



ARTIFICIAL INTELLIGENCE APPLICATIONS IN ASSESSING SHARIA COMPLIANCE AND RISK IN ISLAMIC FINTECH

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Abstract

Islamic fintech has experienced rapid growth as digital financial innovation expands globally, creating new opportunities for financial inclusion while generating complex challenges in maintaining Sharia compliance and managing emerging risks. Artificial Intelligence offers potential solutions through advanced data processing, predictive analytics, automated monitoring, and intelligent decision-support mechanisms. This study aimed to examine the applications of Artificial Intelligence in assessing Sharia compliance and improving risk management practices within Islamic fintech ecosystems. A mixed-methods research design was employed involving 150 participants consisting of Islamic fintech professionals, Sharia compliance experts, artificial intelligence specialists, and digital finance users. Data were collected through questionnaires, interviews, institutional documents, and AI system evaluations. Quantitative data were analyzed using descriptive statistics, correlation analysis, regression analysis, and comparative evaluation, while qualitative data were examined through thematic analysis. The findings revealed that AI significantly enhanced transaction monitoring, compliance assessment accuracy, anomaly detection, and risk prediction capabilities. The results also indicated that algorithm transparency and human oversight were essential factors influencing stakeholder trust and responsible AI adoption. The study concludes that Artificial Intelligence can strengthen Islamic fintech governance by integrating technological innovation with Sharia principles, ethical accountability, and adaptive risk management frameworks.

Keywords: Risk Management, Sharia Compliance, Technological Governance



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INTRODUCTION

The rapid development of financial technology has transformed the global financial ecosystem by introducing innovative digital services that improve accessibility, efficiency, and user experience. Islamic fintech has emerged as a significant component of this transformation by combining technological innovation with the principles of Islamic finance, including fairness, transparency, risk-sharing, prohibition of interest (*riba*), avoidance of excessive uncertainty (*gharar*), and compliance with ethical investment principles (Al-Okaily & Alsmadi, 2025; Ben Bouheni et al., 2023). The expansion of digital financial platforms, including peer-to-peer financing, digital payment systems, crowdfunding, and Islamic investment applications, has created new opportunities for financial inclusion among Muslim communities and underserved populations. This growth, however, also introduces complex challenges related to maintaining Sharia compliance while ensuring operational efficiency, security, and risk management in increasingly sophisticated digital environments (Idrees & Ullah, 2024; Nazir et al., 2025).

Artificial Intelligence (AI) has become an important technological advancement with potential applications across financial sectors, particularly in areas involving data analysis, decision-making, fraud detection, credit assessment, and risk prediction. AI-based systems can process large volumes of structured and unstructured financial data, identify complex patterns, and provide predictive insights that exceed the capabilities of conventional analytical methods (Widiastuti et al., 2025; Xu et al., 2025). Within Islamic fintech, AI offers opportunities to enhance Sharia governance by supporting automated compliance monitoring, detecting potential violations of Islamic financial principles, evaluating contractual structures, and improving risk assessment mechanisms. The integration of AI technologies may strengthen the ability of Islamic financial institutions to maintain ethical standards while adapting to rapid digital transformation (Abdurrahman, 2025; Kholidah et al., 2024).

The application of AI in Islamic fintech represents a significant intersection between technological innovation and Islamic financial governance. Sharia compliance is not limited to legal or technical requirements but involves broader considerations of ethical responsibility, fairness, social benefit, and adherence to Islamic economic principles (Fodol & Aslan, 2026; Narayan et al., 2025). The increasing complexity of digital financial transactions requires more advanced approaches capable of evaluating compliance in real-time and managing emerging risks effectively. AI-based assessment systems may provide valuable support for Islamic fintech institutions by improving transparency, reducing human error, and strengthening decision-making processes. Understanding how AI can contribute to Sharia compliance and risk management is therefore essential for developing sustainable and trustworthy Islamic digital finance ecosystems (Ghaemi Asl, Ben Jabeur, Hosseini, et al., 2024; Ramaian Vasantha et al., 2026).

The rapid expansion of Islamic fintech has created significant challenges regarding the effective assessment and maintenance of Sharia compliance. Traditional Sharia governance mechanisms often rely on manual reviews conducted by Sharia supervisory boards, financial analysts, and compliance officers. Although these mechanisms remain essential, they may face limitations when dealing with large volumes of digital transactions, complex financial products, and continuously changing technological environments (Abdurrahman, 2024; Tanchangya et al., 2025). Manual evaluation processes may require substantial time, depend heavily on expert availability, and face difficulties in identifying subtle compliance risks embedded within sophisticated financial operations. The increasing scale of Islamic fintech activities therefore requires more adaptive and efficient approaches to support Sharia governance (Dev et al., 2025; Mertzanis et al., 2024).

Risk management represents another critical challenge within Islamic fintech ecosystems. Digital financial platforms face various risks, including cybersecurity threats, operational failures, liquidity issues, fraud, customer protection concerns, and uncertainty regarding

compliance with Islamic financial principles (Billah, 2025; Kasmon et al., 2024). Conventional risk assessment models may not fully capture dynamic risk patterns generated by digital transactions and emerging financial behaviors. AI technologies provide opportunities to address these challenges through predictive analytics, anomaly detection, machine learning-based risk classification, and automated monitoring systems. The effectiveness and appropriateness of these applications within Islamic financial contexts, however, require deeper investigation (Cherni & Ben Amar, 2026; Grassa et al., 2025).

