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Research Article

Transformation of Sharia Supervision in the Digital Era: Challenges and Opportunities

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ABSTRACT

This study aims to explore the transformation of Shariah supervision in the digital era, as well as to identify the challenges and opportunities arising from the adoption of technology in the Islamic finance sector. Using a qualitative descriptive method and content analysis of relevant literature, the study finds that digitalization offers significant opportunities to enhance transparency and the efficiency of Shariah supervision through technologies such as blockchain and artificial intelligence (AI). These technologies enable faster, more accurate, and automated transaction monitoring. However, significant challenges arise, particularly in terms of global regulation, differing interpretations of Shariah principles across countries, and limited technological literacy among members of the Shariah Supervisory Board (SSB). Therefore, the digital transformation of Shariah supervision requires collaboration between regulators, Islamic financial institutions, and the religious scholar community to develop a comprehensive regulatory framework. Additionally, enhancing technological literacy for SSB members is crucial to enable them to conduct supervision that is responsive to the rapid advancements in digital technology. This study contributes new insights by proposing the adoption of digital technologies that can improve the efficiency and transparency of Shariah supervision, while also addressing existing challenges in regulation and Shariah interpretation. Suggestions for future research include further exploration of the implementation of global regulatory standards that can be accepted by countries with differing interpretations of Shariah principles, as well as examining the impact of technological literacy on the quality of supervision carried out by the SSB.

Keywords: Shariah Supervision; Digitalization; Islamic Fintech; Blockchain; Shariah Supervisory Board (SSB)

1. INTRODUCTION

Shariah supervision is a fundamental element in ensuring that Islamic financial institutions adhere to Islamic principles. The Shariah Supervisory Board (SSB) plays a central role in ensuring that the operations of Islamic financial institutions are in accordance with the Shariah principles as outlined in the Qur'an, Hadith, and fiqh (Nurhisam, 2016). The existence of the SSB is crucial in maintaining the integrity of Shariah in the Islamic finance industry, which not only includes a commitment to Shariah compliance but also to the sustainability and trust in the Islamic financial system itself. The implementation of Shariah compliance positively correlates with the application of good governance practices, which ultimately enhance the accountability and responsibility of financial institutions (Kaffah & Susetyo, 2020). While all Islamic banks follow Shariah governance principles, their approaches can vary. For example, Bank Muamalat, which operates as a purely Islamic bank, applies more comprehensive Shariah structures and practices compared to BTN Syariah, which focuses primarily on Shariah-compliant housing products as part of a conventional bank's Islamic business unit (Sari & Mugiyati, 2024). These variations in approach highlight the complexities faced in ensuring full compliance with Shariah principles across different types of institutions. Therefore, an effective SSB is critical to building public trust and ensuring the sustainability of the Islamic finance industry.

With the development of digital technology, Shariah supervision is now facing new challenges and opportunities that may change traditional supervisory approaches. The rise of digital financial technologies such as Shariah-compliant fintech, asset tokenization, and Islamic crowdfunding services introduces additional complexities to the supervision process (Hutagalung, Majid, & Harahap, 2024; Sudarwanto, Kharisma, & Cahyaningsih, 2023). With these innovations, Shariah supervision requires not only a deep understanding of Shariah principles but also a comprehensive grasp of the modern technologies underlying these new services (Mohd Haridan, Sheikh Hassan, Mohammed Shah, & Mustafa, 2023; Safian, 2018). On the other hand, technology also presents significant opportunities to enhance supervisory effectiveness.

For example, robo-advisory allows for real-time Shariah consultations, while blockchain technology holds potential to enhance monitoring and compliance auditing functions (Haridan, Ahmad, Sriwardhani, Ithanin, & Nurfarahin, 2023).

