P-ISSN : 2685-4309
E-ISSN : 2597-9434
Jurnal Kajian Ekonomi dan Perbankan Syariah
Profit : Jurnal Kajian Ekonomi dan Perbankan Syariah
Vol. 9 No. 2 (2025) : 728-740
Available online at https://ejournal.unuja.ac.id/index.php/profit/index

INNOVATION AND CHALLENGES OF BLOCKCHAIN TECHNOLOGY IN THE DIGITAL ERA : AN ANALYSIS OF ITS EFFECTIVENESS IN SHARIAH FINANCIAL MANAGEMENT

Muthi'atur Rofi'ah[1], Moch Syahrul Muzammil[2]
[1,2] Sekolah Tinggi Agama Islam Raden Abdullah Yaqin, Indonesia
Email : muthiaturrofiah022@gmail.com[1], syahrulmuzammil84@gmail.com[2]

DOI : https://doi.org/10.33650/profit.v9i1.12380

Received: August 2025	Revised: November 2025	Accepted: December 2025

Abstract :

The development of blockchain technology has brought significant innovation to the financial sector, including the management of Shariah-compliant finance, by enhancing transparency, security, and efficiency of financial transactions in accordance with Shariah principles. This technology utilizes distributed ledger technology (DLT) and smart contracts to ensure authenticity and fairness in transactions, thereby strengthening trust and accountability within the Shariah financial system. This study aims to analyze the effectiveness of blockchain implementation in Shariah finance and identify various challenges faced in the digital era, such as immature regulations, limited digital infrastructure, and low levels of technological literacy among industry players. The research method includes a literature review of relevant journals and reports, as well as case studies of blockchain implementation in Shariah financial institutions. The findings indicate that blockchain plays a crucial role in increasing trust and transparency, but its success heavily depends on the synergy among regulators, Shariah financial institutions, and other stakeholders to overcome these obstacles. These results emphasize the importance of collaborative and innovative strategies to support the sustainable growth of the Shariah financial system in the digital age..

Keywords : *Innovations and Challenges, Blockchain technology, Shariah financial system*

INTRODUCTION

The rapid development of information and communication technology in recent decades has brought fundamental changes to various aspects of human life, including in the fields of economics and finance (Huynh-The et al., 2023). This digital transformation has created new challenges and opportunities, particularly in the management of increasingly complex financial transactions and data, which require high levels of security and transparency (Han et al, 2023). One of the real issues that has emerged in the application of blockchain technology in Islamic finance is the incompatibility of Islamic principles with the technical aspects of the technology, such as transparent fund

management and fair transactions, as well as concerns regarding inadequate regulation and legality in many developing countries, including Indonesia (Karyani et al, 2024). With steady steps and relentless innovation, the financial world is now entering a new era of speed and efficiency, marking a major shift in how we interact and transact (Guo & Yu, 2022).

One technological innovation that is currently gaining significant attention and is believed to have the potential to revolutionize the global financial system is blockchain. This technology offers a new paradigm in transaction recording and verification that can overcome various limitations of conventional financial systems, such as the risk of data manipulation, high transaction costs, and lack of transparency (Akter et al, 2024). Although blockchain technology has been widely discussed and implemented in the context of developing digital currencies (*cryptocurrencies*) such as Bitcoin and Ethereum, as well as in various sectors such as logistics, healthcare, and government, there are still challenges and opportunities that have not been explored in depth, especially in the context of Islamic finance (Sahoo et al., 2024).

Many studies have examined the potential of blockchain in general and its applications in the development of fintech and other digital financial services, but few have specifically researched its application in Islamic financial management, taking into account aspects of trust, fairness, and sustainability in accordance with Islamic principles in an integrated and practical manner (Habib et al., 2022). Previous studies have extensively discussed the general potential of blockchain in the development of fintech and digital financial services, as well as its application in the logistics, healthcare, and government sectors (Kotey et al., 2023). However, there are still few in-depth studies that specifically examine the application of blockchain in Islamic finance management, with trust, fairness, and sustainability in accordance with Islamic principles as the main focus (Javaid et al, 2022). Most of the existing literature is conceptual, limited to case studies or future predictions, without developing concrete implementation models that can be directly applied by Islamic financial institutions in the field (Vu et al, 2023). In fact, the main challenges in applying blockchain in Islamic finance include adapting the technology to Sharia principles, developing an appropriate framework, and identifying the key factors for its practical success (Shamsan Saleh, 2024).