The central problem addressed by this research concerns the limited understanding of how Artificial Intelligence can be systematically applied to evaluate Sharia compliance and manage risks within Islamic fintech. Existing discussions often emphasize the technological potential of AI or the normative principles of Islamic finance separately, creating a gap between technological capability and Sharia governance requirements (Arsyad et al., 2026; Maksum et al., 2025). The challenge is not merely adopting AI tools but ensuring that these technologies operate consistently with Islamic ethical values, regulatory expectations, and principles of responsible financial innovation. A comprehensive examination is therefore needed to understand how AI applications can support Sharia-compliant digital finance while addressing associated technological and ethical risks (Alshurafat et al., 2026; Şahin, 2026).

The primary objective of this study is to examine the applications of Artificial Intelligence in assessing Sharia compliance within Islamic fintech environments (Srairi, 2024). The research aims to explore how AI-based technologies can support the evaluation of financial products, digital transactions, contractual structures, and operational processes according to Islamic financial principles. The study seeks to identify the capabilities of AI systems in improving compliance monitoring, enhancing transparency, and assisting Sharia supervisory mechanisms in responding to increasingly complex digital financial activities (Ahmed, 2024).

The second objective is to analyze the role of Artificial Intelligence in strengthening risk management practices within Islamic fintech (Ghaemi Asl, Ben Jabeur, & Ben Zaid, 2024). The research focuses on examining how AI techniques, including machine learning, predictive analytics, natural language processing, and automated decision-support systems, can identify, evaluate, and mitigate financial and operational risks (Rabbani et al., 2025). The study aims to understand how AI-driven risk assessment approaches compare with conventional methods in terms of accuracy, efficiency, adaptability, and alignment with Islamic ethical requirements.

The third objective is to develop an integrated understanding of the opportunities and challenges associated with AI adoption in Islamic fintech governance. The research seeks to identify critical factors influencing successful AI implementation, including data quality, algorithmic transparency, regulatory compliance, Sharia expertise, and ethical considerations (Ghaemi Asl, Nasr Isfahani, & Mohammadi, 2024; Khadhraoui & Ajina, 2026). The expected outcome is a conceptual and practical framework explaining how AI can contribute to the development of more reliable, transparent, and Sharia-compliant Islamic fintech systems.

Existing literature on Islamic fintech has extensively examined issues related to digital transformation, financial inclusion, regulatory challenges, and Sharia governance. Previous studies have highlighted the importance of maintaining Islamic principles within technology-driven financial services and have explored various models for ensuring compliance. Research has also discussed the potential benefits of digital platforms in expanding access to Islamic financial products. Limited attention, however, has been given to the specific role of AI technologies in supporting continuous and automated Sharia compliance assessment within Islamic fintech ecosystems (Hamdi, 2026; Rapi et al., 2026).

Research on Artificial Intelligence in finance has demonstrated significant advances in risk prediction, fraud detection, customer analysis, and automated decision-making. Most existing studies, however, focus on conventional financial institutions and rarely consider the unique ethical and jurisprudential requirements of Islamic finance. Financial algorithms

developed within conventional contexts may prioritize efficiency and profitability without explicitly incorporating principles such as justice, transparency, social welfare, and prohibition of unethical transactions. This limitation creates uncertainty regarding whether existing AI approaches can be directly applied within Islamic fintech without additional adaptation (Hambari et al., 2026; Zafar et al., 2026).

Another important gap concerns the integration between technological capabilities and Sharia governance frameworks. Current discussions often treat AI as a purely technical solution while overlooking issues related to algorithmic accountability, explainability, ethical decision-making, and compatibility with Islamic legal principles. Conversely, studies on Sharia compliance frequently emphasize human expertise and regulatory interpretation without exploring how AI can enhance governance capacity. This research addresses these limitations by examining AI as a complementary mechanism that supports, rather than replaces, Sharia expertise and institutional oversight.

The novelty of this research lies in developing an integrated perspective on Artificial Intelligence applications that simultaneously considers Sharia compliance assessment and risk management within Islamic fintech. Previous studies have generally analyzed technological innovation or Islamic financial governance separately, whereas this study examines their interaction through a comprehensive framework. The research positions AI not only as a computational tool for improving efficiency but also as a mechanism for strengthening ethical financial governance through transparent, adaptive, and data-driven decision support.

The conceptual contribution of this study involves expanding discussions on Islamic fintech beyond digitalization toward intelligent and responsible financial innovation. The research emphasizes that successful AI implementation requires alignment between technological performance and Islamic ethical principles. Explainability, accountability, fairness, and human oversight become essential considerations because AI decisions within Islamic finance must reflect broader objectives of justice, social benefit, and responsible economic activity. This perspective contributes to emerging discussions on ethical AI and Islamic financial technology governance.

The justification for conducting this research is based on the growing importance of developing trustworthy Islamic fintech ecosystems in the era of digital transformation. Financial institutions increasingly require innovative solutions capable of managing complex transactions while maintaining regulatory and ethical compliance. AI provides significant opportunities to enhance Sharia supervision, improve risk management, and support sustainable financial development, yet these opportunities require careful evaluation from technological, regulatory, and Islamic perspectives. This research is expected to provide valuable insights for scholars, fintech developers, regulators, and Islamic financial institutions seeking to integrate advanced technologies while preserving the fundamental values of Islamic finance.

