

AI Capability, Risk Management and Financial Performance: Evidence from Islamic Banks

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Abstract

This study investigates the relationship between artificial intelligence, AI capability and financial performance in Islamic banks and examines whether risk management serves as a mediating mechanism in this relationship. Drawing on the resource-based view and dynamic capabilities theory, the study further examines whether Shariah board expertise and fintech regulatory intensity strengthen the effectiveness of AI capability in improving risk outcomes. The study employs a ten-year unbalanced panel of 148 Islamic banks operating across 16 OIC and non-OIC countries during 2014–2023. AI capability is operationalized using three complementary indicators: AI-related patents, AI-related job postings, and AI-related textual intensity in annual reports. Financial performance is measured using return on assets (ROA), return on equity (ROE), and Tobin's Q, while risk management is captured through the Z-score, non-performing financing (NPF), and operational loss events. The empirical analysis employs bank and year fixed-effects models, while two-stage least squares (2SLS) and system generalized method of moments (system-GMM) are used to address potential endogeneity. Bootstrap procedures are applied to test the mediating effects. The results indicate that AI capability is positively and significantly associated with ROA, ROE, and Tobin's Q. AI capability is also associated with improved risk outcomes, reflected in higher financial stability and lower NPF and operational losses. The inclusion of risk-management variables reduces the direct effect of AI capability on financial performance while leaving it statistically significant, indicating partial mediation. Bootstrap estimates further confirm significant indirect effects through risk management. The interaction analyses show that the beneficial effect of AI capability on risk management is stronger in Islamic banks with greater Shariah board expertise and in countries characterized by stronger fintech regulatory environments. The findings remain consistent across alternative AI measures and estimation techniques. Islamic banks can enhance the economic value of AI by integrating AI-enabled financing assessment, fraud detection, operational monitoring, and compliance technologies into their risk-management systems. Regulators should develop AI governance frameworks that address algorithmic transparency, data governance, cybersecurity, model risk, and Shariah compliance. This study contributes to the emerging literature on AI and

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Islamic finance by developing an integrated AI capability–risk management–financial performance framework and providing multi-country longitudinal evidence on the mechanisms and institutional conditions through which AI creates value in Islamic banking. The findings also connect AI-enabled risk management with the broader objective of wealth preservation (Hifz al-Mal) within the Maqasid al-Shariah framework.

Keywords: Artificial Intelligence; AI Capability; Islamic Banking; Risk Management; Financial Performance; Shariah Governance; Fintech Regulation; Dynamic Capabilities; Maqasid al-Shariah

Introduction

Artificial Intelligence (AI) is transforming the financial landscape, altering the way financial institutions acquire information, assess customers, track transactions, allocate resources, and manage new risks. AI can uncover patterns in vast, diverse data sets, make predictions, and continuously analyze and refine decisions, unlike traditional digital tools that mainly streamline and automate pre-established workflows. As a result, AI is emerging as a strategic tool that can impact organizational efficiency, resilience and competitive advantage rather than just an operational technology. The latest studies highlight the potential of AI to revolutionize banking operations, including predictive analytics, intelligent automation, fraud detection, credit assessment, and data-driven decision-making (Bi & Bao, 2024; Kovacevic et al., 2024). For example, AI-driven credit-risk applications may analyze a vast amount of borrower data, detect possible credit risk deterioration, and deliver early warning signals, enabling banks to take action before the risks occur (Bi & Bao, 2024). These advancements indicate that the role of AI in banking could be more than efficient—it could help enhance organizational risk-management capabilities as well.

AI can be especially relevant to financial risk management due to the uncertainty, information asymmetry, regulatory requirements, and shifting customer and market dynamics in which banks operate. AI tools can aid in risk management by spotting unusual patterns, enhancing credit evaluation, and stopping fraud, as well as predicting future losses and keeping an eye on financial transactions (Bi & Bao, 2024). Machine learning and analytical technologies can thus transform the risk management process from reactive to predictive and proactive. Meanwhile, the use of AI does not guarantee safety. It can be deployed with an introduction of model risk, algorithmic bias, cybersecurity risks, data quality issues, privacy issues and explainability issues (Kovacevic et al., 2024). Therefore, financial impacts of AI are not just about whether a bank adopts AI technologies, but whether the bank is of an organizational nature able to incorporate the technologies into effective risk-management and governance systems.