However, in addition to opportunities, technology also presents significant challenges, particularly in terms of regulation and the standardization of Shariah principles across regions. These challenges are particularly evident in countries that have recently adopted Islamic finance systems, such as some nations in Africa, which face difficulties in establishing solid Shariah regulations and consistent standards (Amin, 2022). To address these obstacles, close collaboration between regulators, financial institutions, and the Shariah community is required to develop a comprehensive regulatory framework that is relevant to Shariah fintech (Putri & Hanif, 2024; M. I. A. Razak, Dali, Dhillon, & Manaf, 2020). Additionally, there is an urgent need to enhance the technological competence of SSBs so they can respond more effectively to the rapid development of digital technologies (M. I. B. A. Razak, 2020). This research aims not only to identify the emerging challenges but also to provide guidelines and potential solutions for Islamic financial institutions in implementing effective supervision in the digital era.

This article seeks to fill the research gap in the study of Shariah supervision transformation in the digital era. Previous studies have highlighted the importance of governance and Shariah compliance in enhancing customer loyalty and the performance of Islamic banks, with the Shariah Supervisory Board (SSB) playing a key role in ensuring this compliance. However, previous research has largely focused on conventional supervision aspects and has not thoroughly explored the impact of digital transformation on the effectiveness of the SSB. While some Islamic banks have started adopting online platforms for Shariah audits and reporting, studies exploring fully digital Shariah supervision systems are still very limited (Misbah, Muchlis, & Aditiya, 2022; Nugraha, Yusrizal, & Atika, 2023). This article addresses this gap by exploring the opportunities and challenges of building a digital-based Shariah supervision system, which has the potential to increase the efficiency and effectiveness of supervision.

Furthermore, research related to transparency and the disclosure of Shariah compliance information indicates that this aspect needs to be improved, especially within financial institutions with Islamic units and takaful operators (Ab Ghani, Mohd Ariffin, & Abdul Rahman, 2023). While digital technologies such as blockchain and artificial intelligence can enhance transparency and accountability in Shariah supervision, existing literature still lacks exploration of the specific mechanisms for applying these technologies in Shariah governance. Challenges in implementing standardized Shariah governance and the strength of regulation remain key issues in the adoption of Shariah digitalization (Bimantara & Omika Dewi, 2019). Therefore, this article focuses on the innovative opportunities of digital technologies in supporting Shariah supervision, which not only ensures compliance but also strengthens transparency and accountability within Islamic financial institutions in the modern era.

2. RESEARCH METHOD

This study employs a descriptive qualitative method with a content analysis approach to explore the transformation of Shariah supervision in the digital era, particularly regarding its challenges and opportunities. This approach was chosen as it allows for an in-depth examination of the concepts and implementation of Shariah supervision through digital technologies. Content analysis was conducted through stages of identification and categorization of relevant literature, including articles, journals, and books discussing Shariah supervision, digital technologies in Islamic finance, and regulatory issues. A thematic analysis was then performed to identify key themes, such as challenges in regulation, privacy, the independence of the Shariah Supervisory Board (SSB), and the opportunities presented by technologies like blockchain, artificial intelligence (AI), and big data. The findings were interpreted to provide practical guidance on the implementation of more effective digital-based Shariah supervision. Using secondary literature as the primary data source, this research aims to offer a comprehensive understanding of how digital technologies can support Shariah supervision and identify the challenges and solutions for its application across various regions and jurisdictions.

3. RESULTS AND DISCUSSION

3.1 Digitalization in Islamic Finance: Trends, Challenges, and Opportunities

The development of digital technologies in the global financial sector has significantly impacted the Islamic financial industry, offering new opportunities for growth and transformation. This digitalization trend encompasses innovations such as financial technology (fintech), blockchain, artificial intelligence (AI), and big data, which enhance efficiency, accessibility, and flexibility in financial services. These technologies hold particular relevance for Islamic finance, as they can help meet modern demands while ensuring compliance with the foundational principles of Shariah (Sudarmanto, Yuliana, Wahyuni, Yusuf, & Zaki, 2024). However, Islamic finance faces challenges in adapting to these technologies, especially in supervision and service implementation, due to the complex regulatory frameworks that must be followed.

