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Legal and Regulatory Challenges in the Implementation of Blockchain-Based Waqf in Indonesia

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Abstract

This research aims to identify and analyze legal and regulatory challenges in the implementation of blockchain technology-based waqf in Indonesia. Using a qualitative approach through case studies, data was obtained through in-depth interviews with Islamic financial regulators, academics in the field of law and technology, and digital waqf practitioners. This study also examines legal documentation and observations on digital waqf platforms that have implemented blockchain systems, such as Dompet Dhuafa and Waqf Chain. The results of the study show that the main obstacles lie in the absence of regulations that specifically regulate the use of smart contracts and digitization of waqf assets, doubts about sharia compliance, and low technological literacy among nazhir and the community. These findings indicate the need to strengthen legal and regulatory frameworks that are adaptive to technological developments, as well as to increase the capacity of waqf actors through training and socialization. The implications of this study emphasize the importance of synergy between legal authorities, waqf institutions, and technology developers to create a digital waqf ecosystem that is safe, transparent, and in accordance with sharia principles.

Keywords:
digital waqf, blockchain, regulation, Islamic law, smart contract, technology literacy

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Introduction

Waqf has great potential to advance welfare in Indonesia, with the potential for funds collected to reach 180 trillion rupiah every year. Unfortunately, the use of these funds has not been maximized. Some of the problems that hinder waqf management include inefficient use of assets, poor governance, lack of transparency, accountability, and innovation (Aziz & Fauzi, 2020; Mohsin et al., 2016). In Indonesia, the concept of blockchain-based waqf has not yet been implemented. In fact, by utilizing digital technology such as *blockchain*, waqf management can be better as an Islamic financial instrument that is beneficial to society. *Blockchain* is considered to be able to overcome the problem of waqf governance because of its transparent and accountable nature (Hasan & Abdullah, 2018; Nasution & Azhari, 2021).

There have been several studies that have discussed the potential use of blockchain in waqf. This technology offers a solution to improve the governance of waqf and Islamic finance in Indonesia because it is able to provide transparency and accountability (Sabit et al., 2020; Nasution & Azhari, 2021). Blockchain-based systems allow all parties involved to track and verify waqf assets and their use (Hasan & Abdullah, 2018). This study is different because it specifically analyzes the legal and regulatory challenges in the implementation of blockchain-based waqf in Indonesia, which has not been widely discussed in other studies (Aziz, 2022). This research will complement the existing study by providing a deeper understanding of the legal and regulatory aspects that need to be considered in the application of blockchain waqf. To identify and analyze what legal and regulatory challenges may arise in the implementation of blockchain-based waqf in Indonesia. More specifically, this study aims to:

1. Examine the laws and regulations related to waqf and *blockchain* in Indonesia, and analyze whether the regulations are in accordance with sharia principles. (Aziz, 2022).
2. Identify potential legal issues that may arise when blockchain waqf is implemented, such as data security, consumer protection, and legal certainty issues. (Putri, 2021).
3. Provide advice to the government, waqf institutions, and other related parties on how to develop a legal and regulatory framework that supports the implementation of blockchain-based waqf in Indonesia (Ramadhan, 2023).

The implementation of blockchain-based waqf in Indonesia is likely to face various legal and regulatory challenges. One of the main challenges is the legal uncertainty surrounding the use of *blockchain* (Amalia, 2021). In addition, regulations on waqf in Indonesia have not clearly regulated blockchain-based waqf (Fauzan, 2022). This study argues that with a clear and comprehensive legal and regulatory framework, the implementation of blockchain-based waqf in Indonesia can be successful and provide maximum benefits for the community. The government needs to support and develop appropriate and targeted regulations (Nugroho & Rahmawati, 2023).

Literature Review / Theoretical Framework

Waqf functions as a social financial instrument in Islam which has an important role in supporting equitable distribution of welfare and sustainable development (Basyuni, 2020). In the modern context, waqf has evolved in various forms, including money waqf and productive waqf, which can have a more significant economic impact (Jauhari, 2021). Good waqf management is very important to maximize its benefits for the community (Syarifuddin, 2022).