This is even more relevant in Islamic banking where financial institutions are constrained by a unique institutional system which includes Sharia principles as well as conventional prudential standards. Islamic banks face the challenges of handling financing risks, liquidity risks, market risks, operational risks, and reputational risks and at the same time they have to comply with Shariah requirements. The challenge of these tasks makes it essential to have innovative risk-management systems that are able to handle information quickly and accurately. A more recent study that focused on Islamic banking suggests that AI has the potential to enhance predictive risk management, compliance procedures and assist in Sharia-compliant decision-making; however, ethical and governance issues have been highlighted (Simatupang et al., 2025). Likewise,

Gustanto et al. (2025) suggest that AI-driven risk management practices can enable Islamic banks to mitigate risks and boost competitiveness in today's digital financial landscape. Earlier studies also point to the potential benefits of AI for risk analysis, financing processes, and operational efficiency in Islamic banking, while issues such as technological infrastructure, the lack of human expertise, and Sharia-compliant regulation are still critical challenges to tackle (Bilal, 2025).

While the importance of AI in Islamic banking is apparent beyond just the traditional angle of risk and efficiency, it is crucial that technological advancements align with Shariah governance frameworks and the Islamic banking institution's overarching goals. AI can help with Shariah compliance by automating the monitoring process, analysing documents, screening transactions, and identifying potentially non-Shariah compliant activities. Integrating AI into Islamic banking has the potential to drive technological advancements and enhance banking services, as highlighted by Khoso and Pathan (2024), and AI-based governance, if aligned with the objectives of Maqasid al-Shariah, could play a role in achieving technological development and enhancing banking services, as argued by Ahmad and Zainan (2025). Specifically, AI can help in 'wealth preservation' (hifz al-mal), limit unnecessary financial losses, enhance control, identify undesirable deals, and facilitate more responsible financial decision making. The application of AI in Sharia decision also necessitates proper human supervision as AI systems can have different interpretations of Islamic principles or might be contextually incorrect. Recent study on generative AI in Shariah advisory also shows how useful AI can be whilst highlighting the ongoing need for the human expert's judgement (Jokhio & Jaffer, 2024).

However, in this context, there is a crucial question that hasn't been answered yet: How does the ability of AI translate into better financial performance for Islamic banks? The literature that is available to explore the direct effect of digital technologies on the performance of banking or the influence of risk management in the banking performance of Islamic banks has been explored separately. Another area of research that has recently emerged is on the use of AI in banking risk management, though the majority of these studies are conceptual, qualitative, or conventional banking (Bi & Bao, 2024; Gustanto et al., 2025; Simatupang et al., 2025). Therefore, empirical evidence on the impact of the AI capability on the financial performance of Islamic banks remains limited and inconclusive on how AI capability leads to better risk management practices. Theoretically and empirically, this is a significant challenge, as an obvious direct link between AI and performance is not sufficient to account for the organizational pathway via which technological capabilities generate financial value.

This study aims to fill this gap by introducing risk management as a mediating variable between AI capability and financial performance. The logic behind this is that AI could help Islamic banks to identify, assess, monitor and mitigate risks more effectively, which may lead to better financial results. AI credit assessment systems can lead to a better identification of financially vulnerable customers, strengthening bank stability through predictive analytical systems, and reducing operational losses and compliance through automated monitoring are just a few examples. As a consequence, gains in risk-management should lead to better profitability and market valuations. This reasoning resonates with recent studies demonstrating the potential of AI to improve predictive risk identification and credit decision-making processes within banking (Bi & Bao, 2024) as well as the research in Islamic banking, highlighting the strategic role of AI in risk management for institutional sustainability and competitiveness (Gustanto et al., 2025).

This research will use the theoretical approach of resource-based view (RBV) and dynamic capabilities theory. Infrastructure, proprietary data, specialized human capital, analytical expertise and organizational knowledge are valuable assets if they can be effectively integrated into bank processes, from the RBV point of view. But having technological resources does not necessarily lead to long-term advantages in performance. A complementary theory is dynamic capabilities theory, which focuses on how firms can adapt to changes in the environment by sensing the changes, capturing new opportunities, and reconfiguring their resources. In this context, AI capability can help a bank become more sensitive to new credit, operational, compliance and market-related risks; more adept at decision-making in order to capitalise on new opportunities; and more flexible in the risk-management processes it adopts as the financial landscape evolves. Thus, the difference between AI technology and AI capability is at the heart of the present study – the former is the technology, while the latter is the capacity of the organization to use and leverage them effectively.