One notable example of digital technology in Islamic finance is Shariah-compliant fintech. Despite the potential of fintech to drive innovation, many Islamic financial institutions continue to face challenges related to regulatory compliance and the protection of digital assets in accordance with Shariah law (Azizah, 2023). Nevertheless, digital

transformation has created a new ecosystem that encourages Islamic financial institutions to adapt to these changes. For instance, blockchain offers opportunities for improving data transparency and security, as it provides an immutable ledger of transactions, aligning with Shariah principles of honesty and transparency. Similarly, AI can enhance decision-making processes by automating data analysis and monitoring Shariah compliance, identifying transactions that may violate Shariah principles (Mbaidin, Sbaee, Almubydeen, & Alomari, 2024). These synergies between digital technology and Islamic finance provide a competitive edge in an increasingly digital global marketplace. However, implementing digital technologies in Islamic finance also presents significant challenges. The use of blockchain, AI, and big data raises concerns about data security and privacy. Digital systems are vulnerable to cyber threats that can compromise data integrity and customer trust (Hosen, Thaker, Subramaniam, Eaw, & Cham, 2023). Data protection policies in Islamic finance must not only comply with international security regulations but also ensure that all transactions and data storage practices adhere to Shariah principles.

Regulatory challenges further complicate the adoption of digital technologies. Islamic financial systems operate in various countries, each with its own regulatory framework. While countries like Malaysia and Indonesia have developed regulations supporting Shariah-compliant fintech, other regions, such as parts of Africa, are still in the early stages of creating comprehensive fintech regulations (Priyana, Mokodenseho, Ibrahim, & Yarbo, 2024; Sudarmanto et al., 2024). The lack of uniformity in these regulations creates barriers to developing global standards that could help expand Islamic finance in the digital age.

Digitalization in Islamic finance has also led to innovative concepts such as smart contracts based on blockchain and green financing supported by fintech. Smart contracts provide efficiency and security in international trade finance by automatically executing transactions in compliance with Shariah provisions, reducing the risk of non-compliance (Sa'ad, Nor, Ali, & Kassim, 2021). Additionally, the integration of green finance into fintech products aligns with Shariah principles of sustainability while contributing to global green finance efforts (Serdarušić, Pancić, & Zavišić, 2024). These innovations show that digital technologies not only enhance Islamic finance's competitiveness but also expand its relevance in broader contexts like environmental sustainability. For the successful integration of digital technology in Islamic finance, strong collaboration among industry stakeholders, religious authorities, and regulators is crucial. Clear guidelines must be established to ensure that technologies like blockchain, AI, and big data comply with Shariah principles (Fadila, Andaru, & Aryani, 2023). Without compromising core Islamic values, these technologies can play a transformative role in modernizing Islamic finance.

In summary, digitalization presents substantial opportunities for increasing efficiency, innovation, and competitiveness within Islamic finance. However, challenges related to regulation, security, and market acceptance must be addressed to fully realize the potential of this transformation. Further developments in the field are expected to not only provide solutions for modern Muslim societies but also establish global standards for Islamic finance in the digital age. Moreover, the integration of digital technologies presents significant opportunities to improve Shariah supervision. Mobile banking, digital wallets, and application programming interfaces (APIs) can enhance operational efficiency and competitiveness by providing faster, more convenient services (Desky & Maulina, 2022). Blockchain technology, in particular, offers heightened security and transparency, making transactions easier to audit and protected from manipulation (Hutagalung et al., 2024).

Blockchain creates a decentralized and immutable ledger system, ensuring transparency and justice in line with Shariah principles. This technology provides a permanent, accessible transaction record, reducing the risk of fraud in Islamic financial operations. Additionally, blockchain enables smart contracts that execute transactions automatically based on pre-established rules, ensuring strict adherence to Shariah principles (Hutagalung et al., 2024). However, some challenges remain regarding the compatibility of certain digital innovations with Shariah principles, particularly the use of digital contracts and mechanisms for muamalat transactions. Ensuring clarity and validity in relationships between parties remains a challenge (Shuib et al., 2023). Additionally, limited technological infrastructure and human resources in many Islamic financial institutions hinder the widespread implementation of these digital systems (Desky & Maulina, 2022; Priyana et al., 2024).