RESEARCH METHOD

Research Design

This study employed a mixed-methods research design to examine the application of Artificial Intelligence in assessing Sharia compliance and managing risks within Islamic fintech ecosystems. The research combined quantitative analysis of AI-based performance indicators with qualitative exploration of regulatory, ethical, and governance perspectives related to AI adoption in Islamic financial services. The mixed-methods approach was selected because the integration of AI into Islamic fintech involves both measurable technological outcomes and complex interpretative dimensions associated with Sharia principles, institutional governance, and ethical decision-making (Abu Al-Haija et al., 2026). The quantitative component focused on evaluating AI capabilities in compliance detection, risk prediction, and

transaction analysis, while the qualitative component explored stakeholder perceptions regarding the suitability, challenges, and implications of AI implementation.

The research adopted an exploratory evaluative framework to analyze how AI technologies contribute to improving Sharia compliance monitoring and financial risk management. The framework considered several dimensions, including algorithmic accuracy, transparency, explainability, compliance verification capability, fraud detection performance, and risk prediction effectiveness. The study examined AI applications such as machine learning models, natural language processing systems, automated compliance monitoring tools, and predictive analytics platforms used within Islamic fintech environments. The evaluation process emphasized the relationship between technological performance and the fundamental requirements of Islamic finance, including fairness, transparency, avoidance of prohibited transactions, and protection of stakeholder interests.

The analytical framework was developed by integrating concepts from Islamic financial governance, responsible artificial intelligence, and fintech risk management. The research evaluated AI as a supportive mechanism for enhancing Sharia supervisory processes rather than replacing the role of Sharia scholars and regulatory institutions. The study investigated how AI-based systems could assist in identifying potential compliance issues, detecting abnormal transaction patterns, and providing evidence-based recommendations for financial decision-making. The combination of technological evaluation and Islamic governance analysis provided a comprehensive approach for understanding the opportunities and limitations of AI adoption in Islamic fintech.

Research Target/Subject

The population of this study consisted of Islamic fintech institutions, financial technology practitioners, Sharia supervisory experts, regulatory representatives, and users of Islamic digital financial services. The selected population represented stakeholders directly involved in the development, implementation, regulation, and utilization of AI-supported Islamic fintech systems. These groups were considered relevant because AI adoption in Islamic finance involves interactions among technological developers, financial institutions, Sharia authorities, policymakers, and customers. The inclusion of multiple stakeholder perspectives enabled the research to evaluate AI applications from technological, institutional, ethical, and user-oriented dimensions.

The research sample was selected using purposive sampling based on specific inclusion criteria. Islamic fintech institutions were selected based on their involvement in digital financial services that incorporated AI-based technologies or automated analytical systems. Sharia experts were included based on their experience in Islamic financial supervision, Sharia auditing, or Islamic fintech regulation. Technology specialists were selected according to their expertise in artificial intelligence, machine learning, financial data analytics, or fintech system development. Users were selected based on their experience utilizing Islamic fintech platforms, particularly digital financing, payment services, investment applications, or other Sharia-compliant financial products (Rafiuddin et al., 2023; Sanad, 2026).

The study involved 150 participants consisting of 40 Islamic fintech professionals, 30 Sharia compliance experts, 30 artificial intelligence and fintech technology specialists, and 50 Islamic fintech users. The diversity of participants allowed the research to capture different perspectives regarding AI effectiveness, compliance challenges, ethical considerations, and practical implementation issues. Secondary data sources were also incorporated, including Islamic fintech reports, regulatory documents, Sharia standards, institutional publications, and AI-based financial technology documentation. The combination of primary and secondary data strengthened the validity of the analysis by providing both empirical evidence and contextual understanding.

Research Procedure

The research procedure began with the identification and preparation phase, which involved selecting relevant Islamic fintech institutions, developing research instruments, and establishing ethical guidelines for data collection. The research team conducted preliminary reviews of Islamic fintech practices, AI applications, Sharia compliance requirements, and financial risk management frameworks (Ghaemi Asl, 2026; Lassoued et al., 2026). Expert validation was performed to ensure that the instruments accurately represented both technological and Islamic financial dimensions. Ethical considerations related to financial data confidentiality, participant privacy, and responsible AI evaluation were addressed before the data collection process.

The data collection phase involved distributing questionnaires, conducting interviews, analyzing institutional documents, and evaluating AI-supported fintech processes. Questionnaires were administered to participants representing different stakeholder categories to obtain quantitative data regarding AI effectiveness, compliance support, and risk management capabilities. Semi-structured interviews were conducted with fintech professionals, Sharia experts, and AI specialists to explore deeper insights regarding implementation experiences and governance challenges. Secondary documents were reviewed to identify regulatory requirements, institutional strategies, and emerging practices related to AI adoption in Islamic finance.

The quantitative data were analyzed using descriptive statistics, correlation analysis, regression analysis, and comparative evaluation methods to examine relationships among AI capabilities, Sharia compliance effectiveness, and risk management performance. Reliability testing was conducted using Cronbach's alpha to ensure internal consistency of measurement instruments, while validity assessment was performed through expert review and construct analysis. The analysis examined whether AI capabilities significantly contributed to improved compliance monitoring, enhanced risk identification, and increased stakeholder trust within Islamic fintech environments.