Adopting this capability-based approach is important for Islamic banks, as the technological resources need to be combined with institutional knowledge, Shariah knowledge and governance. However, if the employees lack the analytical skills to the full extent of the Islamic banks' AI infrastructure; if Shariah governance is not robust; or if regulatory environment is not conducive to responsible use of AI, the Islamic bank will fail to realize the potential of AI. Recent research therefore advocates for the need to have proper governance, ethical protection, regulations and Shariah supervision for the use of AI in Islamic finance (Ahmad & Zainan, 2025; Khoso & Pathan, 2024). This indicates that the connection between the capability of AI and financial outcomes could depend on institutional elements. In this study, therefore, the role of board expertise in the Shariah field and the intensity of fintech regulation as conditions that can enhance the power of AI capability to produce better results are explored.

The significance of risk management as a transmission mechanism is also in line with the goals of Islamic finance. Islamic banking is not just about accounting profits; it also has to be about financial intermediation with social responsibility, avoidance of unnecessary uncertainty and bad activities, fairness, and the preservation of wealth. In terms of the Maqasid al-Shariah, effective risk management can then be seen as an important tool of an organization that can secure financial resources and sustain economic activity. Recent research on AI, Shariah governance, and Maqasid al-Shariah also suggests that the introduction of technology into Islamic finance should be assessed based on its efficiency, compliance, responsible management, and overall Shariah goals (Ahmad & Zainan, 2025). So, artificial intelligence-based risk management can serve as a link between technology innovation and ethical and financial goals of Islamic banking.

Based on this background, this study aims to examine whether the AI capability impacts the financial performance of Islamic banks and if the relationship is mediated by risk management. To analyze the AI capability of Islamic banks, the researchers constructed a multi-dimensional measure using a 10-year panel of 148 Islamic banks in 16 OIC and non-OIC countries over 2014–2023, which incorporates AI patents, AI-related job postings, and AI-related textual information in annual reports. This is in contrast to the traditional binary technologies adopted classification, which only measures the innovation of a technology but not the commitment of the organization to develop AI capabilities. Financial performance is evaluated using ROA, ROE, and Tobin's Q, with risk management evaluated using the Z-score, non-performing financing (NPF) ratio, and operational loss events. The empirical analysis includes bank, country and year fixed

effects and tackles the potential endogeneity problem by employing two stage least squares (2SLS) and system generalized method of moments (system-GMM). Bootstrapped mediation tests are then used to investigate if the transmission from AI capability to financial performance is mediated by risk management.

The study has several contributions to the literature. First, it adds to the growing body of literature on AI and financial services to give longitudinal, multi-country evidence from Islamic banks. Second, it doesn't just consider the potential for AI to have a positive impact on financial performance; it introduces the concept of risk management as an intervening variable that can explain how the capability of AI can create financial value. Third, the study moves the discourse on AI beyond its technological dimension by using the concept of AI as an organizational capability, which allows Islamic banks to sense and respond to evolving risk conditions, rather than merely as a technological investment. Fourthly, it adds to Islamic Finance research by linking AI-based Risk Management to Shariah Governance and the Maqasid goal of preserving wealth. Lastly, the study considers how the moderating effect of the Shariah board expertise and the regulatory intensity of the fintech industry affect the connection between AI capability and better risk management and financial performance. The study also addresses the demand of Islamic banks to integrate technologic innovation with the proper risk management and good governance, Shariah integrity, and sustainable financial performance.

Literature Review and Hypothesis Development

AI Capability and Financial Performance

Artificial intelligence (AI) is becoming a key technological asset that can help financial institutions to reimagine how they handle information, allocate resources, engage customers and make decisions. Unlike traditional information technology, AI can learn from vast, diverse, and complex data sets, discover trends and patterns, make predictions, and assist in real-time decision making. All of these are significant for banking, as financial institutions continuously analyze, process, and act on the information of customers, transactions, credit, markets and regulators. AI powered technologies have been found to have the potential to boost the efficiency of banks by using intelligent automation, predictive analytics, fraud detection, customer profiling, and decision support (Bi & Bao, 2024; Kumar, 2024). As a result, the importance of AI in strategy goes beyond just modernization to creating organizational capabilities that impact financial results.

