqf management, is expected to increase public awareness to contribute to building community welfare through waqf integrated with blockchain technology. At present, there is only one platform that is a pioneer in the development of blockchain waqf and is based in Singapore namely Finterra. This study will also analyze how if this implementation is implemented in Indonesia, which is currently also to find solutions to complex problems related to waqf management, including the lack of comprehensive data available.

Finterra: First Waqf Blockchain¹

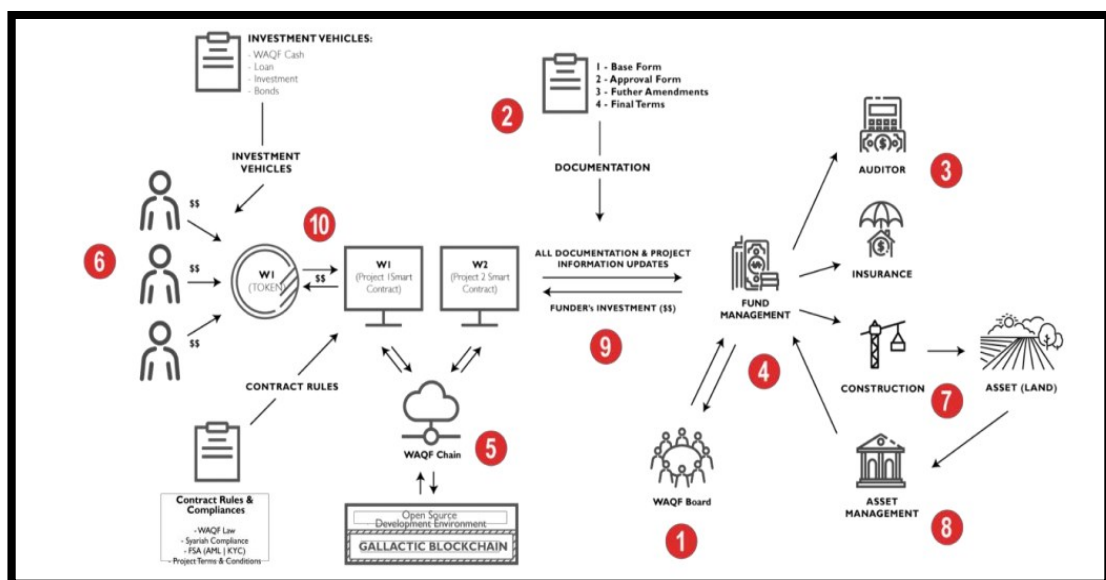
Finterra is a waqf crowdfunding platform through the first blockchain based in Singapore. Finterra is building a better blockchain-based platform ecosystem that allows users to easily engage in their trading token ecosystem using various payment methods. One of the ecosystems built is the Waqf Chain.

¹ www.finterra.org

Finterra has identified waqf as a niche market that has not been touched on par with its goal of becoming a social solution for the blockchain (Social Solution for Blockchain). Finterra provides a smart contract ecosystem and creates a blockchain to enable waqf and other interested stakeholders to take this opportunity to submit project plans with the aim of funding or developing projects on endowment assets. Finterra will develop a specific network for the selected assets.

Contributors can choose, visualize and value these assets before deciding their contribution to their development. Each project will have a digital token on the ERC-777 standard. This token will be placed on the smart contract crowdfunding project which can only be started when the project has passed through the requirements. After the collection of funds has been fulfilled, the results of the token project can be claimed by participants. The following is a diagram that illustrates how waqf crowdfunding through blockchain technology is carried out:

Figure 3. The Finterra Waqf Chain



Source: Finterra (2018a)

Based on Rashid (2018), The Finterra Waqf Chain is explained as follows:

1. The waqf body identifies and makes land assets available for development.
2. Development project plans include land status, feasibility studies, building architecture, building project plans, project budgets, project profit, and loss, and recommended funding instruments.
3. An independent auditor evaluates and validates the development project plan.
4. A licensed fund manager is involved in launching an ICO (Initial Coin Offering, a kind of Initial Public Offering for the blockchain system) for the development of specific waqf development projects, through the sale of crypto tokens to global pre-qualified investors.
5. Waqf Chain is built on the Finterra blockchain, launching tokens for capital that meet the needs to be obtained. Pre-qualified investors globally buy tokens, while funds are

collected by designated fund managers. When investors buy tokens, they are given a choice of financial instruments that are allowed to be used. Waqf Chain has four instruments built, namely waqf of money, Islamic loans, mudarabah, and sukuk.