Despite these hurdles, digitalization offers significant opportunities for improving Shariah supervision. Technologies such as robo-advisory services can provide real-time consultations and evaluations of Shariah compliance, enabling Shariah Supervisory Boards (SSBs) to oversee financial products more efficiently (Haridan et al., 2023). Robo-advisory systems can automatically detect and assess non-compliance, improving decision-making and minimizing violations. Big data and predictive analytics also allow institutions to identify potential compliance risks, enabling proactive measures and boosting public trust in the industry. In conclusion, through the integration of digital technologies, Islamic financial institutions can become more efficient, secure, and transparent, aligning with the demands of the digital age. The collaboration between regulators, industry stakeholders, and technology developers will be essential to ensuring that digital transformation enhances Islamic finance's primary objectives - providing fair, transparent, and ethical financial solutions for the global community.

3.1.1 Transformation of Shariah Supervision through Digital Technologies: Blockchain, AI, Big Data, and RegTech

The transformation of Shariah supervision through digital technology can strengthen transparency, accountability, and efficiency in the Islamic financial sector. One promising technology is blockchain, which can enhance data transparency and security. With its decentralized and immutable characteristics, blockchain creates transaction records that cannot be manipulated, providing better transparency for the Shariah Supervisory Board (SSB) to conduct real-time audits. Additionally, blockchain can help create a single digital market that facilitates uniform Shariah compliance across jurisdictions, reducing the differences in interpretation that can harm Shariah financial institutions (Ballamudi, 2016; Dahdal, Truby, & Ismailov, 2022; M. Z. Khan, Nadeem, Kaleem, & Nazir, 2023). However, the implementation of blockchain requires the development of robust infrastructure and regulatory adjustments to align with Shariah-specific needs (Ametrano, Barucci, Marazzina, & Zanero, 2018).

Another technology with the potential to transform Shariah supervision is Artificial Intelligence (AI). AI, through machine learning and natural language processing, can automate Shariah compliance by analyzing transactions in real time, detecting violations, and identifying risk patterns. AI can also enhance Shariah consulting services through AI-driven chatbots, improving customer service quality (S. Khan & Rabbani, 2021; Prabhakar, Nalinaksha, & Anjaneyulu, 2023). However, the main challenge lies in adapting AI systems to the complexity of Shariah rules, and there is a need for collaboration between technology experts and Shariah scholars to ensure proper implementation (Tiwari & Saxena, 2021).

In addition, the use of big data in Shariah supervision can strengthen the monitoring of compliance with Shariah principles in financial products and services. Big data analytics enables Shariah financial institutions to monitor large-scale transactions in real time and detect suspicious patterns, accelerating responses to potential violations (Chokkalingam & S., 2016; Putchala, Kanala, Donepudi, & Kondaveeti, 2022). This technology can also be integrated with Service-Oriented Architecture (SOA) to provide flexibility in meeting Shariah compliance needs, although challenges related to inter-institutional integration and data security remain concerns (Ramachandran, 2017). Moreover, Regulatory Technology (RegTech) offers an efficient solution to meet Shariah compliance requirements. By leveraging advanced technologies such as AI, machine learning, big data analytics, and robotic process automation (RPA), RegTech enables faster and more automated supervision. This reduces reliance on time-consuming manual oversight and improves accuracy and transparency in Shariah compliance reporting (Firmansyah, Arman, & Wahyuni, 2023; Miglionico, 2020). However, the implementation of RegTech requires significant investment and attention to regulatory challenges, as well as data security concerns that could impact its effectiveness (Grassi & Lanfranchi, 2022). Overall, digital technologies such as blockchain, AI, big data, and RegTech offer significant opportunities to enhance the efficiency, transparency, and accountability of Shariah supervision. However, challenges related to infrastructure, regulation, and data security must be addressed to ensure that this digital transformation effectively supports Shariah principles. Collaboration between technology developers, regulators, and Shariah financial institutions will be key to optimizing the potential of these technologies to create a more transparent, accurate, and responsive Shariah supervision system in the digital era.