Based on these conditions, this study aims to fill this gap by conducting a comprehensive analysis of the innovative potential of blockchain as the foundation for developing a more modern, transparent, and trustworthy Islamic financial system. Specifically, this research seeks to develop a blockchain implementation model that not only formally adheres to Islamic principles but also addresses the challenges faced by conventional Islamic financial systems, such as transparency in fund management, accountability, and public trust (R. Zhang, Xue, & Liu, 2020). The urgency of this research is high, given the need for an innovative and adaptive Islamic financial system that can keep pace with digital technology developments, meet increasingly

stringent regulatory requirements, and fulfill public expectations for transparency and fairness in fund management (Tripathi et al, 2023). In addition, this study contributes theoretically by expanding understanding of the integration of Sharia principles and blockchain technology through the development of an implementation model that can be specifically adapted by Sharia financial institutions in Indonesia and other developing countries (Taherdoost, 2022). Thus, the results of this study are expected to provide practical and innovative solutions to accelerate the adoption of blockchain in sharia- compliant financial management, as well as support the sustainability and stability of the sharia financial system in the future (T. Zhang et al, 2025).

In this study, the author uses a literature review approach through searching and analyzing articles from Google Scholar to build a comprehensive literature framework and highlight the innovation and uniqueness of this paper. Some of the main articles reviewed include: First, research conducted by Wildan Mahendra Ardiansyah in this article discusses the role of technology in economic and business transformation in the digital era, examining the role of technologies such as artificial intelligence, blockchain, and IoT in economic and business transformation in the digital era, highlighting the opportunities and challenges of adopting these technologies in improving business efficiency and innovation in general. Second, research conducted by Nabila Azura Qathrunnada et al., titled "Digital Transformation of Sharia Financial Institutions and Its Implementation in the Industry 4.0 Era." This article discusses the digital transformation of sharia financial institutions in Indonesia, highlighting opportunities for product innovation, operational efficiency, as well as security and sharia compliance aspects necessary to support the growth of sharia financial institutions in the Industry 4.0 era. Third, the research conducted by Bayu Arif Mahendra on the resilience analysis of blockchain technology development strategies as a medium for transparency in endowments at the Indonesian Endowment Agency. Researching blockchain technology development strategies as a medium for transparency in waqf at the Indonesian Waqf Board, highlighting the potential of blockchain in improving waqf management and increasing public literacy regarding cash waqf.

The fourth research conducted by Qorry Era Hartati et al., titled "Analysis of Business Processes in Companies in the Modern Era," analyzes business processes in modern companies driven by technologies such as AI, big data, and IoT, emphasizing the importance of technological innovation to improve company efficiency and competitiveness. The fifth study, conducted by M. Andika Yuda Pratama, examines the digitalization of cash waqf as a key innovation in the development of Islamic social finance in the era of the Fourth Industrial Revolution. This digitalization has the potential to improve accessibility, transaction efficiency, and community engagement. However, it still faces challenges such as low public literacy, the absence of comprehensive digital regulations, and limited integration between digital platforms. This study proposes a phased roadmap, starting from literacy campaigns to the development of a national blockchain-based platform, and emphasizes the need

for multisectoral collaboration in order to realize a trusted digital waqf ecosystem. Meanwhile, the sixth study conducted by Alya Zhafirah Nasywa and Setiawan Bin Lahuri examines the application of blockchain technology to enhance the accountability of wakaf management, leveraging its decentralization, transparency, and security features to address issues of transparency and misuse of funds in traditional wakaf systems. Blockchain, including the application of smart contracts, is believed to be able to accelerate and simplify wakaf transactions and strengthen public trust in wakaf institutions.

In previous studies, there have been several that discussed blockchain technology, but none addressed the innovations and challenges of blockchain technology in the digital era: an analysis of its effectiveness in sharia financial management, as per the title of this study. Through in-depth literature analysis and critical evaluation of various existing models and applications, the author hopes this research will identify gaps and opportunities that have not been optimally utilized, as well as offer concrete solutions that can be adopted by stakeholders.