6. When capital has been earned, the fund manager appoints a construction company to start establishing and building structures.
7. While completing construction, the fund manager appoints an asset manager to manage and manage the assets.
8. Fund managers collect income or income derived from assets.
9. The income collected or income earned is then shared with investors based on the investment instrument used and the terms and conditions that underlie it.

Although Finterra is based in Singapore, the company has an important presence in Malaysia and forms a sophisticated Islamic financial ecosystem in the country to cover the reach of the Islamic market. Finterra has also joined Bank Muamalat Malaysia for the blockchain endowment project and is currently in discussions with several other Islamic banks. This initiative can prove significantly because the use of the blockchain for the tokenization of waqf assets can reduce the problem of low levels of transparency in the waqf ecosystem (IFN Fintech, 2018).

Hamid Rashid, CEO of Finterra said that Finterra began developing the blockchain platform in October 2018, with pilot projects being studied from waqf in Singapore, Malaysia, and Indonesia. The use of blockchain can overcome the problem of limited funds by tracing each contract electronically throughout the life of the investment. The potential waqf project being studied is currently involving rebuilding a school in Jakarta into the commercially viable property (Vizcaino, 2018).

Research Methodology

This research is qualitative research conducted by the descriptive-analytical method through a literature study. The library research method is a method used in searching data, or a method of in-depth observation of the theme under study to find a temporary answer to the problem found at the beginning before the study is followed up (Habibaty, 2017).

Data is collected through secondary data such as journals, books, official website information, and other related matters regarding waqf and blockchain technology as well as observing information related to the platform blockfunding waqf crowdfunding on available websites such as Finterra.

In this study, the authors describe the use of blockchain technology to optimize the development of endowment funds. The research will discuss specific topics related to Finterra as the first blockchain endowment platform. This research will also provide an explanation related to the analysis of opportunities and challenges in the implementation of waqf blockchain in Indonesia.

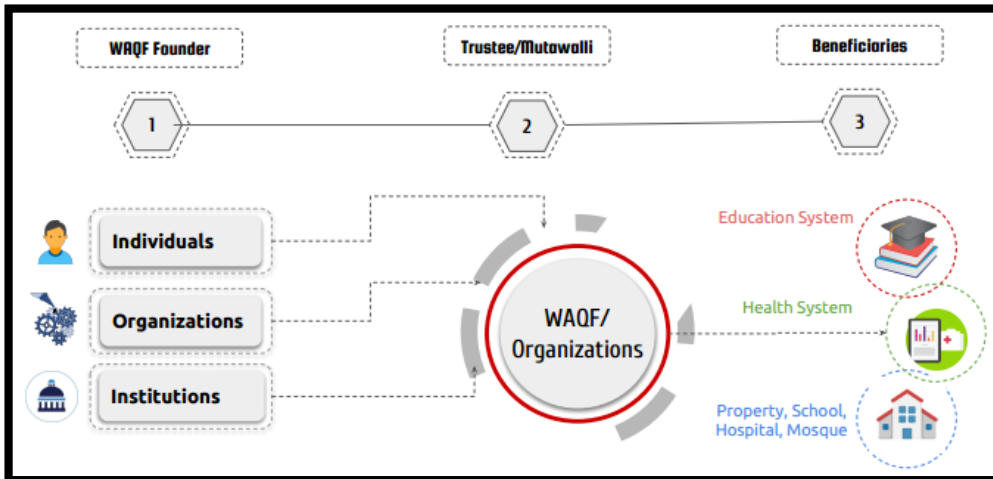
Results and Discussion

1. Waqf Management through Blockchain

The problems faced by most Muslim countries today are related to low literacy rates, lack of good health care, high unemployment, poverty, and low food production. Waqf in its history

as an institution plays a significant role in the welfare of society. Many contemporary Islamic economists say that waqf is still relevant to the social economic development of Muslim communities who face various social problems (Finterra, 2018b). This can be realized with waqf management innovation through crowdfunding that utilizes blockchain technology. The process of managing waqf through crowdfunding can be described as follows:

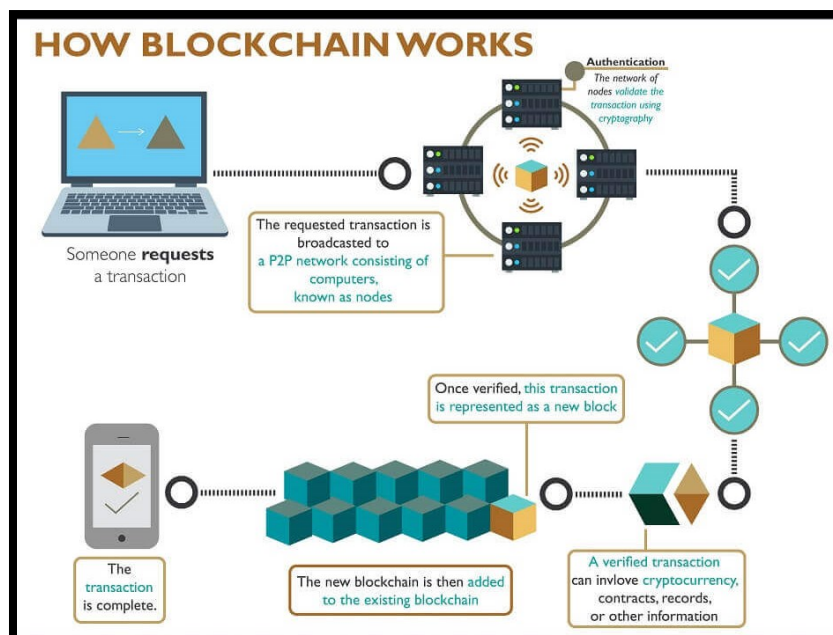
Figure 4. Crowdfunding Waqf Mechanism



Source: Finterra (2018b)

The collection of waqf can be done by an individual, organization or institution both government and private which is managed by a waqf institution (Trustee / Mutawalli) which then benefits are given to mauquf alaih (beneficiaries) for various fields of education, health, mosque, and others. The following is an infographic of how blockchain works:

Figure 5. Blockchain Framework



Source: Thottathil (2018)

With blockchain technology, the process of managing waqf funds can be more secure, transparent, credible and accountable, and not easily manipulated. Funding needs for waqf include four things: 1) capital, obtaining long-term capital needed to start a new endowment development project; 2) financial development is needed to build waqf underlying assets such as land, buildings, commercial assets, and others; 3) liquidity or cash funds, new funds needed to expand the volume of transactions and activities of existing waqf. Mobilization of waqf money is also needed; 4) Asset management services, to manage waqf money and waqf assets efficiently, it needs to be productive (Finterra, 2018b).

Zulaikha & Rusmita (2018) offered a blockchain endowment model that can offer facilities to obtain waqf for money through the blockchain. This model is based on the conception that the money obtained for endowment funds must be transferred to the endowment center. With this special concept, funds collected for waqf are given to Nazir which are then invested in various sectors, so that they can generate profits from investments linked to the waqf program. Besides, the waqf center holds the responsibility for managing funds and not experiencing losses. Through the blockchain system, this money waqf system can be improved by modeling a money waqf framework. This blockchain endowment model reflects the connectivity and transparency offered by blockchain in its transactions.

Blockchain ensures that all transactions are recorded; both when there is an endowment fund and waqf funds that are transferred in the form of assets according to the needs of the customer, accurately and transparently. This allows the identification of fraud and detects data manipulation. When manipulation is found, the application for submission of waqf funds will be rejected. So that the blockchain can easily identify corruption that occurs in related parties

2. Analysis of Planning Waqf Blockchain in Indonesia²

On April 23, 2019, the launch of the Waqf Blockchain Initiative was carried out by the United Nations Development Program (UNDP) Indonesia through the UNDP Innovative Financing Lab team in Jakarta. This initial discussion was also attended by the Indonesian Waqf Board as the regulator and supervisor of waqf management in Indonesia. This discussion discusses the blockchain system and the possibility of implementing it for the donation and distribution of waqf in Indonesia.

Regarding speech from the Indonesian Waqf Board represented by Fahrurroji, it was said that waqf was very much aligned with Sustainable Development Goals (SDGs). Discussion of waqf has a lot of focus on sustainability, community growth and the economy, principles that are also contained in the SDGs. To ensure that waqf reaches the appropriate target community, we need to work with relevant experts. With UNDP contributing to the launch of the waqf blockchain, transparency and credibility of the current waqf distribution have been supported (Soetjipto & Buana, 2018).

