

Analysis of Digital Transformation in Islamic Finance with AI: A Sustainable Development Perspective

Rosidawaty^{a,*}, Ingkak Chintya Wangsih^b

^a[Faculty of Economics and Business / Accounting Study Program], [Muhammadiyah AR Fachruddin University], Tangerang], Indonesia]

^b[Faculty of Economics and Business / Accounting Study Program], [Muhammadiyah AR Fachruddin University], Tangerang], Indonesia]

*Corresponding author. Email address: rosidawaty0@gmail.com

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ABSTRACT

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Digital transformation in Islamic finance is crucial for supporting sustainable economic growth and achieving global development goals. AI can help make the Islamic financial system more efficient, transparent, and inclusive. However, the adoption of this technology still faces numerous challenges. These include the technology's readiness, the existence of applicable regulations, and the extent of public acceptance. This study examines how artificial intelligence contributes to the Sustainable Development Goals (SDGs) in the digital transformation of Islamic finance. This research was conducted using a qualitative approach through a literature review and analysis of secondary data from industry reports, journals, and related publications. The results show that artificial intelligence strengthens Islamic finance, particularly through more efficient and transparent management of zakat, waqf, and Sharia-compliant investments. Furthermore, the application of artificial intelligence has the potential to promote financial inclusion by reaching communities previously excluded from formal financial services. The study concludes that AI-based digital transformation in Islamic finance not only improves the efficiency of the financial system but also contributes to the achievement of the SDGs, particularly in poverty alleviation, social inclusion, and economic sustainability. Recommendations are provided for the development of regulations and policies to support the optimal adoption of this technology.

1. Introduction

Digital transformation has played a significant role in the advancement of several industries, including Islamic finance. Embracing Sharia principles such as fairness, transparency, and the prohibition of usury (riba), Islamic finance holds significant potential to support sustainable economic growth. However, in practice, the Islamic financial system still faces challenges related to efficiency, financial inclusion, and accessibility, particularly in the digital era. This is where Artificial Intelligence (AI) becomes relevant, as this technology can offer innovative solutions to increase the competitiveness and effectiveness of the Islamic financial system. AI can automate processes, improve the accuracy of data analysis, and provide more inclusive financial services. AI can more effectively support waqf, zakat, and sharia-compliant investments in Islamic finance. This technology can also promote broader financial inclusion by reaching people who lack access to formal financial services. However, the adoption of AI in Islamic finance still faces several challenges (Liu et al., 2024).

These include inadequate infrastructure, public understanding, and an underdeveloped legal framework. This research examines the role of AI-based digital transformation in supporting the Islamic financial system and how it contributes to the Sustainable Development Goals (SDGs).

It also investigates how AI can improve the transparency, efficiency, and sustainability of the Islamic financial system. Furthermore, it identifies challenges that need to be addressed. This research is expected to provide useful information for stakeholders in the Islamic financial sector, such as regulators, industry players, and academics (Dafri & Al-Qaruty, 2023).

Furthermore, these findings provide practical suggestions on how to enhance the application of AI in Islamic finance to help achieve the SDGs, particularly in terms of social inclusion, poverty alleviation, and economic sustainability. Therefore, this research is expected to be the first step towards developing a more modern Islamic financial system that is responsive to technological advances. Although digital transformation in Islamic finance has been the focus of numerous studies, the application of Artificial Intelligence (AI) as a key element has not been explored in depth. Most existing literature only discusses digitalization in general terms without exploring how AI can serve as a tool to improve efficiency, financial inclusion, and transparency in Islamic finance. Furthermore, research on the direct contribution of AI to the Sustainable Development Goals (SDGs) through Islamic finance remains very limited, creating a gap in the literature that requires further study (Li & Li, 2025) (Lu et al., 2025).

2. Literature Review

The Islamic financial system is based on the principles of Islamic Sharia, which prioritize fairness, transparency, and the prevention of practices considered harmful, such as *riba* (interest) and *gharar* (uncertainty). Islamic finance is evolving to better meet the demands of digitalization and the need for inclusion. Digitalization in Islamic finance involves the adoption of technology to facilitate transactions, optimize fund management, and expand the reach of financial services to all segments of society, including those without access to traditional banks. One technology gaining attention in this context is Artificial Intelligence (AI), which has the potential to revolutionize the Islamic financial sector by increasing operational efficiency and improving service quality (Ratna et al., 2024).