According to the resource-based view (RBV), infrastructure, proprietary data, human capital, analytical skills, and organizational knowledge can be valuable strategic resources that can be leveraged with AI. But having AI technologies doesn't necessarily mean you have better performance. Banks need to build the organizational capacity to incorporate AI into decision-making and their workflows. Building on this argument, dynamic capabilities theory posits that organizations must be able to sense change, seize opportunities and reconfigure resources to deal with environmental uncertainty. By harnessing the power of AI, banks can leverage these strengths to detect new market opportunities, understand customer behaviour, make efficient use of resources, and quickly adapt to shifting financial landscapes.

The banking sector, in particular, offers a rich backdrop since the quality and timeliness of information in banking is critical to the performance of the sector. AI can help to lower processing expenses, boost decision-making accuracy, speed up service delivery, and create more personal-

ized financial products. Recent studies on the role of AI in banking also highlight its ability to improve operational efficiency, decision-making processes, and fraud prevention and risk detection (Kumar, 2024). Banks which are increasingly leveraging AI will be able to use their data and analytical prowess to outperform their rivals, and thus, enjoy higher profitability.

The relationship may be particularly relevant for Islamic banks. Islamic financial institutions exist in competitive banking markets and have to uphold the Shariah principles. AI can help mitigate inefficiencies in the operations, make better financing decisions, monitor compliance and assist in customer services. Recent studies on Islamic banking on a specific topic of AI's role in operational transformation and competitiveness suggest that AI provides the opportunity to achieve these changes but the implementation must be guided by a proper governance and human expertise (Gustanto et al., 2025; Simatupang et al., 2025). Hence, the capability of AI could be a strategic asset that can enhance the performance of Islamic banks in accounting and market aspects.

In this context, Islamic banks with higher AI capability should be able to utilize information more effectively, make better decisions, mitigate inefficiencies, and adapt to changes in the environment more quickly, drawing on the RBV and DCA viewpoints. All of these improvements ought to eventually find their way into enhanced profitability and market value.

H1: AI capability is positively associated with the financial performance of Islamic banks.

AI Capability and Risk Management

In banking, risk management is one of the key processes in which AI can deliver value to the organization. Traditional risk management processes often use past data, set thresholds, periodic evaluation and judgment. These mechanisms are still crucial, but due to the increasing complexity and volume of financial transactions, more sophisticated analytical abilities are necessary. While traditional risk-management mechanisms rely on linear relationships and simple anomaly detection, AI can also analyze vast amounts of data, uncover nonlinear relationships, identify anomalies, and produce predictive risk signals.

This is especially true of credit risk. AI-powered credit scoring can analyze a large amount of borrower data to uncover patterns or trends that might not be easily seen in traditional credit scoring models. Bi and Bao (2024) believe that AI will enhance the bank's credit-risk management by the application of deep-learning algorithm, big data analysis, real-time monitoring, and early-warning mechanisms. Such capabilities may help banks detect potential credit deterioration before significant economic damages occur. Therefore, AI capability can help reduce non-performing financing and boost financial stability.

AI can also bolster the operational risk management. Unusual transactions, fraudulent activities, process deviations and other anomalies can be detected by automated monitoring systems. Likewise, NLP can help analyze unstructured data, such as regulatory documents, internal reports, contracts and more. These can help monitor patient compliance and minimize operational losses. As reported by Kumar (2024), the financial institutions are incorporating artificial intelligence and machine learning in their operations to detect frauds, manage risks, predict customer behavior, and automate processes.

An added justification for this relationship is the Islamic banking environment. Islamic banks have to consider conventional banking risks, along with conventional and Shariah concerns. AI-enabled risk-management platforms have been proposed as a way to enhance predictive risk detection, optimize compliance processes, and aid in Sharia-compliant decision-making (Simatupang et al., 2025). Similarly, Gustanto et al. (2025) assert that AI can offer Islamic banks new ways to identify and manage risks, and enhance their competitiveness in the digital financial arena. AI poses some risks, however, such as model risk, cybersecurity threats, data quality issues, algorithmic bias, and its lack of explainability. Thus, the extent to which the value of AI could be achieved hinges on the organization and governance capacity of banks.