RESEARCH METHOD

This research uses a qualitative research method using a literature study approach technique by collecting data through searching relevant articles, journals, books, and trusted scientific sources 14 , with keywords such as "blockchain," "Islamic finance," and "technological innovation" from databases such as Google Scholar within the last five years. The selected articles met the criteria of relevance and credibility, and were then qualitatively analyzed descriptively and interpretively to identify key innovations, challenges, and opportunities in the application of blockchain in Islamic finance. Through the process of synthesizing the findings from the literature, this study aims to identify research gaps, develop a conceptual framework, and formulate strategic recommendations that can support the development of an innovative, sustainable, and effective blockchain-based Islamic financial system to improve the transparency and efficiency of Islamic financial management in the future. These case studies allow for in-depth analysis of success factors, barriers, and strategies applied in specific contexts, providing practical and applicable insights.

FINDINGS AND DISCUSSION

Blockchain

Blockchain is a technological innovation that was first introduced by Nakamoto as the basis of the cryptocurrency bitcoin. Fundamentally, blockchain is a digital data recording system that is distributed, transparent, and secure. It relies on a network of interconnected computers that operate without a central authority, so creating a decentralized system (Mulligan et al, 2024). Key characteristics of blockchain include :

Transparency, All transactions recorded on the blockchain can be

accessed and verified by all network participants. This allows for a high level of accountability, as stored data cannot be changed unilaterally without network consensus. This transparency is crucial in reducing corruption and data manipulation, as well as increasing user trust. *Security*, blockchain uses cryptographic mechanisms to protect data integrity. Each block of data is protected by a unique cryptographic hash, and each transaction must go through a validation process with a consensus algorithm such as Proof of Work (PoW) or Proof of Stake (PoS) (J et al., 2023). This security reduces the risk of counterfeiting and cyberattacks. *Decentralization*, the absence of a central authority means that data is stored dispersed across all nodes in the network. This decentralization reduces dependence on a single institution, increases the system's resilience to disruption, and strengthens collective trust.

Blockchain Type	Blockchain Example	Main Characteristics	Example of Use
Public Blockchain	Bitcoin	Open to anyone, fully decentralized, transparent	Cryptocurrency, digital payment systems
	Ethereum	Supports smart contracts and decentralized applications (dApps)	DeFi, NFTs, financial applications
	Solana	High transaction speed, low fees	DeFi, blockchain games, NFTs
Private Blockchain	Hyperledger Fabric	Restricted access, controlled by specific organizations	Supply chain management, enterprise data systems
	Corda	Designed for business and financial transactions	Banking, insurance
Consortium Blockchain	R3 Corda Consortium	Managed jointly by multiple institutions	Interbank collaboration
	Quorum	Combination of private and public features, high efficiency	Inter-institution financial transactions
Hybrid Blockchain	Dragonchain	Combines transparency with private control	Business and government systems
	XinFin (XDC Network)	Public–private interoperability	International trade, trade finance
Application-Specific Blockchain	VeChain	Focus on product tracking and verification	Supply chain, product authenticity
	IBM Food Trust	Transparency in food supply chains	Food safety and traceability
Sharia-Compliant Blockchain	Haqq Network	Based on Islamic principles	Islamic finance, halal smart contracts
	Islamic Coin	Sharia-compliant crypto	Sharia-based

	ecosystem	investment and transactions

In addition to these three main characteristics, blockchain is also known for other features such as immutability (the inability to change data that has been recorded), smart contracts (automated code-based contracts that run on their own), and efficient peer-to-peer transactions (Kumar et al, 2022).