3.1.2 Challenges of Sharia Supervision in the Digital Era

Data security and privacy are critical concerns in the supervision of Sharia-compliant financial services, particularly within the rapidly growing digital financial services sector. With the increasing use of digital platforms, safeguarding user data has become essential. In Sharia-compliant finance, which adheres to Islamic principles, the protection of data must align with Sharia laws that prohibit harmful practices, including the misuse of personal data (Hamsin, Halim, & Anggriawan, 2023). In Indonesia, measures such as the collaboration between Bank Indonesia and the Financial Services Authority (OJK) have been introduced to regulate Sharia digital payment operators. However, challenges persist in ensuring that every digital financial service consistently adheres to legal and regulatory frameworks.

Data security in Sharia-compliant financial platforms faces various threats, including data loss, theft, or corruption, which can erode user trust. With cybercrimes targeting sensitive information, more effective data protection strategies are urgently needed. Beyond addressing technical concerns, it is vital that Sharia principles are incorporated into every transaction to ensure trust and transparency (Hamsin et al., 2023). Regulations like Indonesia's Personal Data Protection Law (No. 9 of 2022) offer a legal foundation, but further strengthening is necessary to ensure robust privacy and security in Sharia-compliant services (Abevsekera, 2021). Moving forward, Sharia-compliant financial service providers must prioritize data protection compliance while integrating Sharia principles in every aspect of their operations. This approach ensures that user trust is maintained, the integrity of services is upheld, and the sector can continue to grow without neglecting privacy rights.

A significant challenge for Sharia supervision in the digital era lies in the complexity of global regulations. The differences in standards and legal approaches across countries complicate efforts to maintain consistent supervision. Sharia-compliant finance must adhere to both Islamic principles and various national and international regulations, creating barriers in multinational institutions. For example, while the European Union's General Data Protection

Regulation (GDPR) emphasizes data privacy, countries like the United States and China have differing policies on data protection and national security (Zuo, 2024). These discrepancies make it difficult for global Sharia-compliant financial institutions to establish a uniform compliance system. Moreover, variations in the interpretation and implementation of policies across countries create further challenges. The increasing integration of environmental, social, and governance (ESG) principles into financial regulations adds another layer of complexity for Sharia-compliant financial institutions. For instance, the European Union's Carbon Border Adjustment Mechanism (CBAM) imposes stringent environmental standards that may conflict with countries that have more lenient policies, complicating the implementation of Sharia-compliant financial systems aimed at public welfare (Shahzada Aamir Mushtaq Shahzada Aamir Mushtaq, 2020).

Harmonization of regulations and international cooperation could help overcome these challenges. Technologies like RegTech can support Sharia-compliant financial institutions in real-time regulatory monitoring, ensuring compliance with both local and international standards (Oguejiofor et al., 2023). By adopting appropriate technology, institutions can more effectively meet diverse regulations without compromising Sharia principles. Another obstacle in Sharia supervision is the varying interpretation of Sharia principles across countries. Different interpretations of the core tenets of Sharia, based on local fiqh methodologies, affect the governance of financial transactions. For example, in Indonesia, the National Sharia Council (DSN-MUI) plays a central role in issuing fatwas regarding digital financial services like e-money, digital financing, and Sharia-based crowdfunding (Hidayati, Hidayatullah, Komarudin, & Atika, 2023). However, Indonesia's low Sharia financial literacy, at only 6.63%, presents challenges in effectively implementing these fatwas (Rini Rahayu Kurniati, 2019).

Additionally, financial technologies considered Sharia-compliant in one country may not be accepted in another, due to differences in interpretations of maslahat (public welfare) and maqashid (Sharia objectives). Technologies like blockchain or robo-advisory, deemed Sharia-compliant in one jurisdiction, may face opposition in others (Elsy Renie, 2019). This underscores the importance of harmonizing Sharia standards globally to facilitate the integration and oversight of digital Sharia-compliant financial services.