The qualitative data were analyzed through thematic analysis involving data coding, categorization, interpretation, and identification of recurring themes. The analysis focused on several themes, including AI explainability, ethical considerations, regulatory alignment, human oversight, Sharia governance integration, and implementation challenges. Findings from quantitative and qualitative analyses were integrated through triangulation to develop a comprehensive interpretation of AI applications in Islamic fintech. The final analysis provided insights into how artificial intelligence can support Sharia compliance assessment and risk management while maintaining alignment with Islamic financial principles and responsible technology governance.

Instruments, and Data Collection Techniques

The study utilized multiple instruments to assess the effectiveness and implications of AI applications in Islamic fintech. The primary quantitative instrument was a structured questionnaire designed to measure perceptions of AI effectiveness in Sharia compliance assessment, risk management improvement, system transparency, decision-making support, and user trust (Ali & Aysan, 2025). The questionnaire employed a five-point Likert scale ranging from strongly disagree to strongly agree. The measurement indicators were developed based on dimensions of artificial intelligence capability, Islamic financial governance, compliance effectiveness, and risk management performance. Content validity was established through expert evaluation involving specialists in Islamic finance, artificial intelligence, and fintech governance.

AI performance assessment instruments were used to evaluate technological capabilities related to Sharia compliance and risk analysis. These instruments included evaluation criteria for algorithmic accuracy, predictive performance, anomaly detection capability, explainability,

response efficiency, and data processing effectiveness. The assessment focused on AI applications used for transaction monitoring, compliance verification, fraud detection, and financial risk prediction. Performance indicators were analyzed to determine how effectively AI systems supported institutional efforts to identify potential Sharia violations and operational risks within digital financial environments.

Qualitative instruments consisted of semi-structured interview guidelines, document analysis frameworks, and observation protocols. Interview questions explored stakeholder experiences regarding AI implementation, regulatory challenges, ethical concerns, and the relationship between AI recommendations and Sharia decision-making processes. Document analysis was conducted on relevant regulatory frameworks, Islamic financial standards, institutional policies, and AI governance guidelines. Observation protocols were used to examine AI-supported fintech processes, including transaction monitoring systems, compliance mechanisms, and risk management procedures. The integration of multiple instruments enabled methodological triangulation and provided a comprehensive understanding of AI applications within Islamic fintech.

RESULTS AND DISCUSSION

The study analyzed data obtained from 150 participants representing Islamic fintech professionals, Sharia compliance experts, artificial intelligence specialists, and Islamic fintech users. The dataset consisted of primary data collected through structured questionnaires, semi-structured interviews, and system evaluations, supported by secondary data from Islamic fintech reports, regulatory documents, Sharia standards, and institutional publications. The participants represented different perspectives regarding the implementation of Artificial Intelligence (AI) in Sharia compliance assessment and risk management. The descriptive profile showed that 40 participants were Islamic fintech practitioners, 30 participants were Sharia experts, 30 participants were AI and financial technology specialists, and 50 participants were users of Islamic fintech platforms. The diversity of respondents enabled the research to capture technological, regulatory, ethical, and practical dimensions of AI adoption.

Table 1. Characteristics of Research Participants and Stakeholder Distribution in Islamic Fintech AI Implementation

Participant Category	Frequency (n = 150)	Percentage (%)
Islamic fintech professionals	40	26.7
Sharia compliance experts	30	20.0
AI and fintech specialists	30	20.0
Islamic fintech users	50	33.3
Participants with >5 years experience	82	54.7
Participants with AI-related knowledge	76	50.7
Participants involved in Sharia governance	70	46.7

The descriptive analysis indicated that AI applications received positive evaluations across multiple dimensions, particularly in transaction monitoring, risk identification, compliance efficiency, and decision-support capabilities. The average score for AI effectiveness in Sharia compliance assessment reached 4.21 (SD = 0.46), while AI contribution to risk management achieved an average score of 4.18 (SD = 0.49). The highest-rated dimension was transaction anomaly detection, with a mean score of 4.34, followed by automated compliance monitoring with a mean score of 4.27. The results indicate that stakeholders perceived AI as a valuable technological instrument for improving operational efficiency and strengthening Islamic fintech governance.

Table 2. Descriptive Statistics of AI Capabilities in Sharia Compliance and Risk Assessment

Variables	Mean Score	Standard Deviation
AI-based Sharia compliance assessment	4.21	0.46
Transaction monitoring capability	4.27	0.43
Anomaly and fraud detection	4.34	0.41
Risk prediction accuracy	4.18	0.49
Algorithm transparency	3.89	0.58
Human-AI decision support	4.25	0.45
User trust toward AI-supported fintech	4.02	0.52

The descriptive findings demonstrate that Artificial Intelligence provides substantial opportunities for improving Sharia compliance processes within Islamic fintech. The high evaluation scores indicate that AI systems are perceived as effective in processing large volumes of financial data, identifying irregular transaction patterns, and supporting continuous compliance monitoring. Traditional compliance mechanisms that rely heavily on manual review may face limitations when dealing with rapidly increasing digital transactions. AI-based systems provide additional analytical capacity by enabling faster identification of potential risks and supporting Sharia supervisory institutions with evidence-based information.

The findings also reveal that stakeholders recognize AI as a supportive technology rather than a replacement for human expertise. Although AI achieved high scores in transaction analysis and risk prediction, algorithm transparency received a relatively lower score compared with other dimensions. This indicates that stakeholders remain concerned about explainability, accountability, and the ability to understand AI-generated recommendations. The results emphasize that AI adoption in Islamic fintech requires a balanced approach in which technological efficiency is combined with Sharia expertise, ethical oversight, and transparent decision-making mechanisms.