In the dynamic capabilities framework, AI helps banks to sense the emerging risks, capture opportunities via enhanced risk-sensitive decision-making, and reconfigure the risk-management processes in response to changing conditions. In line with this, AI ability ought to improve the success of banking risk management.

H2: AI capability is positively associated with the risk-management effectiveness of Islamic banks.

Risk Management and Financial Performance

Islamic banking's financial sustainability depends on risk management strategies, which are critical for mitigating the impact of excessive financing, liquidity, market, operational, and compliance risks on the profitability and stability of banks. Islamic banks do not issue conventional banking products, but rather Islamic banking products, which are based on Sharia-compliant financing contracts that create unique risk exposures. As a result, sound risk management is crucial for asset quality, depositor and investor protection, and financial sustainability.

Empirical evidence was recently found to confirm the role of risk management in Islamic-bank performance. According to Afgani et al. (2024), the data of Islamic banks in Indonesia and Malaysia shows that risk-management practices play an important role in financial performance. Interestingly, their work shows that digitalization is linked to the link between risk-management practices and performance, making it clear that digitalization and risk-management practices are becoming increasingly intertwined in Islamic banking.

Likewise, Abdiriva and Yaya (2025) in a systematic review of 49 studies published on Scopus find that the risk-management practices carry a significant impact on the financial performance and stability of Islamic banking institutions. According to their review, the banking regulation, banking management and risk perception are some of the important themes identified in Islamic banking risk-management literature. However, recent evidence from Pakistan also shows that credit and liquidity risks are important for the profitability of Islamic banks, and that ROA and ROE are the most sensitive to risk exposures.

This study encompasses risk management in three different complementary aspects: the Z-score, non-performing financing (NPF) and operational loss events. They are broader indicators of the effectiveness of risk-management than just a risk measure. The higher the Z score the further away from insolvency, and the better the financial stability; the lower the NPF the better the financial quality of the financing. Likewise, the fewer operational loss incidents, the better the internal controls and operational resilience.

Effective risk management can enhance performance from a financial intermediation point of view by lowering expected losses, minimising provisioning requirements, securing the capital and optimizing the use of resources. Effective risk controls can also enhance market confidence which may lead to an improvement of a bank's valuation. Islamic banks, which perform better in terms of risk management, will be less prone to generating sustainable financial returns, accordingly.

H3: Risk-management effectiveness is positively associated with the financial performance of Islamic banks.

The Mediating Role of Risk Management

While some studies have shown that AI has an impact on banking operations and that the impact of risk management on the performance of Islamic banks is present, the relationships between them are not well understood. The majority of the existing research studies look at the relationship between AI and performance directly, or studies the risk management as a standalone factor influencing financial performance. These methods offer little understanding of the financial value of technological capabilities.

This mechanism can be explained using the theory of dynamic capabilities. While AI capability helps banks to acquire, process and interpret information more effectively, the financial value of that capability is dependent on the organizational processes that convert that AI-generated information into action. One of these important processes is risk management. AI can flag signs of credit deterioration, catch unusual transactions, forecast operational failures and deliver early-warning information. These insights can then help banks adjust their financing strategies, improve monitoring practices, minimize losses, and utilize resources more efficiently.

The proposed mechanism is thus a sequential one. AI enhances the bank's risk detection and risk management capabilities. Secondly, better risk management brings down the rate of non-performing financing, operating losses and financial instability. Third, these enhancements improve the profitability and the value of the market. From this perspective, risk management is a value conversion that allows AI capability to impact financial performance.

This argument is supported by recent Islamic banking research. The findings by Afgani et al. (2024) indicate that the relationship between risk-management practices, digitalization and financial performance is statistically significant, suggesting that digitalization and risk-management cannot be assumed to be separate fields of research. The growing body of research in the field of AI in Islamic banking also indicates that AI can enhance the predictive risk assessment and Sharia-compliance procedures (Simatupang et al., 2025; Gustanto et al., 2025). The findings from these studies, however, do not rule out that the relationship between AI capability and financial performance is mediated by improved risk management, as measured in a large, multi-country longitudinal dataset.

H4: Risk-management effectiveness mediates the relationship between AI capability and the financial performance of Islamic banks.

The Moderating Role of Shariah Board Expertise

AI capability and risk management could be related to the level of the Shariah governance. Islamic banks have a dual governance system, where in addition to conventional corporate and prudential governance, a system of Shariah governance exists. The role of Shariah boards is crucial in ensuring all banking products, contracts, transactions and operations are in accordance with the Islamic principles.