² Discussion Report Waqf Blockchain Initiative
(<http://www.id.undp.org/content/indonesia/en/home/presscenter/pressreleases/2019/undp-and-badan-waqf-indonesia-join-forces-to-launch-waqf-blockch.html>)

UNDP representative Sophie Kemkhadze as Deputy Resident also said that the use of blockchain technology is in line with UNDP's priorities in maintaining innovation to accelerate the achievement of SDGs and improve people's lives, especially for people in need. UNDP is constantly opening technological innovations to fill financial gaps. The launch of the Waqf Blockchain Initiative tries to explore how waqf and SDGs can support each other through the blockchain (Soetjipto & Buana, 2018).

In the discussion, Niall Dennehy, a Co-Founder of IslamiChain also explained that with this technology, blockchain helps to overcome the problem of institutional corruption and personal interests that control data, problems with third parties, and increase public trust in credible data governance and transparency. There are four challenges in improving Islamic finance in Indonesia discussed in the discussion, namely: 1) awareness of Islamic finance; 2) research and development; 3) human resources in the sharia industry, and 4) regulation and governance.

Regarding waqf and blockchain technology, blockchain is one of the solutions to overcome governance and technology issues for sharia-based social finance in Indonesia through the value of transparency and accountability. However, the most important thing is increasing the demand side of waqf. Waqf is not as popular as zakat or alms. To create this waqf ecosystem, actors including the National Committee of Sharia Economics and Finance (KNEKS) need to review and revise waqf regulations for improvement. Besides, the main actors are also important to have a strategic research institution to find the best waqf practices in Indonesia.

There are various possibilities for the issue of collecting waqf from the blockchain. One of the main issues is the focus on awareness of waqf and blockchain in Indonesia. To create a successful waqf blockchain practice, platform managers need to educate users, including entrepreneurs, Nazir, and organizations about blockchain and sharia law for donations in the form of waqf. To introduce the platform, broader community involvement is also a top priority. Each user's understanding of how the blockchain works is not important because it will be understood if the blockchain is included in people's daily lives.

Blockchain in the view of Islamic law does not conflict with the principle of maqasid sharia which includes aspects of maintenance on religion, soul, reason, ancestry, and property. The utilization of the blockchain to contribute is part of preserving religion and property. Also, the Quran emphasizes the presence of witnesses in transactions between two parties, there are at least two witnesses. Blockchain technology enables the existence of more than two witnesses in each transaction because all users can see changes in each transaction. It can also increase the value of transparency, honesty, and fairness that is recommended in Islam.

The discussion resulted in several conclusions, including 1) the urgency to create awareness of the blockchain especially for government, the private sector and institutions related to waqf; 2) stakeholders need to encourage waqf requests, including further discussion regarding policies and regulations for waqf and sophisticated technology; 3) there is an urgent need to harmonize waqf ecosystems through cooperation and enable the environment to demonstrate the impact of waqf on SDGs.

In the previous year, the 2018 International Waqf and Blockchain Forum were held which aimed to create collective clarity and understanding related to the potential of blockchain technology to support the facilitation and development of waqf on a global scale. Besides, this event also promotes new economic alternatives to enhance Muslim unity. Waqf Chain allows participants to make project proposals to develop and strengthen waqf assets. Other parties can fund this project with funding contributions. If the project is suitable, then a proposal is accepted and several waqf tokens are created and distributed to participating waqfs. Aside from issues of legality and compliance with waqf, the biggest problem is making it happen and creating income (Thottathil, 2018).

Current waqf problems include the use of inefficient waqf assets, poor governance, transparency, accountability and efficiency of waqf management, limited financial liquidity, and lack of innovation including investing in sharia-compliant businesses to obtain high returns (Finterra, 2018b). Other research states that there are three priority waqf issues in Indonesia based on waqf stakeholders which include regulators, nazir and waqif. The main problems of waqf are waqf management, lack of socialization of waqf regulations and low waqf knowledge related to waqf itself. Whereas the priority of the solution offered is the transformation of Nazir from individuals into institutional form, collaboration with religious proselytizing associations, and the need to educate the public regarding waqf. The strategies needed to deal with this are expansion and innovation. This is related to waqf objects that need to be produced and Nazir transformation from individuals to institutions (Huda et al., 2017).