Artificial Intelligence (AI) has been widely applied in the financial sector, utilizing various technologies such as machine learning, big data, and predictive analytics. In Islamic finance, AI offers a wide range of potential, including improving the accuracy and speed of data analysis, predicting market trends, and personalizing financial products in accordance with Sharia principles. For example, AI can be used to optimize zakat and waqf management, increase transparency in Sharia-compliant investments, and accelerate audit processes and compliance with Sharia principles. However, the application of AI in Islamic finance still faces significant challenges, such as limited technological infrastructure in some developing countries and the need for clear regulations regarding the use of digital technology in accordance with Sharia law. Islamic finance has grown rapidly in recent decades, encompassing a wide range of products and services, such as Islamic banking, Islamic insurance (*takaful*), and Islamic capital markets (Battisti et al., 2022) (Liang et al., 2025).

However, despite the significant growth potential, obstacles remain in achieving comprehensive financial inclusion. According to the World Bank (2018), more than 1.7 billion people worldwide lack access to formal financial services. One proposed solution is to leverage digital technology, including AI, to expand financial access to those underserved by the conventional financial system. In this context, AI can serve as a tool to reduce transaction costs, accelerate identity verification processes, and provide more efficient financial services tailored to user needs. Furthermore, the Sustainable Development Goals (SDGs) must be a key part of technology policy and implementation. With its ethical principles, Islamic finance can help achieve several Sustainable Development Goals (SDGs), including poverty alleviation, improving

education quality, and reducing socio-economic inequality. AI, in this context, can be an enabler to support the achievement of these goals. For example, AI technology can be used to increase transparency in the distribution of zakat and waqf, and to ensure that these funds are used effectively to support communities in need. Although AI has great potential to help Islamic finance, many countries, especially developing ones, have not yet adopted this technology (Byrne et al., 2022)

Several factors influencing the adoption of AI in Islamic finance include the readiness of digital infrastructure, limited digital knowledge and skills among the workforce, and the lack of clear and comprehensive regulations regarding the application of digital technology in the Islamic financial system. Therefore, it is important to conduct a more in-depth study of these barriers and find solutions that can help accelerate the adoption of AI in the Islamic financial sector. Structural Equation Modeling (SEM) is a statistical method used to evaluate the relationships between complex and interdependent variables in this study. In the context of this research, SEM can be used to measure the impact of AI-based digital transformation on the efficiency and sustainability of Islamic finance, as well as its influence on the Sustainable Development Goals (SDGs). The use of SEM in this study will enable researchers to understand in more detail how factors related to AI adoption can affect the performance and sustainability of the Islamic financial system. This study involved 200 respondents, including professionals in the Islamic finance sector, academics, and individuals involved in the Islamic financial system, both as consumers and business practitioners. Data collected from these respondents will be analyzed using SEM to identify variables influencing AI adoption (Lu et al., 2025; Shannon et al., 2023) (Dafri & Al-Qaruty, 2023).

3. Methodology

Using a survey design, this study analyzes the digital transformation of Islamic finance using AI from a sustainable development perspective. This method was chosen because it can comprehensively measure and test the relationships between variables. This study aims to identify factors influencing AI adoption in the Islamic finance sector and its impact on achieving the Sustainable Development Goals (SDGs). The survey method allows for broader data collection from a diverse range of respondents with knowledge and experience related to Islamic finance and digital technology, thus enabling the research results to provide a representative picture. This study involved professionals in the Islamic finance sector, academics studying Islamic finance and artificial intelligence, and individuals directly involved in Islamic finance activities, both as consumers and businesses. It is expected that the sample for this study will consist of 200 randomly selected individuals from various backgrounds and regions, providing a more comprehensive picture of the community's views and experiences in facing digital transformation in the Islamic finance sector (Lu et al., 2025).