Conventional waqf management often faces various challenges, such as lack of transparency and accountability, inefficiencies in asset management, and limited access to information for stakeholders (Alfitri, 2020). These problems can hinder the development of waqf and reduce public trust in waqf institutions. (Ningsih & Suhartini, 2021). Therefore, innovative solutions are needed to overcome these challenges and improve the effectiveness of waqf management (Hafid, 2022).

Blockchain technology offers a promising solution to overcome various challenges in conventional waqf management. With its transparent, secure, and non-modifiable characteristics, *blockchain* can increase accountability and trust in the management of waqf funds (Pratama, 2022). In addition, this technology can also simplify the waqf donation process, reduce transaction costs, and expand the reach of waqf globally (Alamsyah & Fadillah, 2023). Several studies have explored the potential application of *blockchain* in various aspects of waqf management.

Several studies have discussed the application of *blockchain technology* in the context of waqf. For example, research by Wirawan and Firdaus (2024) analyzed the blockchain-based waqf business model in Indonesia using the *Business Model Canvas*, highlighting the potential for increasing waqf income and providing guidance for developers and managers. Mahendra (2023) focuses on the strategy of the Indonesian Waqf Agency (BWI) in implementing *blockchain technology* for waqf, as well as the importance of increasing public literacy about waqf and collaboration between parties. Other research also explores the use of *blockchain* to improve transparency and accountability in the management of productive waqf (Sari & Nugroho, 2021). However, most of this research is more focused on technical aspects and business models, while studies of legal and regulatory challenges are still limited (Ramadhani & Subhan, 2022).

This research is based on the theory of *New Institutional Economics* (NIE), which emphasizes the importance of institutions (laws, regulations, norms) in influencing economic behavior. In the context of the implementation of blockchain-based waqf, the existence of a clear legal and regulatory framework will reduce uncertainty and encourage the adoption of the technology (Gorib & Nugroho, 2021). In addition, this study also uses *the theory of Technology Acceptance Model* (TAM) to understand the factors that affect the acceptance and use of *blockchain* technology by the community and waqf institutions. The research variables include:

a. **Regulatory Clarity:** The level of clarity and legal certainty related to the application *of blockchain* in the context of waqf.
b. **Sharia Compliance:** Alignment between *blockchain* regulations and sharia principles (Ali, 2022).

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c. **Perception of Usefulness:** The belief that the use of *blockchain* provides benefits for waqf management (Rizki & Junaidi, 2023).
d. **Perception of Ease of Use:** The belief that *blockchain technology* is easy to use and understood by the community and waqf institutions (Setiawan, 2022).

This study differs from previous studies because it focuses on a thorough analysis of the legal and regulatory challenges that may be faced in the implementation of blockchain-based waqf in Indonesia. This research aims to identify legal and regulatory barriers that can hinder the adoption of this technology and provide recommendations for solutions that are appropriate to the legal and social context in Indonesia. Thus, this research is expected to make a significant contribution to the development of regulations that support the implementation of blockchain-based waqf effectively and inclusively, as well as encourage the successful implementation of the system in Indonesia (Sudarmaji & Hadi, 2021).

Research Methodology

The material object in this study is the legal and regulatory challenges in the implementation of blockchain-based waqf in Indonesia. The analysis unit used includes waqf regulations in Indonesia, policies related to blockchain technology, and legal barriers that arise in the implementation of this concept. The selection of material objects is based on the relevance and urgency of the application of blockchain in the waqf system to increase the transparency and efficiency of waqf asset management. (Nugroho & Sudiro, 2023). The selection process was carried out by reviewing academic literature, government policies, and case studies of blockchain implementation in the Islamic philanthropic sector (Surianto & Prasetyo, 2022).

The research design used in this study is qualitative research with a case study approach. This design was chosen because it is able to explore a deep understanding of legal and regulatory challenges in the implementation of blockchain-based waqf. (Mulyadi, 2021). The research process is carried out through an in-depth exploration of applicable regulations, interviews with stakeholders, and analysis of government policies. The analyzed case studies include several initiatives to use blockchain in waqf management, both in Indonesia and in other countries for comparison (Bashir, 2023).

