

The Role of Digitalization and AI in the Transformation of Islamic Financial Institutions

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Abstract-The rapid development of digitalization and artificial intelligence (AI) has significantly transformed the structure and operations of Islamic financial institutions. This study aims to map and analyze the evolution of scientific research on digitalization and AI in Islamic finance during the period 2020-2025. A bibliometric analysis was employed using publication data from reputable academic databases and analyzed with VOSviewer to identify research trends, thematic clusters, and knowledge structures. The results indicate a substantial growth in studies focusing on Islamic digital banking, Islamic fintech, and AI applications, particularly in relation to operational efficiency, financial inclusion, risk management, and Sharia governance. Network visualization reveals that Islamic finance, artificial intelligence, fintech, and Sharia governance constitute dominant research clusters, while overlay analysis shows a shift in research focus from technology adoption toward the integration of advanced technologies and governance strengthening. However, density visualization suggests that issues related to ethical AI, regulatory readiness, and digital Sharia governance remain underexplored. This study contributes by providing a state-of-the-art bibliometric mapping of digital transformation research in Islamic financial institutions and by identifying critical gaps for future research. The findings offer valuable insights for academics, regulators, and practitioners in developing Sharia-compliant digital transformation strategies within Islamic finance.

Keywords: Islamic Finance; Artificial Intelligence; Digitalization; Fintech; Sharia Governance

1. INTRODUCTION

The development of digital technology has brought about fundamental changes in the global financial system, marked by the increasing utilization of financial technology (fintech), artificial intelligence (AI), big data, and blockchain in the provision of financial services. This digital transformation not only improves operational efficiency and service quality but also fundamentally changes the business models of financial institutions. Since the COVID-19 pandemic, financial digitalization has accelerated and is seen as a strategic factor in maintaining the competitiveness and sustainability of the financial industry (Thakor, 2020; Alshater et al., 2022; Meero, 2025).

In the context of Islamic finance, digital transformation presents more complex challenges and opportunities compared to conventional financial systems. Islamic financial institutions are not only required to adapt to technological innovation, but must also ensure that all financial processes and products remain compliant with Islamic principles, such as the prohibition of usury, gharar, and maysir, and uphold the values of justice, transparency, and trust. Therefore, digitalization in Islamic finance cannot be understood solely as a technological innovation, but rather as an integrative process between technology, governance, and Islamic values (Hassan & Aliyu, 2021; Yusoff, 2022).

As the adoption of digital technology increases, academic attention to digital transformation and the performance of Islamic financial institutions is also experiencing significant growth. Various studies indicate that Islamic digital banking, Islamic fintech, and the use of AI contribute to improved operational efficiency, financial inclusion, and risk management in Islamic financial institutions (Qudah et al., 2023; Rahim et al., 2023; Budiyan et al., 2025). National studies also confirm that digital transformation is becoming one of the important determinants in improving the competitiveness and performance of Islamic financial institutions in developing countries, including Indonesia (Gunawan & Rusydiana, 2023; Widiyanto & Zuhri, 2024).

Nevertheless, empirical and conceptual findings in the literature still show mixed results. Some studies emphasize the positive impact of digitalization on the financial and non-financial performance of Islamic financial institutions, while others highlight emerging new risks such as regulatory uncertainty, data security, and potential deviations from Sharia compliance due to automation and the use of AI-based algorithms (Ichsan et al., 2024; Karim, 2022; Afzal et al., 2025). This condition indicates that the relationship between digital transformation and the performance of Islamic financial institutions has not been fully and comprehensively understood.

In recent years, bibliometric approaches have been increasingly used to map research developments and knowledge structures in the fields of finance and fintech. Bibliometric analysis allows for the objective and systematic identification of research trends, thematic clusters, dominant authors and journals, as well as the direction of research development (Donthu et al., 2021; Nasution, 2021). Several bibliometric studies have been conducted on the topic of Islamic fintech and Islamic finance in general, but research specifically linking digital transformation with the performance of Islamic financial institutions is still relatively limited and fragmented (Alshater et al., 2022; Qudah et al., 2023).

Based on this research gap, this study aims to analyze and map the development of global literature on digital transformation and the performance of Islamic financial institutions during the period 2020-2025 using a bibliometric approach assisted by VOSviewer. This research is expected to identify the main thematic clusters, current research trends,

and the evolutionary direction of studies linking digitalization with the performance of Islamic financial institutions. The main contribution of this research lies in providing a state-of-the-art research map that can serve as a basis for developing future research agendas, while also offering a reference for regulators and practitioners in formulating digital transformation strategies aligned with Sharia principles.