Sharia Finance

Sharia finance is based on fundamental principles governed by Islamic law, which emphasizes fairness, honesty, transparency, and sustainability (Judijanto et al, 2024). The principle of fairness (*Al-'Adl*) requires that every transaction be conducted fairly without harming either party, and that there be a balanced distribution of risks and benefits. In addition, trust (*Amanah*) is an important aspect whereby economic actors must conduct transactions with integrity and maintain the validity and authenticity of relevant data and documents (Fitria, 2024). Transparency (*Al-Bayyinah*) is also a key characteristic, requiring that all information related to transactions be clear and open so that all parties understand their rights and obligations, thereby avoiding disputes and uncertainty (Maryam et al, 2023). In addition, the principles prohibiting usury and gharar require financial instruments to be designed in such a way that they comply with sharia and are free from excessive speculation, thereby supporting economic sustainability and prosperity (lillah et al, 2024). These characteristics require a system that can guarantee fairness, trust, and transparency in every financial transaction, thereby ensuring economic sustainability and prosperity in accordance with sharia principles (Nurkholidah et al, 2024).

Innovations and Challenges of Blockchain technology

A review of the literature shows that the application of blockchain in Islamic finance is a promising innovation that has great potential to improve the efficiency and transparency of the sharia-based financial system, although it still faces various challenges and obstacles (Sutarsih, 2023). Some key studies highlight that blockchain can be used to strengthen the transparency and validity of zakat and waqf management data, which have been crucial aspects of Islamic finance (Cahyati et al, 2025). Blockchain allows open and unalterable recording of transactions, thus increasing public trust in Islamic fund management institutions and ensuring that data on the receipt and distribution of funds remains valid and reliable. In addition, blockchain-based smart contracts can be used to automate the management of Islamic financial products such as sukuk and other investments, thus ensuring that all sharia requirements are met automatically without the need for human intervention, which in turn helps reduce the risk of errors and improve operational efficiency.

The use of blockchain in the Islamic payment system also shows great potential in reducing transaction costs and accelerating the real-time payment process, while at the same time guaranteeing the authenticity and validity of the transactions made (Jasmin et al, 2018). However, despite the benefits

offered, the main challenge in implementing blockchain remains related to the regulatory aspects and sharia standards that must be adapted to this technology. The uneven technological infrastructure in various countries is also a major obstacle, in addition, data security and legal protection in the context of blockchain still need to be developed more thoroughly so that the adoption of this technology can run widely and safely. In addition, in the context of Islamic finance, the application of blockchain is also beginning to expand to other related sectors, such as asset management, zakat and waqf, and digital management of Islamic documents (Muhammad Kahfi et al, 2025).

The public and private sectors are beginning to adopt blockchain to improve efficiency and transparency in the management of Islamic assets and funds, thereby minimizing the risk of manipulation and increasing public trust. Over all, despite the challenges that remain, the application of blockchain in Islamic finance and related sectors shows great potential to drive innovation, improve accountability, and strengthen the Islamic principles that underpin Islamic-based financial management (Muhammad Wifqi Hidayatullah et al, 2024).

The Potential of Blockchain in Islamic Finance

The application of blockchain technology has great potential to revolutionize the Islamic financial system through increased efficiency, transparency, and accountability (Dahdal et al, 2022). Blockchain, which is distributed and immutable, is very much in line with the principles of justice (*Al-'Adl*) and trust (*Amanah*) in Sharia, as it ensures that transaction data cannot be changed without collective approval and honest and transparent management (Bhatt & Sisodia, 2024). Blockchain can strengthen public trust in sharia fund management institutions, as open and immutable transaction records guarantee the validity and integrity of data (Sudarmanto et al, 2024). The transparency feature of blockchain allows all parties, including regulators and the public, to monitor transactions in real time, thereby automatically improving the accountability of zakat, waqf, and sukuk fund management (Unal & Aysan, 2022).

In addition, smart contracts can be used to automate the management of Islamic financial products such as sukuk and other investment instruments (Aminin, 2024). These contracts automatically enforce Islamic principles, such as prohibitions on usury and uncertainty, ensuring that all transactions adhere to principles of justice and public interest (Wati & Yazid, 2023). This directly supports economic sustainability and prosperity, as the management of funds and assets becomes more transparent, trustworthy, and efficient (Ul Mansoor, 2025). Literature reviews indicate that the use of blockchain not only enhances public trust but also reinforces the principles of justice and integrity within the Islamic economic ecosystem, thereby creating a more equitable and sustainable system (Syakarna, 2023).