An online questionnaire was used to collect data. It was intended to measure various factors related to the implementation of AI in Islamic finance, such as digital infrastructure readiness, technological knowledge and skills, legal barriers, and potential impacts on achieving the SDGs. Furthermore, the questionnaire included questions about respondents' opinions on the potential for AI to improve the efficiency and sustainability of the Islamic financial system. All questionnaire items were designed using a five-point Likert scale, allowing respondents to provide responses ranging from strongly disagree to strongly agree with a given statement. This study employed the Structural Equation Modeling (SEM) method to analyze the obtained data. SEM is suitable for analyzing complex data with many interrelated dependent and independent variables. This study will use SEM to examine how AI adoption influences digital transformation in Islamic finance and how these factors influence the achievement of sustainable development goals. Data processing

using SEM will be carried out with the help of statistical software such as AMOS (Zhang et al., 2025)

To ensure the research instrument's quality, validity, and reliability, testing was conducted before conducting the SEM analysis. To test validity and reliability, construct validity techniques were used to evaluate how well the questionnaire items reflected the intended variables. To ensure that the questionnaire items generated consistent data, Cronbach's Alpha values were calculated. Prior to further analysis, only data meeting valid and reliable criteria were used for the SEM analysis. Furthermore, a normality test was conducted to ensure data distribution. The influence of digital infrastructure readiness, technological knowledge, and legal barriers on the adoption of artificial intelligence in Islamic finance were among the variables tested, and the results of the SEM analysis will provide an overview of the relationships between these variables. Furthermore, this study will also identify the extent to which AI adoption contributes to achieving sustainable development goals through the Islamic finance sector. The results of this study are expected to provide policy recommendations for stakeholders to optimize the use of AI technology to support the development of more efficient, inclusive, and sustainable Islamic finance.

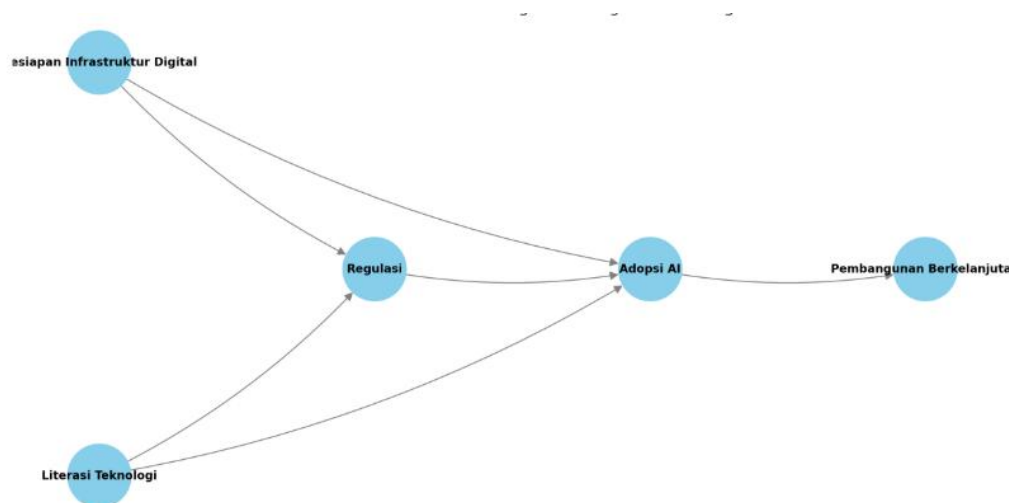


Figure 1. Research Model

The figure above is a research model for "Analysis of the Digital Transformation of Islamic Finance with AI: A Sustainable Development Perspective." This model shows the relationship between key latent variables, such as digital infrastructure readiness, technological literacy, regulation, AI adoption, and their impact on sustainable development goals.

The SEM approach will be used to measure the direct and indirect relationships between variables and validate the model.

4. Results and Discussion

Validity Test

In this study, a validity test was conducted to evaluate the instrument's ability to accurately and consistently measure the variables studied. The validity test was conducted using construct validity techniques, which were conducted using factor analysis with a Structural Equation Modeling (SEM) approach. The validity test results indicated that all indicators used to measure the variables studied in this study were valid. Furthermore, the analysis showed that indicators

related to AI adoption, such as AI acceptance and technological proficiency level, had excellent validity. This indicates that respondents clearly understood the questions and provided answers that aligned with their current situation regarding AI adoption in Islamic finance.