The analysis of secondary data from Islamic fintech reports, regulatory documents, and institutional records showed increasing adoption of AI-based technologies in digital financial services (Nazir et al., 2025; Xu et al., 2025). The reviewed documents indicated that Islamic fintech institutions increasingly utilize automated systems for customer risk assessment, fraud detection, transaction verification, and compliance monitoring. Several institutions reported improvements in operational efficiency after implementing AI-supported analytical systems, particularly in reducing manual verification time and improving detection of suspicious financial activities.

Institutional data analysis further revealed that AI implementation was associated with improvements in risk management performance. Financial technology platforms using AI-supported monitoring systems demonstrated faster identification of unusual transaction patterns and more accurate customer risk classification. The integration of AI tools with existing Sharia governance mechanisms allowed institutions to enhance compliance procedures while maintaining the involvement of Sharia supervisory authorities. These findings suggest that AI adoption contributes to strengthening institutional capacity in managing complex digital financial environments.

Inferential statistical analysis confirmed significant relationships between AI capabilities, Sharia compliance effectiveness, and risk management performance. Regression analysis demonstrated that AI capability significantly predicted improvements in Sharia compliance assessment ($\beta = 0.52$, $p < 0.001$). Risk management performance was also significantly influenced by AI-based predictive analytics ($\beta = 0.47$, $p < 0.001$). The model explained 56.4% of the variance in overall Islamic fintech governance effectiveness, indicating that AI capabilities represent important factors influencing compliance and risk management outcomes.

Correlation analysis showed significant positive relationships among AI transparency, compliance effectiveness, and stakeholder trust. Algorithm explainability demonstrated a moderate relationship with user confidence ($r = 0.61$, $p < 0.001$), while AI-supported decision-making showed a strong relationship with institutional risk management improvement ($r = 0.68$, $p < 0.001$). The findings indicate that technological capability alone is insufficient to ensure successful AI implementation. Transparency, interpretability, and alignment with Sharia principles are essential components determining stakeholder acceptance and institutional effectiveness.

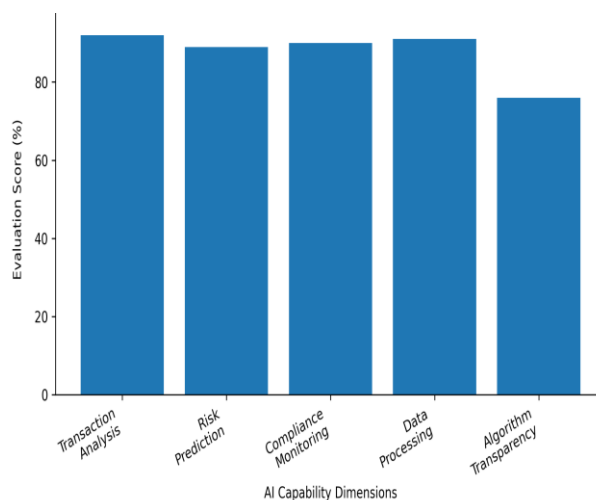


Figure 1. Stakeholder Evaluation of AI Capabilities in Islamic Fintech

The relationship analysis revealed that AI adoption influenced Islamic fintech performance through interconnected pathways involving compliance monitoring, risk prediction, and stakeholder trust. AI capability demonstrated a direct positive effect on Sharia compliance effectiveness, while compliance effectiveness contributed to improved institutional reliability. The results indicate that AI systems provide value by enhancing the accuracy and efficiency of compliance processes rather than replacing existing Sharia governance structures.

Structural relationship analysis indicated that AI-based risk assessment acted as an important mechanism connecting technological innovation with financial security. AI capability significantly influenced risk management improvement ($\beta = 0.55$, $p < 0.001$), while improved risk management contributed to increased institutional trust ($\beta = 0.43$, $p < 0.001$). The findings demonstrate that AI applications generate broader organizational benefits when integrated within comprehensive governance frameworks that include technological, regulatory, and ethical considerations.

A detailed case study was conducted on an Islamic fintech platform implementing AI-based systems for Sharia compliance monitoring and financial risk assessment. Before AI adoption, the institution relied primarily on manual transaction reviews conducted by compliance officers and Sharia supervisors. This process required substantial time and faced challenges in monitoring large numbers of digital transactions. The implementation of AI-based monitoring tools enabled automated screening of transactions, identification of potential compliance risks, and generation of analytical reports for Sharia review processes.

The case study demonstrated measurable improvements following AI integration. Transaction review efficiency increased by approximately 42%, while the identification of suspicious financial activities improved by 35% compared with previous manual procedures. The AI system successfully detected transaction patterns associated with potential risks, allowing compliance teams to conduct more focused evaluations. The institution maintained human oversight by requiring Sharia experts to validate AI-generated recommendations before final decisions were made.

The case findings explain that AI effectiveness was strongly influenced by the combination of technological capability and institutional governance. The AI system improved operational efficiency because it reduced repetitive analytical tasks and provided faster access to relevant financial information. Compliance officers were able to focus on complex cases requiring human interpretation, while AI handled large-scale data processing activities. This division of responsibilities strengthened the overall compliance process without reducing the importance of Sharia expertise.