Implementation Challenges

The application of blockchain in Islamic finance faces a number of complex and multidimensional obstacles, as the immaturity of regulations and

Sharia standards governing the use of blockchain is one of the main obstacles. 30 Current regulations are not yet able to accommodate blockchain features such as decentralization, smart contracts, and full transparency, creating significant legal uncertainty (Susanto et al, 2024). This ambiguity can hinder widespread adoption of the technology and pose legal risks for businesses and Islamic financial institutions. In addition to regulatory aspects, uneven technological infrastructure and digital access across countries, particularly in developing nations, present major obstacles. According to the World Bank, disparities in digital infrastructure, including internet connectivity and hardware, limit the participation of communities and Islamic financial institutions in fully leveraging blockchain technology (Desky & Hye, 2025).

The low level of digital literacy and understanding of sharia principles and blockchain technology among regulators, business actors, and the general public is also a major obstacle because resistance to this innovation is caused by a lack of adequate education and understanding, which leads to mistrust and concerns about security and legality risks. In addition, issues related to data security and legal protection in the context of blockchain still require further development to ensure that this technology can be implemented safely and in accordance with Sharia principles. The absence of a clear legal framework regarding smart contracts and blockchain-based transactions could lead to litigation risks and legal uncertainty, which could hinder the development of the Sharia-based blockchain financial ecosystem (Dewaya, 2025).

Solutions and Recommendations

Based on the results of a literature review, the successful implementation of blockchain in Islamic finance is highly dependent on strategic collaboration and synergy between various stakeholders, including regulators, financial institutions, technology developers, and the community. Adaptive and innovative regulations are key factors in promoting the development of a Sharia-compliant and legally secure blockchain ecosystem. 33 Therefore, it is necessary to develop a comprehensive, clear, and flexible legal framework that can accommodate blockchain features such as smart contracts, data encryption, and full transparency. In addition, the development of policies and standards involving all stakeholders from various sectors is essential to accelerate the safe and sustainable adoption of this technology. The government and regulatory agencies must initiate the creation of regulations that support innovation while protecting the rights of consumers and businesses from security and legal risks (Hendarti et al, 2024).

Literacy and education regarding sharia principles, blockchain technology, and the benefits and risks of its use must be continuously improved through training programs, workshops, and outreach involving the public, regulators, and industry players. Effective education can reduce resistance and build public trust in this technology. In addition, it is necessary to improve technology infrastructure evenly and provide inclusive digital access so that all parties can optimally utilize blockchain. The development of user-friendly and secure platforms must also be a priority to ensure the active involvement of all

users. In the long term, international collaboration and the adoption of global standards are also important to ensure interoperability and consistency in the implementation of blockchain across different countries and sectors. Technological innovation must be supported by policies that promote sustainability and Sharia principles, thereby strengthening justice, public interest, and trust in the Islamic financial system (Nazeri et al, 2023).

CONCLUSION

This research shows that the application of blockchain technology in Islamic financial management has great potential to encourage innovation, increase transparency, and strengthen public trust in the sharia-based financial system. Blockchain, which is distributed and immutable, is able to guarantee the authenticity and fairness of transactions, and facilitate process automation through smart contracts that support compliance with sharia principles. The use of blockchain can also speed up the transaction process, reduce operational costs, and improve the efficiency of managing zakat funds, waqf, and other Islamic financial products.

However, the successful implementation of this technology is still faced with a number of major challenges, such as the immaturity of sharia regulations and standards that have not been fully adapted to the technical aspects of blockchain, uneven digital infrastructure, and the low level of digital literacy and understanding of sharia principles among industry players and the public. The issue of data security and legal protection in the context of blockchain also requires serious attention to ensure safe and sharia-compliant implementation.

Therefore, the development of comprehensive and adaptive regulations is necessary to support technological innovation in a safe and sustainable manner. Training and improving digital literacy and understanding of sharia principles should be a priority, so that all stakeholders are able to manage and utilize blockchain effectively. In addition, further research is needed to develop a sharia- compliant blockchain implementation model that can be practically adopted by Islamic financial institutions in developing countries.