To address these issues, international collaboration is needed to align Sharia principles in financial technology. Applying maqashid Sharia, which prioritizes public welfare, will help develop regulations that not only comply with Sharia but also foster broader economic and social development. Collaborative efforts between countries and Sharia institutions to align their fatwas could accelerate the integration of digital Sharia-compliant finance. One key challenge is the technological literacy of Sharia Supervisory Board (SSB) members. While the SSB plays a critical role in ensuring Sharia compliance in financial services, many members lack sufficient understanding of digital financial technologies. Studies show that this gap in knowledge hinders effective supervision, especially in areas like crowdfunding (Sudarwanto et al., 2023). Conversely, SSB members with higher educational qualifications, particularly those holding doctoral degrees, have been shown to positively impact the financial performance of Islamic banks, suggesting that enhanced technological knowledge among SSB members could improve supervision in digital financial services (Safiullah, 2023). To address this, continuous education through regular technology training is essential for SSB members. Collaborating with technology experts and academics will also strengthen the SSB's competence in overseeing digital financial products.

Resistance to change remains a significant barrier in Sharia supervision. Many Sharia-compliant financial institutions continue to rely on traditional paper-based methods, despite the potential efficiency of digital technologies. Cultural factors and reluctance to change often hinder the adoption of new technologies (Gupta, Sharma, & Jha, 2024). To overcome this, a gradual, inclusive approach is needed. Comprehensive training and change management strategies involving all stakeholders will facilitate the transition to digital supervision (Moussa, Benrimoj, Musial, Kocbek, & Garcia-Cardenas, 2021). Cultivating an organizational culture that embraces technological change is crucial for the success of digital transformation in Sharia-compliant finance. In summary, Sharia supervision in the digital financial sector faces multifaceted challenges, including data security, regulatory complexity, differences in Sharia interpretations, and low financial literacy. To address these, harmonized regulations, international collaboration, and enhanced Sharia Supervisory Board capacity are essential. Integrating technology with Sharia principles can provide solutions, ensuring that Sharia-compliant financial services remain secure, transparent, and aligned with both Islamic values and modern regulatory standards.

3.1.3. Opportunities in Digitalization for More Effective Sharia Supervision

Digitalization presents significant opportunities to enhance Sharia supervision in Islamic banking, improving transparency, operational efficiency, and global compliance. One of the key advantages of technology is its ability to monitor Sharia compliance in real-time using digital tools like Financial Technology (FinTech). These tools enable quick access to data, facilitating rapid and thorough transaction analysis, which is crucial for maintaining stakeholder trust in Islamic financial institutions (Ramadhan, 2022). Furthermore, digital technology aids in standardizing contracts and operational procedures in line with Sharia principles, reducing legal risks and inconsistencies across jurisdictions (Karimah, 2022).

The use of technology also streamlines Sharia supervision, allowing Sharia Supervisory Boards (SSBs) and regulatory authorities such as the Financial Services Authority (OJK) and the National Sharia Board (DSN) to conduct more efficient oversight. Technology-driven supervision minimizes errors or deviations from Sharia principles in financial transactions, helping SSBs maintain the integrity of Islamic finance (Jailani, 2023; Purnomo, 2019). The automation of reporting processes enhances accuracy, shortens the time for compliance audits, and improves transparency. This allows regulators and the public to access comprehensive Sharia compliance information, contributing to more robust corporate governance and social responsibility practices within Islamic banks (Usdeldi, Nasir, & Ahsan, 2022). Digitalization also promotes transparency in Islamic banking by encouraging banks to adopt clearer reporting practices that include SSB decisions, evaluations, and Sharia compliance assessments. This transparency helps build public trust in Islamic banking, assuring customers that financial institutions adhere to Sharia principles consistently (Rusady, Razati, & Utami, 2019). By maintaining Sharia compliance and demonstrating operational transparency, Islamic banks can attract more customers who seek ethical and trustworthy financial services.