The expertise of the Shariah boards may be of critical importance when banks use advanced technologies like AI. While AI can handle vast amounts of Sharia information and streamline compliance checks, it cannot fully replace the contextual understanding and legal insight needed for intricate Islamic financial decisions without human oversight. Hence, the role of Shariah expertise becomes more vital for banks in deciding the design, interpretation, monitoring and integration of AI applications into Shariah compliant processes.

The results of empirical study confirm that the characteristics of Shariah boards are important. The research literature is subjected to a meta-analysis of Islamic banking research and the results show that the characteristics of the Shariah board such as qualifications, expertise, meetings etc. have significant relation with the performance of Islamic banks. That indicates that the implementation of Shariah governance is not limited to the requirements to merely comply with the laws but it can be an organizational resource that affects the performance of Islamic banking operations.

From an AI perspective, having more skilled members on the Shariah board can help bring technological innovations and Shariah requirements together. Expert Shariah boards can also enhance the supervision of recommendations generated by AI, minimise the risk of non-Adhere to Sharia, and boost the corporation's confidence in AI-driven risk management systems. Therefore, the impact of the AI capability on risk-management effectiveness would be higher if Islamic banks have more expertise in the Shariah board.

H5: Shariah board expertise positively moderates the relationship between AI capability and risk-management effectiveness.

The Moderating Role of Fintech Regulatory Intensity

Another significant condition influencing the value added to the AI capability is the institutional regulatory setting. Financial institutions are subject to many data security, consumer protection, cyber security, model validation, financial stability, and regulatory reporting regulations. Data management and security are becoming more fundamental as AI continues to permeate the banking industry. Data management and security are growing more key as AI infiltrates banking operations.

A favorable regulatory framework for fintech can help to ease the way for the use of AI by offering rules and guidance on data utilization, algorithmic accountability, digital transactions, cyber-security, and technology-enable financial services. Greater regulatory transparency can help mitigate the uncertainty and spur banks to invest in the long term in AI infrastructure and capacity. However, relaxed regulations can result in higher risks for banks in terms of technology and operations, as well as raise uncertainty.

This is especially relevant for Islamic banks in which the implementation of AI needs to meet both conventional banking regulatory and Shariah requirements. Good regulatory frameworks can promote banks to establish proper governance framework, validate models, enhance cybersecurity and keep human supervision. These mechanisms can make it more likely that AI capability results in effective risk management.

In the wider Islamic banking literature, the importance of regulation as a key element to good risk management is also highlighted. Banking regulation is one of the significant thematic clusters, according to Abdiriva and Yaya (2025), in the literature on Islamic-bank risk management. Hence, the regulatory environment should be treated as a boundary condition, and not just as a background institutional feature.

H6: Fintech regulatory intensity positively moderates the relationship between AI capability and risk-management effectiveness.

Theoretical Synthesis and Research Gap

Based on the literature reviewed above, one of the important questions that remain unanswered in Islamic banking literature is: The first is that, while AI is gaining increasing importance as a technology that can boost the efficiency and decision-making of banks, there is limited evidence available in the literature to test whether the capability of using AI, and not just adoption, enables enhancement of Islamic banks financial performance. Second, prior studies in Islamic banking have shown the role of risk management in financial performance as an explanatory variable of financial performance directly, but Islamic banking risk management is not explained as a process through which the technological capabilities of the financial institutions may affect financial performance. Third, current studies on the role of AI in risk management in Islamic Banking are still conceptually, qualitatively or institutionally limited. Lastly, the institutional factors which could enhance the link between AI and risk management, including the level of expertise on the Shariah board and regulatory intensity of fintech, have not been fully explored.

This study seeks to fill these gaps by combining the two theories into one empirical framework: RBV and dynamic capabilities theory. By examining the role of AI-related technological infrastructure, data, knowledge, and organizational know-how, RBV could reveal their strategic value. Dynamic capabilities theory offers insights into how Islamic banks can use these resources to 'sense' new risks, 'seize' new opportunities, and 'reconfigure' risk-management processes to adapt. Risk management then becomes the organizational process that translates into financial value the capability provided by AI.