2. RESEARCH METHODS

This research employs a quantitative descriptive approach with bibliometric analysis methods to map the development of literature on digitalization and artificial intelligence (AI) in Islamic financial institutions. The research data consists of scientific articles obtained from reputable databases, namely Scopus and Web of Science, with Google Scholar as a supporting source. The literature search was conducted using keywords relevant to the research topic, such as Islamic finance, Islamic banking, digitalization, artificial intelligence, and Islamic fintech, with a publication time range of 2020-2025. The analyzed articles were selected based on inclusion criteria that included topic relevance, publication quality, and research novelty.

Data analysis was conducted using VOSviewer software to identify keyword co-occurrence patterns, author collaboration (co-authorship), and publication impact (citation analysis). The analysis results are visualized in the form of network, overlay, and density visualizations to illustrate the intellectual structure, research trends, and main thematic clusters in the study of digitalization and AI in Islamic finance. The validity of the research is maintained thru strict literature selection and cleaning of bibliographic data, although the study has limitations due to its quantitative nature and reliance on the coverage of the databases used.

3. RESULTS AND DISCUSSION

3.1 Results

A bibliometric analysis was conducted on scientific publications from the period 2020-2025 that discuss digitalization and artificial intelligence (AI) in Islamic financial institutions. Data processing using VOSviewer software produces a keyword network (co-occurrence) visualization that shows the structure and patterns of research theme interconnections.

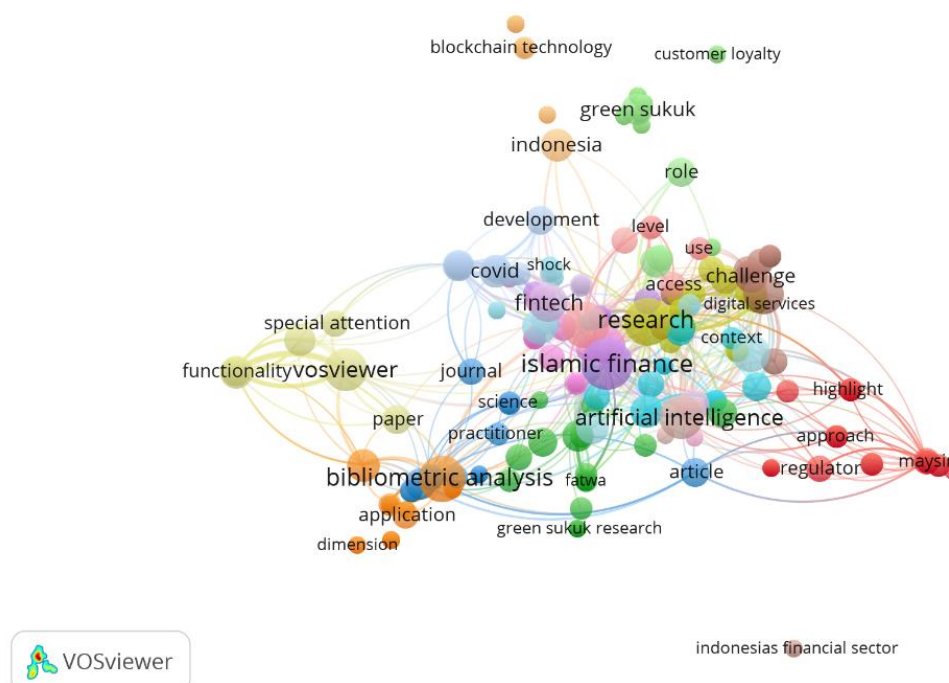


Figure 1. Network visualization

The network visualization results show the formation of several main clusters. The first cluster is dominated by the keywords Islamic finance, Islamic banking, and fintech, indicating that the study of digitalization and AI remains deeply rooted in the core discourse of Islamic finance. The second cluster centers on artificial intelligence, machine learning, and automation, reflecting the growing attention to the utilization of intelligent technologies in risk analysis, operational efficiency, and decision-making. Other clusters feature keywords such as sharia governance, regulation, and compliance, indicating the importance of sharia governance and compliance aspects in digital transformation.