Another major benefit of digitalization is operational efficiency, achieved through automation. Technologies like Robotic Process Automation (RPA) have proven to reduce errors and enhance performance across industries by automating repetitive manual tasks. In Islamic finance, RPA can ease the workload of SSBs and compliance teams by speeding up transaction verification based on Sharia principles. Automation can also adapt quickly to regulatory changes, ensuring that Islamic financial institutions remain compliant with evolving Sharia standards (Gao, van Zelst, Lu, & van der Aalst, 2019). RPA technology automates the checking and analysis of transaction documents, reducing manual effort and accelerating compliance verification. In addition to improving Sharia compliance, automation boosts customer service by streamlining transaction processing and ensuring consistent adherence to Sharia guidelines. RPA technology can also enhance human resource management in Islamic banks, ensuring compliance with key processes such as recruitment, payroll, and training (Balasundaram & Venkatagiri, 2020). By automating these processes, Islamic financial institutions can improve customer service and reduce operational costs, enabling them to focus more on service innovation and compliance management.

The global standardization of Sharia compliance is another area where digital technology plays a crucial role. International organizations like the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) and the Islamic Financial Services Board (IFSB) have developed frameworks and guidelines for Sharia governance, which help guide Islamic financial institutions globally (Hilmy & Hassan, 2019). However, discrepancies between global standards and local practices remain a significant challenge. By adopting technologies such as Islamic fintech, blockchain, and artificial intelligence (AI), Sharia compliance can be standardized more effectively, improving the efficiency, transparency, and consistency of Sharia supervision worldwide.

Islamic fintech, in particular, can strengthen global standardization by enabling real-time data access and monitoring. Countries like Malaysia, Saudi Arabia, and Indonesia lead the Global Islamic FinTech Index (GIFT), demonstrating the potential of Sharia-compliant fintech to revolutionize financial services (Sudarwanto et al., 2023). Yet, challenges such as low compliance levels in products like Islamic crowdfunding highlight the need for more robust technologies and standardized Sharia supervision. Blockchain technology, for example, offers immutable and transparent transaction records, supporting monitoring and standardizing Sharia compliance across borders. By creating a global network, blockchain ensures that Sharia-compliant transactions and documents are accessible to relevant stakeholders, improving data transparency and integrity.

Countries such as Turkey have pioneered innovative Sharia-compliant products and integrated fintech solutions, offering valuable lessons for emerging markets in the Islamic financial sector (BULUT & KORKUT, 2024). Achieving global standardization requires collaboration between industry players, religious authorities, and regulators in each country. Establishing Sharia Supervisory Boards in various regions and adopting internationally agreed-upon supervisory standards will be key to this collaboration. The use of AI in analyzing and classifying Sharia-compliant financial products also provides new opportunities for ensuring global Sharia compliance across all jurisdictions. Despite challenges in harmonizing Sharia standards, digital technologies like blockchain and AI offer hope for achieving global Sharia compliance standardization. With structured implementation and strong regulation, these technologies can enable Islamic financial institutions to operate transparently and effectively across jurisdictions, ensuring that all products and services comply with Sharia principles.

Digitalization also plays a pivotal role in strengthening public trust in Islamic financial products and services. Technology enables Islamic financial institutions to provide more efficient, transparent, and customer-centric services, which in turn enhances customer loyalty and trust. Research shows that the convenience and improved service quality offered by digital technologies, such as mobile banking and digital wallets, positively influence customer satisfaction, especially when these services align with Sharia values (Alfarizi, 2023; Fadila et al., 2023). Furthermore, digitalization opens opportunities for innovative services, such as biometric authentication and data analytics, enhancing the security and personalization of customer experiences (Desky & Maulina, 2022; Nugroho et al., 2023). However, challenges remain in the digital transformation process, including limited digital infrastructure and human resources in Islamic banking,

which can hinder the adoption of new technologies (Desky & Maulina, 2022). Another critical issue is ensuring that digital financial services adhere to Sharia principles. Islamic digital services must align with Sharia values, requiring close oversight from the Sharia Supervisory Board (DPS) (Hidayanto, Gustanto, & Rahmawanti, 2024; Ramadhan, 2022). To address these challenges, Islamic financial institutions must focus on improving infrastructure and human resource capacity.