3. The Implementation of Waqf Blockchain: Opportunities and Challenges

Based on previous explanations, it can be concluded that the opportunities for implementation planning of waqf blockchain in Indonesia include several things, namely: First, the Muslim population continues to increase. Based on the State of the Global Islamic Economy Report 2018/19, in 2017, 24% of the global population is Muslim (1.8 billion inhabitants) with an estimated 2050 reaching 3 billion Muslim populations (growing around 70%). This also happened in Indonesia, with the majority of the population being Muslim (more than 80%). Also, the penetration of young people under 40 years also dominates this population (millennial generation). Sectors related to millennials are Islamic finance and media, followed by fashion and travel (Thomson Reuters, 2018). So that millennials play an important role in reaching waqf as one of the broader Islamic financial instruments.

Second, using the blockchain for crowdfunding waqf funds allows everyone to participate without time and space. Diaspora Indonesian Muslim communities spread throughout the world can be united to raise endowment funds in an integrated manner through blockchain technology so that the benefits felt by the Islamic Board of Trustees are more numerous and enable the development of significant productive waqf. This is also the goal of Tokocrypto in collaboration with Indogiving in opening services to donate with cryptocurrencies, such as Bitcoin and Ethereum. The crypto will not be saved and then exchanged later, but will be converted immediately. Tokocrypto also does not charge transaction fees for this donation (Dabu, 2018).

Third, the concept of waqf that is fiqhly flexible enables the use of waqf funds that are more dynamic and reach broader benefits. One of the solutions is by producing this waqf by the proposed project, as long as it does not violate Islamic regulations and existing regulations. Fourth, the emergence of halal industry trends and public attention to Islamic financial instruments through various discussion activities, seminars, the opening of majors related to Islamic economics and finance. This is an opportunity to include elements of technological innovation in the implementation of Islamic finance and also people's daily lives.

Opportunities that arise in the implementation of waqf blockchain in Indonesia are also in line with the various challenges that need to be faced. Some of these challenges include: First, inadequate literacy and understanding of Muslim societies related to the concept of waqf which is flexible and can be produced so that the level of awareness is still low. This is also one of the causes of the gap between the potential and realization of waqf assets that occur in Indonesia. The government, nazhir, wakif, business people, academics and practitioners as well as the general public need to be educated about waqf and also blockchain technology innovation that can be integrated and utilized in daily life.

The national waqf literacy index value only reached a score of 50.48 and was included in the low category. this index consists of the literacy value of basic waqf understanding of 57.67 and the literacy value of advanced waqf understanding of 37.97 (Indonesian Waqf Board & Ministry of Religion Republic of Indonesia, 2020). Based on the study of Fiscal Policy Agency Ministry of Finance, there are four main problems that challenge waqf in Indonesia today, namely the lack of socialization and education, substandard institutional governance, limited waqf fundraisers, and lack of promotion of programs or activities (Waqf Research Team of The Fiscal Policy Agency, 2019). Waqf literacy has an important role in realizing the potential of waqf through blockchain technology.

Second, there are inadequate human resources both in Nazir aspects as waqf managers and experts in the field of information technology, especially for programmers to develop blockchain systems in Indonesia. Two of the main reasons respondents from survey of literacy waqf related to the selection of nazhir waqf institutions were aspects of accountability and transparency and accessibility. In addition, based on the survey shows that only 45% of respondents chose to carry out their waqf to nadzir institutions and 29% of respondents carried out their waqf through direct submission to mauquf alaih (Indonesian Waqf Board & Ministry of Religion Republic of Indonesia, 2020). Three fundamental factors that need to be improved at this time are literacy issues, strengthening inclusion, and improving cash waqf governance (Waqf Research Team of The Fiscal Policy Agency, 2019). Cash waqf governance can be better when nazhir practitioners have appropriate competences.

Third, internet access and technological infrastructure are not yet adequate for the wider community. According to the International Telecommunications Union (2017), 52% of the world's population still does not have internet access and one million people in the world have low digital literacy and the expertise needed to fully utilize communication information technology (Muneeza et al., 2018). Also, the cost of sophisticated internet access is still quite high in developing countries like Indonesia. Demirgüç-Kunt et al. affirmed that mobile phones and the internet cannot direct financial inclusion if there is no need for adequate

infrastructure, namely electricity and a reliable internet network (Muneeza et al., 2018). This also happened in Indonesia as a developing country, although internet user penetration in Indonesia was quite high reaching 50% (132.7 million people) and active mobile phone users reaching 675 (177.9 million people), but more for media activities social with 40% penetration (130 million people) (We Are Social, 2019). It is also a matter of concern related to technology that the Indonesian Waqf Board as a regulator and supervisor needs to utilize technological innovations to unlock the potential of waqf in Indonesia. Schwab in his book *The Fourth Industrial Revolution* states that technology and digitalization will change everything. He explained that the blockchain is a secure protocol where computer networks collectively verify transactions before they are recorded and approved. At the moment, the best-known application of blockchain is Bitcoin (Nasir & Kader, 2018).