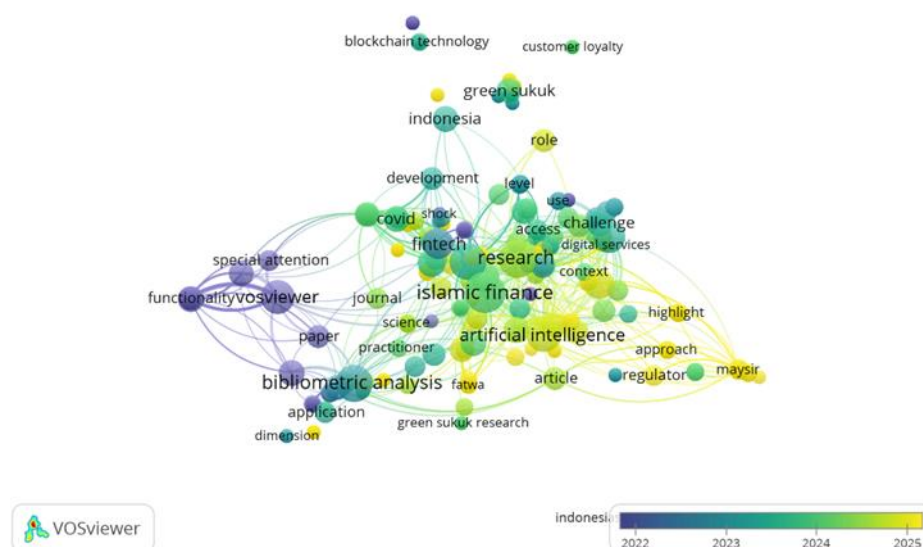


Figure 2. Overlay Visualization

The overlay visualization results show the temporal development of the research topic. In the initial period (2020-2022), research focused more on fintech adoption, digital banking, and financial inclusion. Meanwhile, in the subsequent period (2023-2025), brighter colors emerged for the keywords artificial intelligence, blockchain, and governance, indicating a shift in research interest toward advanced technologies and strengthening digital sharia governance.

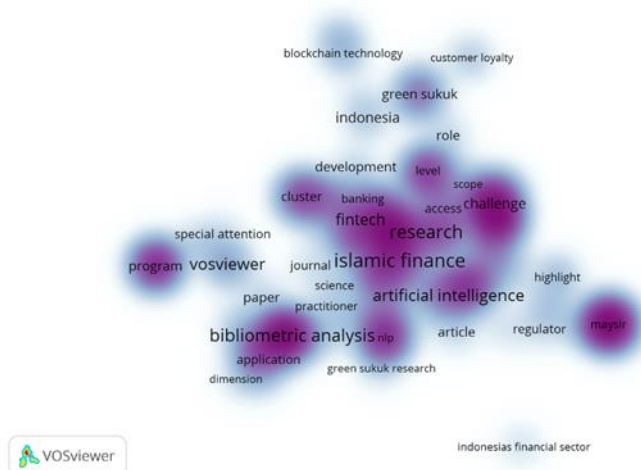


Figure 3. Destiny Visualization

Next, density visualization shows the density level of research on specific keywords. The area with the highest intensity is concentrated on the keywords Islamic finance, fintech, artificial intelligence, and bibliometric analysis. Conversely, keywords like ethical AI, sharia digital audit, and regtech still have low density, indicating opportunities for further research in the future.

3.2 Discussion

The results of the bibliometric analysis confirm that digitalization and artificial intelligence (AI) have become mainstream in the transformation of Islamic financial institutions during the 2020-2025 period. The dominance of the keywords Islamic finance, Islamic banking, fintech, and artificial intelligence shows that digital transformation is no longer understood as a partial technology adoption, but rather as a systemic process that reshapes business models, governance, and value creation mechanisms in Islamic finance (Thakor, 2020; Alshater et al., 2022; Hassan & Aliyu, 2021; Qudah et al., 2023). These findings are consistent with the international literature that states that the COVID-19 pandemic has accelerated the adoption of digital technology as an institutional sustainability strategy, including in the Islamic finance sector (Donthu et al., 2021; Meero, 2025).

The strengthening of AI and machine learning clusters reflects a shift in research focus from the issue of technology adoption to the use of smart technology in data-driven decision-making. AI is seen as able to improve the quality of risk analysis, operational efficiency, and the accuracy of financing assessments through real time processing of big data (Aysan et al., 2023; Afzal et al., 2025; Rahim et al., 2023). In the context of Islamic finance, AI's predictive capabilities

have become relevant due to the more complex risk characteristics, including sharia compliance risks, so that the technology serves not only as an efficiency tool but also as a value-based risk mitigation instrument (Ichsan et al., 2024; Karim, 2022).