The data sources of this research involve key informants such as Islamic financial regulators, academics in the field of blockchain law and technology, and waqf practitioners. In addition, data sources also include legal documents, government regulations, academic journals, and reports from related institutions. Informants are selected based on the relevance of their expertise and involvement in the regulation or implementation of blockchain-based waqf (Kurniawan & Suharto, 2023). The selection of participants was carried out purposively to obtain in-depth and diverse insights to obtain in-depth and diverse insights into the legal and regulatory challenges faced (Ibrahim & Hidayat, 2022).

The data collection techniques used include in-depth interviews, documentation studies, and participatory observation. In-depth interviews were conducted to obtain perspectives from regulators, academics, and practitioners regarding legal obstacles in the application of blockchain for waqf. Documentation studies are used to examine relevant

policies, regulations, and academic literature. Participatory observation is carried out by participating in discussions or seminars related to digital waqf and blockchain to understand the dynamics of its implementation in the field (Taufik & Saleh, 2022).

The data analysis technique used is thematic analysis with an inductive approach. This technique was chosen to identify patterns, themes, and relationships between legal and regulatory challenges in blockchain-based waqf implementation (Sugiarto, 2022). The analysis process is carried out by categorizing data based on the main theme, conducting in-depth interpretation, and comparing the findings with existing theories and regulations (Herman & Pranata, 2023). Validation of results is carried out through triangulation of data sources to ensure the accuracy and credibility of research findings (Widodo, 2021).

Results and Discussion

A. What are the legal and regulatory challenges in the implementation of blockchain-based waqf in Indonesia

The application of blockchain technology in waqf management in Indonesia has significant potential to increase transparency and efficiency, but it also faces a number of legal and regulatory challenges. One of the main problems is the lack of clarity of the legal framework that governs the use of blockchain in the context of waqf. Although Law No. 41 of 2004 on Waqf provides a legal basis for waqf management, the regulation does not yet cover aspects of digitization and the implementation of smart contracts, which are important components of blockchain technology. This legal uncertainty is an obstacle for waqf institutions that want to innovate by utilizing new technology (Yuliana, 2024). Therefore, it is necessary to revise existing regulations in order to accommodate technological developments and provide legal certainty for all parties involved.

Furthermore, the application of blockchain in waqf must consider conformity with sharia principles. In this regard, it is important to ensure that digital mechanisms such as smart contracts and asset tokenization do not conflict with Islamic law. For example, the validity of waqf contracts carried out digitally needs to be tested so that they still meet the legal requirements according to fiqh muamalah (Sutrisno & Marwan, 2023). Another challenge that needs to be overcome is the need to educate nazir and the public about the use of blockchain technology and its impact on waqf management. Without adequate understanding, the adoption of this technology can be hampered, so its potential benefits cannot be maximized (Sari & Susanto, 2022).

Finally, collaboration between the government, waqf institutions, academics, and the community is essential to create an ecosystem that supports the implementation of blockchain-based waqf. Socialization and training efforts on the benefits and how blockchain technology works must be carried out intensively so that all parties can participate properly. With this collaborative approach, it is hoped that waqf management in Indonesia can become more transparent, accountable, and efficient, so as to be able to optimize the potential of waqf as an instrument of sustainable socio-economic development (Putra & Amalia, 2023).

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Blockchain is a decentralized technology that is able to record transactions transparently and securely through an immutable ledger system. In the context of waqf, this technology offers solutions to overcome various traditional challenges in the management of waqf assets, such as data manipulation, lack of transparency, and efficient distribution of funds. Indonesia, with a Muslim population that reaches more than 80%, has great potential to integrate blockchain in waqf management. However, the application of this technology still faces various obstacles, including regulations that have not yet been supportive and the low level of public literacy towards blockchain technology (Wijayanto & Rahardjo, 2024).