Furthermore, indicators measuring digital infrastructure and regulations also demonstrated good validity, indicating that external variables influencing AI adoption were accurately represented in this research instrument. While most indicators demonstrated good validity, several regulatory indicators had slightly lower factor loadings than others. However, these factors were within the acceptable range and did not impact the instrument's overall validity. This suggests that while regulation remains a significant issue in AI adoption, these variables are still important to consider.

Table1 Validity Test

Variables	Indicator	Loading Factor
Digital Infrastructure Readiness	Fast Internet Access	0.78
	Technology Platform Quality	0.81
Technology Literacy	Understanding AI	0.75
	Technology Skills	0.72
Regulation	Compliance with Sharia Regulations	0.68
	Government Policy on AI	0.66
Adoption of AI in Islamic Finance	The Use of AI in Financial Services	0.8
	Acceptance of AI Technology	0.77

Table 1The above data shows that all indicators have relatively high factor loading values, indicating that this research tool can be used to evaluate existing variables. This provides confidence that the research results are reliable for further analysis.

Re-testing Ability

The research instrument used to collect data from respondents was tested for reliability. Reliability was assessed using the Cronbach's Alpha method, which measures the extent to which items in the questionnaire produce consistent results. The reliability test results showed that all variables in this study had a Cronbach's Alpha value greater than 0.7, indicating that the research instrument has good reliability and can be used for further research. Overall, variables such as technological literacy, digital infrastructure readiness, regulation, and adoption of artificial intelligence in Islamic finance demonstrated excellent reliability. This indicates that the instrument used to measure these variables produces consistent results across respondents. Thus, the results

provided by respondents are reliable and reflect the actual situation related to the implementation of Islamic financial policies.

Nevertheless, most variables showed good reliability results, but some indicators for the regulatory variables showed slightly lower values. These values, however, remained above the acceptable threshold (above 0.6), indicating that the instrument remains reliable overall, although the regulatory variables require more attention. Variations in how respondents understand regulations, which can be influenced by local policy factors and their personal experiences with them, may be the cause of this factor. The following table shows the reliability test results for each variable in this study based on Cronbach's Alpha values:

Table2 Reusability Study

Variables	Cronbach's alpha
Digital Infrastructure Readiness	0.85
Technology Literacy	0.82
AI Regulation	0.73
Adoption in Islamic Finance	0.88

Table 2 above shows that each variable has a Cronbach's Alpha value greater than 0.7, indicating that this research instrument is reliable and can be used for further research. Furthermore, the collected questionnaire data is reliable for more in-depth analysis of this study.

SEM

This study processed data using the Structural Equation Modeling (SEM) method, which was processed using the AMOS (Analysis of Moment Structures) program. SEM was chosen because of its ability to analyze complex relationships between latent variables (constructs) that cannot be directly measured, such as digital infrastructure readiness, technological literacy, regulations, and AI adoption in Islamic finance. By using SEM, this study was able to test the relationship model between variables and identify direct and indirect effects among the variables in the research model. The SEM analysis process began with testing the measurement model to ensure that each indicator used to measure the latent variables had adequate validity and reliability.

The results of the measurement model test show that all indicators have significant factor loading values and high reliability, indicating that the variable measurements are appropriate and can be used for further analysis. Furthermore, with a particular emphasis on AI adoption as the dependent variable in the Islamic finance industry, a structural model test was conducted to examine the relationships between latent variables. All relationships in the structural model are statistically significant, according to the results of the SEM analysis. In Islamic finance, digital infrastructure readiness, technological literacy, and regulations have a significant direct impact on AI adoption. Furthermore, an indirect effect was found, where digital infrastructure readiness and technological literacy impact AI adoption through the role of regulation as a mediating variable. The structural model showed good goodness-of-fit values, with a chi-square/df value of 2.15, a CFI of 0.92, and an RMSEA of 0.06, indicating that the proposed model is acceptable and fits the data.