The overlay visualization shows that in the initial phase (2020-2022) the research emphasizes more on fintech adoption, digital banking, and financial inclusion. This focus is in line with the need for Islamic financial institutions to expand the range of services and overcome financial exclusion, especially in developing countries (Gunawan & Rusydiana, 2023; Augustine, 2023; Rahim et al., 2023). National and regional studies show that digitalization is able to reduce transaction costs, increase service speed, and expand MSMEs' access to sharia financing (Fianto & Gan, 2020; Fitriyaningsih & Fianto, 2022; Budiyanto et al., 2025).

Over time, the literature shifts towards more advanced technologies such as AI and blockchain, as reflected in the visualization overlay for the period 2023-2025. Blockchain is often perceived as being in line with sharia principles because of its transparent, immutable, and auditable nature, especially in the management of zakat, waqf, and Islamic social finance (Rabbani et al., 2020; Khan et al., 2023; Zulfikri et al., 2023). The integration of AI and blockchain marks the maturity phase of the digital transformation of Islamic finance, where technology is no longer an operational support, but rather the foundation of digital governance.

However, the results of the density visualization reveal the disparity between the intensity of technology research and regulatory research and sharia governance. Topics such as sharia governance, regulation, and ethical AI are still relatively underexplored compared to core technology themes. The literature confirms that regulatory lag has the potential to create regulatory arbitrage and compliance risks, considering that Islamic financial institutions face dual obligations: financial regulatory compliance and sharia compliance (Yusoff, 2022; Kasri & Ath Thahirah, 2023; Kumara & Nugraha, 2024).

Governance issues become increasingly crucial when AI is used in financing decision-making and risk management. Without a clear governance framework, AI has the potential to cause algorithmic bias, lack of transparency, and violations of the principles of justice that are the foundation of maqashid al-shariah (Aysan et al., 2023; Safriatullah et al., 2025). Therefore, the latest literature emphasizes the urgency of developing Shariah-compliant AI and digital sharia audits that are able to explain the logic of algorithmic decisions in an accountable manner (Yusoff, 2022; Salem & Shahimi, 2025).

From a user behavior perspective, the adoption of digitalization and AI in Islamic finance is greatly influenced by trust, perception of benefits, and ease of use. Studies based on TAM and UTAUT show that sharia compliance plays a key differentiating factor that strengthens user trust and loyalty to Islamic digital financial services (Azman & Zabri, 2022; Fitriyaningsih & Fianto, 2022; Supriyono et al., 2024). This confirms that the success of digital transformation does not only depend on

Overall, bibliometric and thematic synthesis shows that digitalization and AI have formed a new socio-technical ecosystem in Islamic finance. This transformation opens up significant opportunities for improved efficiency, financial inclusion, and industry sustainability. However, these benefits can only be optimized if they are accompanied by strengthening governance, harmonization of regulations, and a technological ethical framework that is in line with maqashid al-shariah (Donthu et al., 2021; Meero, 2025; Salem & Shahimi, 2025). Thus, future research needs to shift from mere technological exploration to the development of integrative models that connect digital innovation, governance, and Islamic values conceptually and empirically.

4. CONCLUSION

This study concludes that digitalization and artificial intelligence (AI) have become dominant and transformative forces in the development of Islamic financial institutions during the period 2020-2025. The bibliometric analysis demonstrates a significant increase in scholarly attention to Islamic digital banking, Islamic fintech, and AI-based applications, indicating that digital transformation in Islamic finance has evolved beyond partial technology adoption into a systemic restructuring of institutional operations, governance, and value creation. The strong presence of keywords such as Islamic finance, fintech, and artificial intelligence confirms that digital innovation is now an integral component of the modernization of Sharia-compliant financial systems. The findings further reveal a clear shift in research focus from fintech adoption and financial inclusion toward more advanced technologies, particularly AI and blockchain. These technologies are increasingly perceived as tools to enhance operational efficiency, data-driven decision-making, and risk management, while also supporting transparency and traceability that align with Sharia principles. However, the density analysis highlights a notable imbalance between technological development and research on regulatory readiness, Sharia governance, and ethical considerations. Issues such as Sharia governance, regulatory harmonization, and ethical AI remain relatively underexplored, despite their critical importance in ensuring the legitimacy and sustainability of digital Islamic finance. Overall, this study provides a state-of-the-art overview of the intellectual structure and evolution of research on digitalization and AI in Islamic financial institutions. The results suggest that the success of digital transformation in Islamic finance depends not only on technological innovation but also on the strengthening of governance frameworks, regulatory coordination, and ethical standards consistent with maqashid al-shariah. Future research should therefore move beyond technology-centered discussions toward integrative models that combine digital

innovation, Sharia governance, and institutional performance to support sustainable and trustworthy Islamic financial systems in the digital era.

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