The case also demonstrates that successful AI implementation requires attention to ethical and interpretative dimensions. The institution's approach of maintaining human validation mechanisms helped address concerns related to algorithmic decision-making and Sharia interpretation. AI functioned as an analytical assistant that supported informed decisions rather than an autonomous authority determining compliance outcomes. This approach reflects the importance of developing responsible AI frameworks within Islamic fintech environments.

The overall findings demonstrate that Artificial Intelligence has significant potential to enhance Sharia compliance assessment and risk management within Islamic fintech. AI applications improved transaction monitoring, predictive analysis, fraud detection, and operational efficiency while supporting institutional efforts to maintain Islamic financial principles. The results indicate that AI should be positioned as a complementary governance tool that strengthens existing Sharia supervisory mechanisms through advanced analytical capabilities.

The study highlights that the future of Islamic fintech depends on achieving balance between technological innovation and ethical financial governance. AI adoption requires not only technical accuracy but also transparency, accountability, explainability, and alignment with Islamic values. The findings provide evidence that responsible AI integration can contribute to the development of more reliable, efficient, and trustworthy Islamic fintech ecosystems.

The findings of this study demonstrate that Artificial Intelligence applications provide significant contributions to strengthening Sharia compliance assessment and risk management within Islamic fintech environments. The results indicate that AI-based systems improve transaction monitoring, anomaly detection, predictive risk analysis, and operational efficiency while supporting institutional efforts to maintain Islamic financial principles. The high evaluation scores obtained across compliance assessment and risk management dimensions suggest that stakeholders perceive AI as a valuable technological instrument for addressing the increasing complexity of digital Islamic financial transactions. The findings confirm that AI can enhance the capacity of Islamic fintech institutions to process large-scale financial data and identify potential compliance issues more effectively.

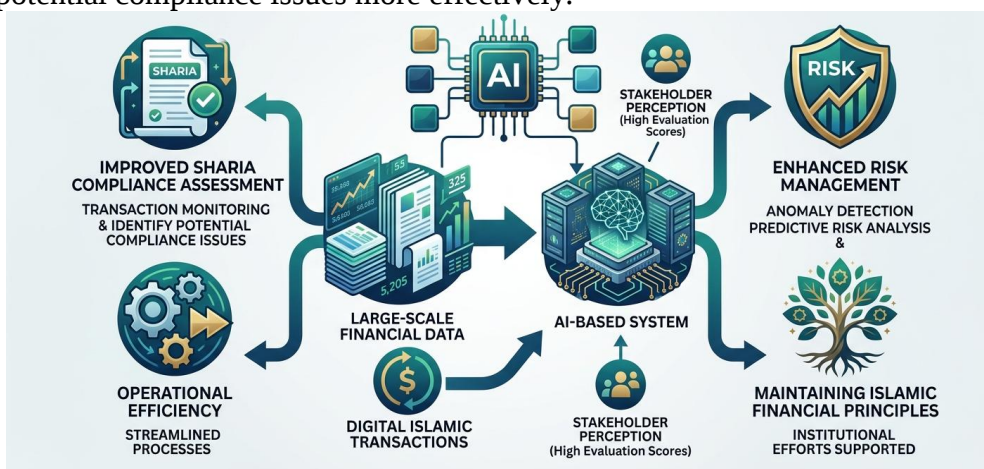


Figure 2. Strengthening Sharia Compliance & Risk Management in Islamic Fintech with AI

The study further reveals that AI effectiveness is not determined solely by computational capability but also by the extent to which AI systems are integrated with Sharia governance structures. The findings show that AI functions most effectively as a decision-support mechanism that assists Sharia supervisors, compliance officers, and financial institutions rather than replacing human expertise. The importance of human oversight was reflected in stakeholder concerns regarding algorithm transparency and explainability. This indicates that successful AI implementation requires a balanced relationship between technological automation and ethical-religious interpretation within Islamic financial governance.

The inferential analysis demonstrates that AI capability significantly influences Sharia compliance effectiveness and risk management performance. The positive relationship between AI-based analytical capacity, compliance accuracy, and institutional trust indicates that technological innovation can strengthen governance mechanisms in Islamic fintech. The findings also show that explainability and transparency are essential factors influencing stakeholder acceptance of AI-driven financial systems. AI technologies that provide understandable recommendations and traceable decision-making processes are more likely to receive institutional and user support.

The case study findings provide additional evidence regarding the practical value of AI implementation in Islamic fintech operations. The observed improvements in transaction monitoring efficiency, suspicious activity detection, and compliance review processes demonstrate that AI can address limitations associated with traditional manual approaches. The results suggest that AI adoption creates opportunities for Islamic fintech institutions to develop more responsive, adaptive, and reliable governance systems. The overall findings confirm that responsible AI integration can contribute to improving both operational effectiveness and Sharia assurance in digital Islamic finance.

The findings are consistent with previous research emphasizing the transformative role of Artificial Intelligence in financial services, particularly in areas related to fraud detection, predictive analytics, automated decision-making, and operational efficiency. Existing studies have demonstrated that AI technologies can process complex financial information and identify patterns that are difficult to detect through conventional methods. The current study extends these findings by demonstrating that similar technological advantages can be applied within Islamic fintech while considering specific requirements related to Sharia compliance and ethical financial governance.