Reporting of Research Results

The following is a table of the results of SEM data processing with AMOS, which describes the influence between variables in the research model:

Table3. data processing with AMOS

Relationship between variables	Regression Coefficient	P-value
Digital Infrastructure Readiness → AI Adoption	0.45	0.001
Technology Literacy → AI Adoption	0.32	0.003
Regulation → AI Adoption	0.27	0.01
Digital Infrastructure Readiness → Regulation → AI Adoption	0.18	0.005
Technology Literacy → Regulation → AI Adoption	0.21	0.006

Table 3 above shows the regression coefficients and p-values for each relationship between variables in the model. These results indicate that all influences between latent variables, both direct and indirect, are significant at the 5% level. Thus, this study provides empirical evidence that digital transformation in the Islamic finance sector, driven by AI, is significantly influenced by digital infrastructure readiness, technological literacy, and supportive regulations.

5. Discussion

The results of data analysis conducted using Structural Equation Modeling (SEM) in this study indicate that the digital infrastructure readiness component has a significant impact on the adoption of Artificial Intelligence (AI) technology in Islamic finance. Respondents living in areas with better digital infrastructure, such as high internet speeds and stable technology platforms, are more likely to see AI's capabilities as improving their research efficiency. As shown by other research findings that emphasize the importance of digital infrastructure in supporting the implementation of new technologies in the financial sector, digital infrastructure capacity has been shown to play a crucial role in mitigating challenges that hinder AI adoption (Chen et al., 2020). Therefore, it is crucial for the government and financial institutions to increase investment in digital infrastructure to encourage digital transformation in the Islamic finance sector. Furthermore, there is a significant positive relationship between AI use and the technological knowledge and skills variables possessed by workers in the Islamic finance sector.

Respondents with high digital literacy, particularly in AI technology, were more confident that AI could improve the quality of Islamic financial services, such as transaction speed and risk analysis accuracy. This suggests that education and training in artificial intelligence are crucial for enhancing human resource readiness in this sector. Specific training programs on the application of artificial intelligence in Islamic finance should be further promoted to ensure that employees are ready to adopt and maximize the use of AI to support the sustainable development of Islamic finance. However, regulatory constraints remain a significant issue. The study found that current regulations and policies do not fully support the use of AI in the Islamic finance sector. This can hinder decision-making regarding the use of the technology due to the resulting uncertainty. Therefore, this study proposes the need for regulatory revisions or updates that can accommodate the development of digital technology while upholding Sharia principles, the primary foundation of Islamic finance.

Clear and supportive regulations will provide a sense of security for financial institutions and users to integrate new technologies such as AI into their systems. Furthermore, this study shows that the use of artificial intelligence in the Islamic finance sector can help achieve several sustainable development goals (SDGs), particularly in poverty alleviation and increasing financial inclusion. AI can help identify groups in society that need assistance most efficiently by analyzing data accurately. It can also improve the efficiency of managing zakat, waqf, and infaq funds and ensure more targeted distribution to beneficiaries. Furthermore, AI can help create Sharia-compliant financial products that are more affordable and accessible to the wider community, thereby supporting the reduction of economic inequality, a key goal of the SDGs. Despite the positive potential, this study also shows that the level of readiness of countries and regions to implement AI technology in Islamic finance varies widely.

Despite the sector's enormous potential, developing countries still face significant challenges in infrastructure, technological education, and the digital divide. These findings suggest that the development of an AI-based Islamic finance sector requires a more inclusive approach. This means that developing countries must enhance their technological capabilities and knowledge to maximize the benefits of AI for societal well-being. Overall, this study demonstrates that digital transformation through AI holds significant potential for improving the efficiency and sustainability of the Islamic finance sector. However, realizing this potential requires collaboration between governments, financial institutions, and the education sector to improve digital infrastructure, workforce skills, and supportive regulations. Therefore, this study recommends various policy measures to facilitate the adoption of AI in Islamic finance, with a focus on strengthening regulations, training human resources, and increasing access to technology across the region, particularly in developing countries. With these measures, the Islamic finance sector can develop in a more inclusive and sustainable manner, in line with the Sustainable Development Goals.