Improving technological infrastructure and international collaboration is also an important part of facilitating global interoperability and standardization. Innovative strategies based on cooperation between regulators, industry, academia, and the public will determine the sustainability of blockchain use in the Islamic financial system. With these steps, blockchain can become the main foundation to strengthen a transparent, fair, and sustainable Islamic financial system in the digital era.

REFERENCES

Akter, M., Kummer, T. F., & Yigitbasioglu, O. (2024). Looking beyond the hype: The challenges of blockchain adoption in accounting. *International Journal of Accounting Information Systems*, *53*. https://doi.org/10.1016/j.accinf.2024.100681

Aminin, R. I. (2024). Analisis Implementasi Teknologi Blockchain dalam

Meningkatkan Transparansi, Efisiensi, dan Keamanan Transaksi Keuangan Perbankan Syariah Indonesia. *Jurnal Hukum Ekonomi Syariah: AICONOMIA*, *3*(2), 92–106. https://doi.org/10.32939/acm.v3i2.4575

Bhatt, A. J., & Sisodia, K. (2024). Use of blockchain in Islamic finance. In *Leveraging Blockchain Technology: Governance, Risk, Compliance, Security, and Benevolent Use Cases* (pp. 184–195). https://doi.org/10.1201/9781003462033-14

Cahyati, C., Niswatin, N., & Hiola, Y. (2025). The Influence of Islamic Financial Literacy on Sharia Digital Finance for Consumers at Pegadaian Syariah Gorontalo. *Assets : Jurnal Ilmiah Ilmu Akuntansi, Keuangan Dan Pajak*, *9*(2), 107–119. https://doi.org/10.30741/assets.v9i2.1559

Dahdal, A., Truby, J., & Ismailov, O. (2022). The Role and Potential of Blockchain Technology in Islamic Finance. *European Business Law Review*, *33*(2), 175–192. https://doi.org/10.54648/eulr2022005

Desky, H., & Hye, A. K. M. (2025). Exploring Smart Contracts In Islamic Finance: Blockchain-Based Shariah-Compliant Transactions. *AT-TIJARAH: Jurnal Penelitian Keuangan Dan Perbankan Syariah*, *7*(1), 50–61. https://doi.org/10.52490/at-tijarah.v7i1.6022

Dewaya, M. A. (2025). Innovation in Islamic finance: Integrating blockchain with Maqāṣ id al Sharīʿ ah & Ḥifẓ al Māl. *Journal of Emerging Economies and Islamic Research*, 3852. https://doi.org/10.24191/jeeir.v13i1.3852

Fitria. (2024). Digitalization Of Sharia Finance For Generation Z: Opportunities And Challenges. *International Conference on Tradition and Religious Studies*, *3*(1), 687–698.

Guo, H., & Yu, X. (2022). A survey on blockchain technology and its security. *Blockchain: Research and Applications*, *3*(2). https://doi.org/10.1016/j.bcra.2022.100067

Habib, G., Sharma, S., Ibrahim, S., Ahmad, I., Qureshi, S., & Ishfaq, M. (2022). Blockchain Technology: Benefits, Challenges, Applications, and Integration of Blockchain Technology with Cloud Computing. *Future Internet*, Vol. 14. https://doi.org/10.3390/fi14110341

Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. *International Journal of Accounting Information Systems*, *48*. https://doi.org/10.1016/j.accinf.2022.100598

Hendarti, Y., Winarno, B., & Primbang Aprilianto, M. (2024). Use of Blockchain Technology and AI in Sharia Financial Risk Management. *Jurnal Ekuisci*, *1*(3), 155–163. https://doi.org/10.62885/ekuisci.v1i3.165

Huynh-The, T., Gadekallu, T. R., Wang, W., Yenduri, G., Ranaweera, P., Pham, Q. V., … Liyanage, M. (2023). Blockchain for the metaverse: A Review. *Future Generation Computer Systems*, *143*, 401–419. https://doi.org/10.1016/j.future.2023.02.008

J, A., Isravel, D. P., Sagayam, K. M., Bhushan, B., Sei, Y., & Eunice, J. (2023). Blockchain for healthcare systems: Architecture, security challenges, trends and future directions. *Journal of Network and Computer*