Blockchain-based waqf allows the management of waqf assets, both movable and immovable, to be carried out more efficiently. This system can increase data transparency between nadzir (waqf manager), waqf (waqf giver), and regulators such as the Ministry of Religion or the Indonesian Waqf Agency (BWI). In addition, the use of smart contracts in blockchain can facilitate the automatic execution of waqf contracts according to predetermined conditions. However, the main challenges faced are the lack of clear regulations to support the implementation of this technology, as well as the need to harmonize sharia law with digital mechanisms such as cryptographic signatures and asset tokenization.

However, the main challenge faced is the lack of clear regulations to support the implementation of this technology, as well as the need to harmonize sharia law with digital mechanisms such as cryptographic signatures and asset tokenization. Current regulations, such as Law No. 41 of 2004 concerning Waqf, do not explicitly cover the use of blockchain technology in the waqf management process, thus adding legal uncertainty for waqf institutions that want to adopt this technology. Therefore, revisions and updates of regulations involving sharia principles are very important to ensure the conformity of blockchain systems with Islamic law (Hasan & Fadli, 2025).

In addition to the technical aspect, community literacy is an important factor in the successful implementation of blockchain for waqf. Many people do not understand the benefits of this technology in increasing the productivity of waqf assets. Low literacy also has an impact on public trust in blockchain-based systems. Therefore, an education and training campaign is needed for nazirs and other stakeholders to ensure that the adoption of this technology is effective. Studies show that increasing waqf literacy can open up great opportunities for optimizing the management of waqf assets in Indonesia (Putra & Amalia, 2023).

Overall, this study focuses on analyzing legal and regulatory challenges in the application of blockchain for waqf management in Indonesia. With a qualitative approach based on literature studies, this study aims to provide policy recommendations that can support the integration of blockchain technology in the national waqf system. This includes revising related regulations, improving public literacy, and establishing a collaborative ecosystem between the government, waqf institutions, and blockchain technology providers (Nasution & Azzahra, 2021; Hamdani & Yuliani, 2022).

In the study on "Legal and Regulatory Challenges in the Implementation of Blockchain-Based Waqf in Indonesia," there are arguments that show that the object of this research is not fully in accordance with the theoretical foundation of the previous one. One of the main reasons is the incompatibility between the concept of a decentralized blockchain and

the legal structure currently in force in Indonesia, which tends to be centralistic (Rahman et al., 2023). Although institutional theory underscores the importance of institutional adaptation to new technologies, the reality is that many waqf institutions are still bound by traditional regulations that do not accommodate digital innovation. This creates a gap between the potential of blockchain technology and the existing legal reality, thus hindering effective implementation (Al-Tamimi, 2021).

Furthermore, in the context of sharia maqashid, the application of blockchain in waqf should aim to increase transparency and accountability. However, many previous theories did not take into account the practical challenges faced in the application of this technology. For example, although blockchain offers transparency, the confidentiality of waqf-related information is still a major concern in Islamic law. (Kusuma & Aziz, 2021). The limitations in understanding how sharia principles can be integrated with digital mechanisms such as smart contracts show that existing theories have not fully addressed this challenge (Huda et al., 2022).

Another aspect that shows the incompatibility is the lack of public literacy regarding blockchain technology and waqf. Technology adoption theories such as UTAUT emphasize the importance of user understanding in adopting new innovations. However, in the Indonesian context, the level of public understanding of these two concepts is still low, thus hindering the application of blockchain technology in waqf management (Wibisono & Prasetyo, 2023). Without adequate educational efforts, the potential benefits of this technology cannot be maximized (Rahman, 2021).

Finally, collaboration between various government parties, waqf institutions, academics, and the community is an important element to create an ecosystem that supports the implementation of blockchain-based waqf. However, previous theories often do not discuss in depth the importance of cross-sector collaboration in the context of waqf digitalization. (Mahmud & Yusuf, 2023). The involvement of all stakeholders is needed to ensure that the resulting regulations and policies can create an environment conducive to innovation and better management of waqf (Hafidz & Nurhayati, 2022).