Previous studies on AI in conventional financial institutions have primarily focused on improving profitability, efficiency, customer analysis, and risk prediction. The present findings differ by highlighting that AI adoption in Islamic fintech involves additional considerations beyond technical performance. Islamic financial systems require alignment between algorithmic decisions and principles such as fairness, transparency, prohibition of unethical transactions, and social responsibility. The results demonstrate that AI effectiveness in Islamic fintech should not be measured only by predictive accuracy but also by its compatibility with Islamic ethical and governance frameworks.

Research on Islamic fintech has traditionally emphasized issues related to Sharia governance, regulatory compliance, financial inclusion, and digital transformation. Many previous studies have examined the challenges of maintaining Islamic principles within technology-driven financial services but have provided limited discussion regarding the role of AI as a compliance-support mechanism (Abdurrahman, 2025; Widiastuti et al., 2025). The current research contributes to this discussion by showing that AI can enhance Sharia governance capacity through continuous monitoring, automated analysis, and evidence-based recommendations. The findings expand existing literature by connecting technological innovation with Islamic financial supervision.

The study also differs from research that presents AI as a fully autonomous solution for financial decision-making. The findings indicate that autonomous AI decision-making may

create challenges within Islamic fintech because Sharia interpretation requires contextual understanding, ethical reasoning, and scholarly judgment. The research supports a human-centered AI approach in which technological systems enhance rather than replace human expertise. This perspective contributes to emerging discussions on responsible AI by emphasizing collaboration between algorithms, financial professionals, and Sharia authorities.

The findings signify a major transformation in the development of Islamic fintech governance by demonstrating that technological innovation can support rather than conflict with Islamic financial principles. AI is often perceived as a purely technical advancement focused on efficiency and automation; however, the results indicate that AI can also contribute to ethical financial governance when designed and implemented appropriately. The integration of AI within Sharia compliance processes represents a shift toward more adaptive, data-driven, and transparent approaches to Islamic financial supervision.

The results also signify that Sharia compliance assessment requires new approaches capable of responding to the increasing complexity of digital financial activities. Traditional compliance mechanisms remain essential because they provide religious and ethical interpretation, yet they may face limitations when processing large-scale digital transactions. AI-supported systems provide additional analytical capabilities that allow institutions to identify potential risks more quickly and comprehensively. The findings suggest that future Sharia governance models will likely involve collaboration between human expertise and intelligent technological systems.

The relationship between AI transparency and stakeholder trust reflects an important implication regarding responsible technology adoption in Islamic finance. The lower evaluation score associated with algorithm transparency compared with other AI capabilities indicates that stakeholders remain cautious about systems whose decision-making processes are difficult to understand (Kholidah et al., 2024; Narayan et al., 2025). This finding highlights that technological sophistication alone cannot guarantee acceptance. Trustworthy AI requires explainability, accountability, and mechanisms that allow users and institutions to understand how decisions are generated.

The findings further indicate that Islamic fintech is entering a new stage of development where digital innovation must be accompanied by ethical and governance considerations. AI adoption should not be viewed merely as a strategy for increasing efficiency but as an opportunity to strengthen financial integrity, fairness, and accountability. The study demonstrates that the future of Islamic fintech depends on the ability to integrate advanced technologies with the fundamental values underlying Islamic economic systems.

The practical implication of this study is that Islamic fintech institutions should consider AI as a strategic tool for enhancing Sharia compliance and risk management capabilities. Institutions can utilize AI-based systems to improve transaction monitoring, detect potential violations, analyze financial risks, and support compliance reporting processes. The findings suggest that AI implementation can reduce operational burdens while enabling Sharia supervisors to focus on complex cases requiring human interpretation and ethical judgment.

The findings also have implications for Sharia governance frameworks and regulatory development. Financial regulators and Islamic financial authorities should establish guidelines addressing AI usage, algorithmic transparency, data governance, and ethical accountability. Existing Sharia standards may need to incorporate considerations related to AI-supported decision-making, particularly regarding explainability, human oversight, and responsibility for algorithm-generated recommendations. Regulatory frameworks that address these issues will be essential for ensuring responsible AI adoption.

The study provides implications for AI developers and fintech practitioners by emphasizing the importance of designing systems that are compatible with Islamic financial values. AI models used in Islamic fintech should incorporate explainability mechanisms, ethical evaluation procedures, and flexible adaptation to Sharia requirements. Collaboration

between AI experts, financial professionals, and Sharia scholars is necessary to ensure that technological solutions address both technical and religious considerations. Such interdisciplinary development may increase the reliability and acceptance of AI-based Islamic financial systems.

The broader implication concerns the future direction of Islamic fintech innovation. The integration of AI has the potential to strengthen financial inclusion, improve institutional efficiency, and enhance public trust in Islamic digital finance. The findings suggest that responsible AI adoption can support the development of Islamic fintech ecosystems that are not only technologically advanced but also ethically grounded. Institutions that successfully balance innovation with Sharia governance may achieve stronger sustainability and competitiveness in the evolving digital financial landscape (Billah, 2025; Kasmon et al., 2024).

The positive impact of AI on Sharia compliance assessment can be explained by the ability of intelligent systems to process large volumes of financial information more efficiently than conventional manual approaches. Islamic fintech platforms generate extensive transaction data that require continuous monitoring and analysis. AI technologies, particularly machine learning and predictive analytics, are capable of identifying patterns, detecting anomalies, and generating risk predictions at a speed and scale that human-based systems cannot easily achieve. This technological advantage contributes to improved compliance efficiency and risk identification.