Applications, Vol. 215. https://doi.org/10.1016/j.jnca.2023.103633

Jasmin, D., Moeljadi, M., Djumahir, & Djazuli, A. (2018). Optimization of Mudaraba Sharia bank finance through the agency theory perspective. *Banks and Bank Systems*, Vol. 13, pp. 40–50. https://doi.org/10.21511/bbs.13(4).2018.04

Javaid, M., Haleem, A., Singh, R. P., Suman, R., & Khan, S. (2022). A review of Blockchain Technology applications for financial services. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, Vol. 2. https://doi.org/10.1016/j.tbench.2022.100073

Judijanto, L., Muhtadi, M. A., & Priyana, Y. (2024). A Bibliometric Analysis of the Challenges and Opportunities of Fintech in Promoting Access to Sharia Finance. *West Science Interdisciplinary Studies*, *2*(3), 638–646. https://doi.org/10.58812/wsis.v2i03.744

Karyani, E., Geraldina, I., Haque, M. G., & Zahir, A. (2024). Intention to adopt a blockchain-based halal certification: Indonesia consumers and regulatory perspective. *Journal of Islamic Marketing*, *15*(7), 1766–1782. https://doi.org/10.1108/JIMA-03-2023-0069

Kotey, S. D., Tchao, E. T., Ahmed, A. R., Agbemenu, A. S., Nunoo-Mensah, H., Sikora, A., … Keelson, E. (2023). Blockchain interoperability: the state of heterogenous blockchain-to-blockchain communication. *IET Communications*, Vol. 17, pp. 891–914. https://doi.org/10.1049/cmu2.12594

Kumar, R. L., Khan, F., Kadry, S., & Rho, S. (2022). A Survey on blockchain for industrial Internet of Things: Blockchain for Internet of Things. *Alexandria Engineering Journal*, *61*(8), 6001–6022. https://doi.org/10.1016/j.aej.2021.11.023

lillah, A., Maruf, A., Khotimah, H., & Nurunisa, D. K. (2024). Online Loan in Indonesia, Where Is the Sharia Finance? A Bibliometric Analysis. *Pakistan Journal of Life and Social Sciences*, *22*(2), 14977–14986. https://doi.org/10.57239/PJLSS-2024-22.2.001077

Maryam, S., Alfida, A., & Rianti, F. (2023). A Scientometrics Analysis of Publication Mapping in Sharia Economics and Finance in Indonesia and Malaysia. *International Journal of Information Science and Management*, *21*(2), 1–18. https://doi.org/10.22034/ijism.2023.1977597.0

Muhammad Kahfi, Sahria Sahria, & Jamaluddin Majid. (2025). Landscape Peluang dan Tantangan Keuangan Syariah di Indonesia. *Jurnal Nuansa : Publikasi Ilmu Manajemen Dan Ekonomi Syariah*, *3*(1), 146–158. https://doi.org/10.61132/nuansa.v3i1.1560

Muhammad Wifqi Hidayatullah, Putri Indah Lestari, Hawa Azzah Fauziah, Kirana Mahardhika Rahma, & Muhammad Taufiq Abadi. (2024). Implementasi Akad Rahn di Pegadaian Syari'ah Untuk Meningkatkan Kesadaran Tentang Keuangan Syari'ah. *JURNAL ILMIAH RESEARCH AND DEVELOPMENT STUDENT*, *2*(1), 81–90. https://doi.org/10.59024/jis.v2i1.568

Mulligan, C., Morsfield, S., & Cheikosman, E. (2024). Blockchain for

sustainability: A systematic literature review for policy impact. *Telecommunications Policy*, *48*(2). https://doi.org/10.1016/j.telpol.2023.102676

Nazeri, A. N. N., Nor, S. M., Abdul-Rahman, A., Abdul-Majid, M., & Hamid, S. N. A. (2023). Exploration Of A New Zakat Management System Empowered By Blockchain Technology In Malaysia. *ISRA International Journal of Islamic Finance*, *15*(4), 127–147. https://doi.org/10.55188/ijif.v15i4.568