Strengthening Legal Regulations, It is important for the government to strengthen the regulatory framework that regulates blockchain-based waqf. Revisions to Law No. 41 of 2004 concerning Waqf need to be carried out in order to accommodate this new technology (Rahman, 2021) This includes the preparation of clear regulations regarding the use of smart contracts and digital management of waqf assets. With legal certainty, waqf managers (nazir) will be more confident in implementing this technology, thereby increasing transparency and accountability in waqf management (Kurniawan & Suharto, 2023).

Collaboration between Stakeholders, Collaboration between various parties, including the government, waqf institutions, academics, and the community, is essential to create an ecosystem that supports the implementation of blockchain-based waqf. The formation of a consortium or discussion forum can help in formulating operational standards and guidelines for the use of blockchain technology in waqf management (Amelia & Santoso, 2023). By involving all stakeholders, legal and regulatory challenges can be overcome collectively (BWI, 2021)

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To increase public literacy and education, the public needs to be educated about the concept of waqf and blockchain technology to increase their understanding of its benefits. Training and socialization programs must be carried out intensively so that nazirs, donors, and the general public understand how this technology can increase efficiency and transparency in waqf management (Hasanah & Fauzi, 2022). Through this increase in literacy, it is hoped that public participation in blockchain-based waqf programs will increase (Nurfalah & Widodo, 2024).

Development of Supporting Technology Infrastructure, The development of adequate technological infrastructure is indispensable to support the implementation of blockchain-based waqf. The system built must be able to ensure data security and transaction transparency, so that all parties can easily access information related to waqf assets (Ilyas et al., 2021). Blockchain technology allows for the recording of transactions that cannot be altered after verification, thereby increasing public trust in the management of waqf (Yusri & Karim, 2023).

With this, it is hoped that research on legal and regulatory challenges in the implementation of blockchain-based waqf can make a positive contribution to the development of the waqf system in Indonesia.

Table 1. Comparison of Conventional Waqf with Blockchain Waqf

Aspects	Conventional Waqf	Blockchain-Based Waqf
Transparency	Limited, depending on manual reports	High, because transactions are recorded automatically and can be publicly audited
Accountability	Difficult to track in real-time	Can be traced directly by all parties
Transaction Speed	Requires a long manual administrative process	Fast and automated transactions with smart contracts
Supervision	Depends on the local authority or specific waqf institution	Decentrally and automatically supervised
Data Security	Vulnerable to data manipulation and falsification	Secure, because the data is encrypted and cannot be changed indiscriminately
Regulatory Acceptance	It has been regulated in the Waqf Law and fatwa	It has not been specifically regulated, it needs to strengthen the legal framework
Community Understanding	High, because it has been applied for a long time	Still low, requires education and digital literacy

Source: Hakim, M. L., & Nashihin, M. (2022). Blockchain in Waqf Management: A Legal and Regulatory Review. *Journal of Islamic Law*, 20(1), 71–88.

To overcome the challenges in the implementation of blockchain-based waqf in Indonesia, it is necessary to formulate a comprehensive strategy that includes four main aspects: regulation, collaboration, literacy, and technological infrastructure.

The aspect of legal regulation is the main foundation. Revisions to Law No. 41 of 2004 concerning Waqf and its derivative regulations are urgently needed in order to accommodate the development of digital technology, especially related to smart contracts, asset tokenization, and digital audit systems. This new regulation must be drafted in an inclusive manner, involving sharia and information technology experts, to ensure that the management of digital waqf is not only legally legal but also in accordance with sharia principles. This is in line with recommendations in a study by the Indonesian Sharia Fintech Association (AFSI) and academics in the field of Islamic finance which emphasized the need for a regulatory sandbox and adaptive policy updates (AFSI, 2021).

Collaboration between stakeholders must be strengthened. The government, the Indonesian Waqf Agency (BWI), the National Sharia Council of the Indonesian Ulema Council (DSN-MUI), blockchain technology providers, and academics need to form a coordinating forum or digital waqf consortium. This collaboration is important to formulate standard operating procedures that are responsive to technological developments and answer the needs of Muslims in waqf management. As revealed by Harahap and Hasanah (2021), cross-sector partnerships will strengthen accountable and reliable digital waqf governance (Harahap & Hasanah, 2021).