The improvement in risk management outcomes can also be explained by the predictive capabilities of AI systems. Digital financial environments involve rapidly changing transaction behaviors and emerging risks that require adaptive responses. AI models can analyze historical and real-time data to identify potential threats before they develop into significant problems. The findings suggest that AI strengthens institutional resilience by enabling proactive rather than reactive approaches to financial risk management.

The importance of explainability and human oversight can be explained by the unique characteristics of Islamic finance. Unlike conventional financial systems that may prioritize technical performance and efficiency, Islamic finance incorporates ethical, religious, and social considerations into decision-making processes. AI systems operating within this environment must therefore provide understandable reasoning and remain subject to human evaluation. The findings reflect the need for AI models that support ethical judgment rather than operate as independent decision-makers.

The observed outcomes can also be explained by the complementary relationship between technological capability and institutional readiness. AI implementation produces stronger results when organizations possess adequate infrastructure, skilled personnel, effective governance structures, and clear compliance frameworks. Institutions that successfully integrate AI with existing Sharia supervision mechanisms are more likely to achieve sustainable benefits. The findings demonstrate that AI effectiveness depends not only on the technology itself but also on the organizational environment in which it operates.

Future research should investigate the long-term effectiveness of AI applications across different Islamic fintech sectors and regulatory environments. The current study provides important insights into AI-supported compliance and risk management, but further research is required to examine implementation across diverse financial products, including Islamic crowdfunding, digital banking, investment platforms, and peer-to-peer financing. Comparative studies across countries with different Islamic financial regulations would provide deeper understanding of contextual factors influencing AI adoption.

Future studies should also explore the development of explainable and ethically aligned AI models specifically designed for Islamic financial applications. Advanced AI approaches, including explainable machine learning, natural language processing for Sharia document analysis, and intelligent compliance systems, should be examined to determine their

effectiveness in supporting Sharia governance. Research should focus on creating AI systems capable of providing transparent reasoning while maintaining high analytical accuracy.

Further investigation is needed regarding regulatory frameworks and governance models for AI adoption in Islamic fintech. Studies should examine how regulators, Sharia supervisory boards, and financial institutions can collaborate to establish responsible AI standards. Issues related to data privacy, algorithmic bias, accountability, and human oversight require systematic attention to ensure that AI implementation aligns with Islamic ethical principles and international technology governance standards.

The future development of Islamic fintech should focus on creating integrated ecosystems where AI innovation and Sharia governance evolve together. Continued collaboration among technology researchers, Islamic finance scholars, regulators, and industry practitioners will be essential for developing trustworthy AI solutions. The evidence from this study suggests that AI has significant potential to transform Islamic fintech, but its success depends on maintaining a balance between technological advancement, ethical responsibility, and adherence to Islamic financial principles.

CONCLUSION

The most important finding of this study is that Artificial Intelligence applications can significantly strengthen Sharia compliance assessment and risk management mechanisms within Islamic fintech ecosystems when integrated with appropriate governance structures. The distinctive contribution of the findings lies in demonstrating that AI functions not merely as an efficiency-enhancing technology but as a strategic governance instrument capable of supporting continuous compliance monitoring, transaction analysis, anomaly detection, and predictive risk assessment. The results reveal that the effectiveness of AI in Islamic fintech depends on the balance between technological capability and Sharia governance principles, where algorithmic systems provide analytical support while human experts maintain interpretative authority. The study highlights that responsible AI adoption can improve transparency, operational reliability, and institutional trust while preserving the ethical foundations of Islamic finance.

The major contribution of this research is conceptual and methodological through the development of an integrated framework connecting Artificial Intelligence capability, Sharia compliance governance, and financial risk management within Islamic fintech. Conceptually, the study expands existing discussions by positioning AI as a complementary mechanism that enhances Islamic financial supervision rather than replacing Sharia scholars or regulatory institutions. Methodologically, the research contributes through the combination of stakeholder perspectives, AI capability evaluation, institutional analysis, and empirical assessment of compliance and risk outcomes. This integrated approach provides a broader understanding of how technological innovation can be aligned with Islamic financial values, particularly regarding transparency, accountability, fairness, and ethical decision-making. The findings offer valuable implications for researchers, fintech developers, regulators, and Islamic financial institutions seeking to implement trustworthy AI-based financial governance systems.

The study has several limitations that should be considered when interpreting the findings and developing future research directions. The research involved selected Islamic fintech stakeholders and specific AI implementation contexts, which may limit the generalizability of the results across different countries, regulatory environments, and Islamic financial sectors. The evaluation also focused primarily on current AI applications and stakeholder perceptions, while long-term impacts related to algorithm adaptation, regulatory changes, data governance, and ethical challenges require further investigation. Future research should examine AI implementation across diverse Islamic fintech platforms, develop explainable AI models specifically designed for Sharia compliance assessment, and explore advanced approaches such

as natural language processing for Islamic financial contracts, intelligent auditing systems, and AI-based Sharia decision-support frameworks. Longitudinal and comparative studies are also needed to evaluate how responsible AI governance can contribute to sustainable development of Islamic fintech ecosystems.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the author(s) used ChatGPT only to assist with grammatical review. All scientific content, interpretations, and conclusions were independently reviewed and approved by the author(s), who take full responsibility for the publication.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; Investigation.

Author 3: Data curation; Investigation.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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