To further strengthen consumer trust, Islamic banks must prioritize the security and privacy of customer data. In the digital era, consumers are increasingly concerned about how their personal information is protected. Banks that meet high security standards and offer privacy-supporting services will have a competitive advantage in gaining the public's trust (Alfarizi, 2023; Nugroho et al., 2023). Additionally, educating the public about the benefits of Sharia-compliant digital banking products is essential. This education should not only focus on service usage but also on understanding the Sharia principles embedded in these products. Collaboration between financial institutions, Islamic organizations, and governments is vital to strengthen Sharia financial literacy and build a sustainable Islamic financial ecosystem. Financial literacy programs will help the public understand the benefits of Islamic finance, promoting the adoption of Sharia-compliant digital services (Alfarizi & Sari, 2022). In conclusion, digitalization not only supports efficiency and transparency in Sharia supervision but also acts as a catalyst for building public trust in Islamic financial products, further solidifying the role of Islamic banking in the digital era.

4. CONCLUSION

The digital transformation in Sharia supervision has opened significant opportunities to enhance the effectiveness and efficiency of ensuring compliance with Islamic financial principles. Technologies such as blockchain, artificial intelligence (AI), big data, and RegTech enable the automation of compliance processes, improve transparency, and facilitate more accurate data management. In this context, Sharia Supervisory Boards (SSBs) can leverage technology to conduct more responsive and proactive supervision, reduce the risk of Sharia violations, and build public trust in the Islamic financial industry. At the international level, the transformation of Sharia-based supervision through digital means has profound implications for countries with Islamic financial systems. The complexity of global regulations and differing interpretations of Sharia principles across countries has created an urgent need for international standards in Sharia supervision. Digital technologies allow the creation of more universal platforms for Sharia compliance monitoring, which can strengthen the integration of international Islamic financial markets. Cross-border collaboration through global Sharia standards and the adoption of advanced technologies will support the harmonization of supervision, enhancing the competitiveness of Islamic finance in the global market.

In this context, Islamic financial institutions and SSBs are expected to adopt technologies such as AI, blockchain, and big data in the supervision process. The use of automation and predictive analytics can assist SSBs in identifying and preventing violations more efficiently. Additionally, regular training programs for SSB members are necessary to ensure they understand the latest technologies, especially those related to digital Sharia compliance. This technological literacy will enhance the ability of SSBs to monitor tech-based financial products and ensure they remain compliant with Sharia principles. Not only financial institutions but international regulators also play an important role in facilitating cooperation among countries to develop uniform Sharia supervision standards. Standardization will ease the integration of international Islamic financial markets, minimize interpretative conflicts, and strengthen global investor confidence. International regulators could also establish regular forums to discuss new technological developments, compliance trends, and relevant Sharia regulations, enabling countries to share best practices. These steps can help build a more integrated and globally aligned Islamic finance ecosystem. However, with the increasing adoption of digital technologies, Islamic financial institutions must implement stringent data security policies in accordance with Sharia principles. Measures such as data encryption, regular security audits, and access control mechanisms are essential to safeguard the confidentiality and integrity of customer data. Furthermore, countries with Islamic financial systems are encouraged to adopt or strengthen data privacy regulations, such as the GDPR in the European Union, to protect user data in digital surveillance. This not only protects customer privacy but also strengthens trust in the Islamic finance industry. This article identifies the opportunities digitalization presents for Sharia supervision, but it remains limited in its discussion of the technical implementation and specific adoption challenges of technology. Future research should focus on practical analyses of technology implementation through case studies or empirical experiments on the use of technologies like blockchain and AI in Sharia supervision, as well as evaluating their impact on supervision effectiveness. Furthermore, research on technological infrastructure and human resource capacity in Islamic financial institutions is needed, particularly to identify barriers and solutions for integrating technology. In-depth studies on how varying interpretations of Sharia across countries affect technology implementation in supervision and how harmonization can be achieved are also necessary. By focusing on these aspects, future research is expected to provide a more comprehensive insight into the development of effective, secure, and globally compliant technology-based Sharia supervision in the digital era.

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