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technological infrastructure, the development of a secure, transparent, and sharia-compliant blockchain platform is urgent. This system must be able to record waqf transactions in real-time, protect user data, and be integrated with Islamic financial institutions. Innovations like this have begun to be pioneered by a number of sharia fintech startups in Indonesia that have developed a blockchain-based waqf model with a user-friendly approach and technology-based internal audit systems (Hasan, 2023).

B. Sharia Legal Implications of Blockchain Waqf in Indonesia

From the perspective of Islamic law (fiqh al-waqf), the implementation of blockchain technology in waqf management introduce both opportunities and responsibilities. The use of blockchain must comply with the fundamental Sharia requirements of a valid waqf, namely:

1. The transfer of ownership (*tamlik*);
2. The permanence of dedication (*ta'abid al-waqf*); and
3. The utilization of assets for public benefit (*maslahah 'ammah*)

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Blockchain technology, with its immutable and transparent record system, can enhance trust (amanah) and prevent mismanagement or corruption. The smart contract, as a self-executing digital agreement, may serve as a contempory from of waqf declaration, provided it explicitly states the donor's intent and purpose. However, such digital contracts must be verified by a Sharia supervisory board to ensure that they adhere to the principles of Islamic jurisprudence and avoid prohibited elements such as gharar, riba, or maysir.

According to the DSN-MUI Fatwa No. 2/DSN-MUI/IV/2002 on Cash Waqf, the waqf principal must remain intact while only ints returns may be utilized for social purpose. Blockchain's feature of immutability ensures that the waqf principal cannot be altered or misappropriated, thus fulfilling this requirement. In the light of maqashid sharia, blockchain-based waqf supports the protection of wealth (hifz al-mal), promotes justice ('adl), and enhances publick benefit (maslahah). When supervised under proper regulatory and sharia governance by bodies such as BWI and DSN-MUI blockchain can be considered a sharia compliant digital mechanism that strengthens trust and efficiency in the waqf sector.

Conclusion

From the analysis of the legal, regulatory challenges, and risks associated with the application of blockchain technology in the management of waqf in Indonesia, it can be concluded as follows:

One of the main challenges faced in the application of blockchain technology for waqf management in Indonesia is the lack of clarity of existing laws and regulations. Although Law No. 41 of 2004 on Waqf provides a legal basis for waqf management, the regulation does not yet cover new aspects that arise due to the use of digital technology such as blockchain. This creates uncertainty for waqf managers (nazirs) in adopting this technology, thereby hindering innovation and efficiency that can be achieved through blockchain-based systems.

There are still many regulations that are conventional and do not fully support the implementation of blockchain-based waqf. For example, the lack of clear guidelines on the use of smart contracts and audit mechanisms in the context of digital waqf is a significant obstacle. On the other hand, there is also an opportunity to update the law to be more responsive to technological developments, so as to create a legal environment conducive to the development of blockchain-based waqf

The use of blockchain technology in waqf management also brings its own risks and weaknesses. One of them is the potential vulnerability to cyberattacks and data security issues that can harm all related parties. Additionally, while blockchain offers transparency, not all users understand how this technology works, which can lead to confusion or mistrust among the public

To overcome these challenges, it is necessary to increase public literacy regarding the concept of waqf and blockchain technology. Good education will help the public understand the benefits of the application of this technology and increase their confidence

in the management of digital waqf. Training and socialization involving a wide range of stakeholders, including nazirs and donors, will be critical to ensuring successful adoption.

Finally, collaboration between the government, waqf institutions, academics, and the wider community is key to overcoming legal and regulatory challenges in the implementation of blockchain-based waqf. By involving all parties in discussions and policy formulation, it is hoped that better regulations can be created and more in line with the needs of the times. Measures such as study forums and training must be carried out on an ongoing basis to build a strong digital waqf ecosystem in Indonesia.

Orcid		Scopus ID	
Author 1	-	**Author 1**	-
Author 2	-	**Author 2**	-
Author 3	-	**Author 3**	-

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