Fourth, the blockchain is still in its infancy in Indonesia, so it requires considerable time to enter the community ecosystem to participate and realize the benefits of this network. This also happens in Malaysia, blockchain requires time to reach out to the wider community (Niforos et al. in Muneeza et al., 2018). Indonesian people still tend to choose a more practical and simple way by donating directly through a mosque or foundation.

Fifth, regulations and governance are still inadequate. In the current management of waqf, Indonesia still has large and heavy homework because regulations still need to be adjusted to the times and also governance that still runs on each waqf institution. Currently, the Waqf Core Principle has been launched which aims to provide a realistic description of the position and role of waqf management and supervision systems in economic development programs. Also, it provides a methodology for regulating key principles in waqf management and its supervision system (Bank Indonesia et al., 2018).

Smart contract and blockchain are technology innovations, some of previous literatures show that these technology can address the issues in Islamic finance including waqf (Khan et al., 2020; Listiana, 2018; Oseni & Ali, 2019). According to survey conducted by Deloitte, Federal regulation connected to blockchain deployment, according to 48% of executives, can help accelerate the use of this technology. Industrial players and regulators can collaborate to develop gradual enabling regulations (Deloitte Insights, 2018).

Khan et al. (2020) presented a study to support blockchain usage for sukuk issuing by providing an impact-assessment approach for institutions, SMEs, and startups. The transaction can be made more efficient by tokenizing sukuk al-Murabaha using Ethereum smart contracts. Because high-quality code is essential to eliminate fraud and errors, smart contracts can reduce contractual defaults (Deloitte Insights, 2018). Smart contract can be used to manage the ownership of properties both tangible (e.g., cash, house, vehicles) and intangible (e.g., access rights, shares) (Nofer et al., 2017). Waqf assets also can be tangible and intangible assets. Therefore, smart contract has no issue with sharia principles because this is part of technology innovation and development. Smart contract using is based on *maslahah* perspective.

Jaseem Ahmed (2017), a former Secretary General of the Islamic Financial Services Board (IFSB), summed up the importance of considering sharia and regulatory issues while

embracing the solutions fintech has to offer to the Islamic financial services industry: first, the principle that innovations are allowed in fiqh unless they fall under an explicit prohibition; second, detailed requirements of the Islamic financial services industry. In many areas of fintech, contractual ambiguity can be a problem; nevertheless, blockchain and smart contracts can help to improve the efficiency of fintech operations (Oseni & Ali, 2019).

Conclusion

The development of information technology in the era of the industrial revolution 4.0 is currently inevitable. The emergence of digital financial innovation in the form of crowdfunding through blockchain technology is an opportunity and challenge that needs to be faced by the world of representation. A considerable opportunity in realizing the potential number of waqf that are still far away can be done with this technological innovation. However, various challenges still need to be considered in implementing this.

There is a need for communication and education in the preparatory stage if the implementation of waqf blockchain will be carried out in Indonesia. Gathering experts from various fields related to this matter is an important agenda to do. However, another more important thing is the hard work to realize this. The initiation of the forum carried out through the International Waqf and Blockchain Forum 2018 in Malaysia and the Waqf Blockchain Initiative in Indonesia 2019 is an initial step in educating and providing a comprehensive understanding of innovations that can encourage the world of Muslim representation. Increased trust through more efficient, effective, transparent and accountable management are things that need to be considered in the use of blockchain technology as a solution to the existing waqf problems and to optimize the development of waqf today.

This research still has limitations on the information observed by the writer through literature studies and information on the available website. So that further research can be done with in-depth interviews with related parties such as regulators, supervisors, waqf institutions, and also blockchain technology developers such as Finterra in Singapore or Waqfnetwork in Indonesia. Stakeholders need to make proper regulation in blockchain area, improve skill of waqf manager, and increase awareness of public to do waqf by campaign.

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