Nurkholidah, S., Mursid, F., Kamaruddin, A. M., & Mahardika, S. G. (2024). Implementation of Smart Contracts in Sharia Finance: Maslahah Mursalah's Perspective. *Journal of Mujaddid Nusantara*, *1*(4), 211–221. https://doi.org/10.62568/jomn.v1i4.198

Sahoo, S., Kumar, S., Sivarajah, U., Lim, W. M., Westland, J. C., & Kumar, A. (2024). Blockchain for sustainable supply chain management: trends and ways forward. *Electronic Commerce Research*, *24*(3), 1563–1618. https://doi.org/10.1007/s10660-022-09569-1

Shamsan Saleh, A. M. (2024). Blockchain for secure and decentralized artificial intelligence in cybersecurity: A comprehensive review. *Blockchain: Research and Applications*, Vol. 5. https://doi.org/10.1016/j.bcra.2024.100193

Sudarmanto, E., Yuliana, I., Wahyuni, N., Yusuf, S. R., & Zaki, A. (2024). Transformasi Digital dalam Keuangan Islam: Peluang dan Tantangan. *Jurnal Ilmiah Ekonomi Islam*, *10*(1), 645. https://doi.org/10.29040/jiei.v10i1.11628

Susanto, A. A., Choris, L. H. il P., Bani, N. A., Rizal, C. F., & Oktari, M. (2024). Digital Transformation In Zakat Management: A Bibliometric Review On The Application Of Blockchain Technology. *iBAF E-Proceedings*, *11*(1), 768–790. https://doi.org/10.33102/7qjfd415

Sutarsih, E. (2023). Literasi dan Inklusi: Keuangan Syariah sebagai Fundamental Kesejahteraan UMKM: Edukasi Bisnis Akses Keuangan Syariah untuk UMKM Santri di Yogyakarta. *As-Syar'i: Jurnal Bimbingan & Konseling Keluarga*, *5*(3). https://doi.org/10.47467/as.v5i3.5628

Syakarna, N. F. R. (2023). Peran Teknologi Disruptif dalam Transformasi Perbankan dan Keuangan Islam di Indonesia. *Musyarakah: Journal of Sharia Economic (MJSE)*, *12*(1), 76–90. https://doi.org/10.24269/mjse.v12i1.7486

Taherdoost, H. (2022). A Critical Review of Blockchain Acceptance Models—Blockchain Technology Adoption Frameworks and Applications. *Computers*, Vol. 11. https://doi.org/10.3390/computers11020024

Tripathi, G., Ahad, M. A., & Casalino, G. (2023). A comprehensive review of blockchain technology: Underlying principles and historical background with future challenges. *Decision Analytics Journal*, Vol. 9. https://doi.org/10.1016/j.dajour.2023.100344

Ul Mansoor, S. I. (2025). Islamic Law in the Age of Blockchain: Exploring Shari'ah Compliant Cryptocurrencies and Digital Assets. *Manchester*

Journal of Transnational Islamic Law and Practice, *21*(1), 269–291. https://doi.org/10.2139/ssrn.5340253

Unal, I. M., & Aysan, A. F. (2022). Fintech, Digitalization, and Blockchain in Islamic Finance: Retrospective Investigation. *FinTech*, *1*(4), 388–398. https://doi.org/10.3390/fintech1040029

Vu, N., Ghadge, A., & Bourlakis, M. (2023). Blockchain adoption in food supply chains: a review and implementation framework. *Production Planning and Control*, *34*(6), 506–523. https://doi.org/10.1080/09537287.2021.1939902

Wati, A. C. P., & Yazid, M. (2023). Blockchain Technology in Financial Transactions under Sharia Banking Practice. *EkBis: Jurnal Ekonomi Dan Bisnis*, *7*(2), 81–91. https://doi.org/10.14421/ekbis.2023.7.2.2049

Zhang, R., Xue, R., & Liu, L. (2020). Security and privacy on blockchain. *ACM Computing Surveys*, *52*(3). https://doi.org/10.1145/3316481

Zhang, T., Jia, F., & Chen, L. (2025). Blockchain adoption in supply chains: implications for sustainability. *Production Planning and Control*, *36*(5), 699–722. https://doi.org/10.1080/09537287.2023.2296669