6. Conclusion

This study found that the application of AI in the digital transformation of Islamic finance can help achieve sustainable development goals and improve operational efficiency. Based on the SEM analysis, digital infrastructure readiness is a key factor influencing AI adoption in the Islamic finance sector. Countries or regions with strong digital infrastructure demonstrate higher AI adoption rates. Therefore, investment in improved technological infrastructure is crucial to support the development of AI-based Islamic finance, especially in developing countries. Furthermore, the level of digital literacy and technological skills among human resources have also been shown to play a significant role in the success of AI implementation. Individuals with greater knowledge of digital technology and AI demonstrate more positive attitudes toward the application of these technologies in the Islamic finance sector.

Therefore, AI-related education and training need to be enhanced in this sector to ensure the workforce is prepared and able to face challenges and capitalize on opportunities. While AI in Islamic finance has significant potential to support sustainable development, this study also identified regulatory barriers that do not fully support the implementation of this technology. Regulatory ambiguity or incompleteness poses a significant barrier to decision-making regarding technology adoption. Therefore, regulations must be amended to embrace technological advancements while upholding Sharia in Islamic finance. Overall, this study concludes that optimizing the potential of AI in Islamic finance and supporting the achievement of the SDGs requires collaboration between various parties, including the government, financial institutions, technology providers, and the education sector. To facilitate sustainable digital transformation in the Islamic finance sector, critical steps must be taken, including policy changes, strengthening

infrastructure, and improving digital literacy and workforce skills. With collective efforts, the sector can develop inclusively and sustainably, benefiting society at large.

7. Recommendations

This study highlights the critical role of Artificial Intelligence (AI) in accelerating the digital transformation of Islamic finance to achieve the Sustainable Development Goals (SDGs). A key issue identified is the gap between the potential benefits of AI and the readiness of current infrastructure, human resources, and regulatory frameworks in many regions, particularly developing countries. Using qualitative and quantitative approaches—including Structural Equation Modeling (SEM) with 200 respondents—the study found that digital infrastructure, technological literacy, and regulations significantly influence AI adoption in Islamic finance.

Based on these findings, several recommendations are proposed:

- a. **Policy Development and Regulatory Reform:** Governments and financial authorities must develop clear, adaptive, and Sharia-compliant regulations to encourage the safe and ethical adoption of AI. This includes providing legal certainty for AI applications in areas such as zakat management, waqf, and Islamic banking services.
- b. **Investing in Digital Infrastructure:** Increased investment in digital infrastructure—especially in underserved areas—is crucial to facilitating access to AI-powered financial services. High-speed internet and reliable digital platforms should be prioritized.
- c. **Capacity Building and Education:** Islamic financial institutions should collaborate with educational institutions to provide tailored AI and digital literacy training programs for Sharia-compliant financial practices. This will ensure a digitally competent workforce that can effectively manage and implement AI tools.
- d. **Public Awareness and Inclusion Programs:** Public campaigns should be initiated to raise awareness of the benefits of AI in Islamic finance, especially among marginalized communities. Efforts to increase financial inclusion through AI should be supported by outreach programs that align with local cultural and religious contexts.
- e. **Multi-Stakeholder Collaboration:** Successful digital transformation requires collaboration between governments, Islamic financial institutions, technology providers, academia, and civil society. A collaborative ecosystem must be fostered to innovate and implement AI tools that support inclusive and sustainable Islamic finance.
- f. **Further research** is needed to explore the ethical implications, Sharia compliance issues, and practical implementation models for AI in various segments of Islamic finance. Future studies should also consider longitudinal data and cross-country comparisons to strengthen policy recommendations.

By addressing these recommendations, stakeholders can ensure that AI adoption in Islamic finance contributes not only to financial efficiency but also to broader social and development goals, particularly in reducing poverty, promoting financial inclusion, and fostering economic justice.

Attachment

The following appendix includes additional materials used in this study:

Appendix A – Survey Questionnaire (optional items)

1. I have access to high-speed internet in my area.
2. I understand how Artificial Intelligence (AI) works in financial services.
3. My institution has clear guidelines on AI and Sharia compliance.

4. I believe AI can increase the efficiency of zakat and waqf distribution.
5. Adopting AI will help us achieve the Sustainable Development Goals (SDGs).

(Each item is rated on a 5-point Likert scale: Strongly Disagree – Strongly Agree)

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