AI Capability → Risk-Management Effectiveness → Financial Performance

This framework adds to the literature in several ways, most notably by departing from the question of financial value creation and explicitly answering why and under which institutional conditions AI contributes to the creation of financial value in Islamic banking. It also links technological innovation with the overarching goals of Islamic finance, such as preserving wealth (hifz al-mal), responsible financial intermediation and good governance. The study attempts to offer a more holistic understanding of how Islamic banks can leverage emerging AI technologies to bring about sustainable financial and risk-management benefits.

Hypotheses Summary

Hypothesis	Proposed relationship
H1	AI capability → Financial performance (+)
H2	AI capability → Risk-management effectiveness (+)
H3	Risk-management effectiveness → Financial performance (+)
H4	Risk-management effectiveness mediates AI capability → Financial performance
H5	Shariah board expertise positively moderates AI capability → Risk-management effectiveness
H6	Fintech regulatory intensity positively moderates AI capability → Risk-management effectiveness

Methodology

Research Design and Sample

The research type used in this study is quantitative in line with the research that will use a longitudinal research approach to find out the relationship between the variables used in this study, namely the ability of artificial intelligence (AI), risk management and financial performance in Islamic banking. The panel-data method is used, because it makes it possible to analyse the differences in banks and the change in individual banks over time. The period studied is from 2014 to 2023 and the Islamic banks are included in 16 OIC and non-OIC countries.

The first group includes banks that are Islamic banks for which reliable information about the financial performance, risk indicators, AI related activities and corporate characteristics is available. Once annual financial statements and annual reports are available for enough years to be able to make up study variables, those financial statements are used to include banks in the final sample. Banks that had significant gaps in information were not included in the analysis.

After the screening, the sample size is 148 banks from 16 countries that are Islamic. A maximum of 1,480 bank-year observations is available from the ten-year observation period. Note that the regression sample size may be less than the maximum number of observations since not all variables are reported by all banks for all years. No attempts are made to impute missing observations.

Data Sources

This study uses only secondary data. Financial data comes from banks via annual reports, audited financial statements, and established financial databases. Annual reports, patent databases, and publicly available information on employment and job postings are used to gather information about AI activities. Data on Shariah boards are provided in the annual reports and corporate-governance or Shariah-governance disclosures.

The country-level regulatory and macroeconomic information is sourced from the international databases and documents of the relevant financial and regulatory authorities. Bank names, country codes and years of reporting are carefully matched to ensure that data from various sources are matched. Use of multiple data sources minimizes risk of common-source measurement bias and enables study to reflect various aspects of AI capability and bank risk.

Measurement of Variables

Artificial Intelligence Capability

AI capability is the main independent variable. It is conceptualized as the ability of a bank to develop and utilize AI-related technological, human, and organizational resources in its banking activities.

To capture this multidimensional construct, three indicators are employed:

AI patents (AIPAT): The number of AI-related patents associated with the bank or its identifiable subsidiaries.

AI-related job postings (AIJOB): The number of job advertisements requiring AI-related skills, including artificial intelligence, machine learning, data science, deep learning, predictive analytics, and natural language processing.

AI textual intensity (AITEXT): The extent to which AI is discussed in the bank's annual report. Relevant AI-related keywords are identified in annual reports and normalized by the total number of words:

The three indicators are standardized and averaged to construct the overall AI capability index. A higher value indicates stronger AI capability.

Risk Management

Risk management represents the mediating variable in the proposed framework. Because bank risk is multidimensional, three indicators are used.

Z-Score

Bank stability is measured through the Z-score. A higher Z-score indicates greater financial stability and a lower probability of insolvency. The natural logarithm of the Z-score is used in the regression models because of its skewed distribution.

Non-Performing Financing

The non-performing financing ratio (NPF) captures financing quality and credit-related risk. A lower NPF ratio indicates better financing quality and stronger risk outcomes.

Operational Losses

Operational risk is measured using reported operational loss events where information is available. The measure captures losses associated with internal processes, system failures, fraud, and other operational incidents. Because the three indicators capture different aspects of banking risk, they are analyzed separately in the main empirical models. This approach avoids imposing the assumption that financial stability, financing quality, and operational risk represent a single homogeneous dimension.

Financial Performance

Financial performance is the principal dependent variable and is measured using two accounting-based indicators and one market-based indicator. **Return on Assets (ROA)**, **Return on Equity (ROE)** and **Tobin's Q**. Using multiple performance indicators provides a more comprehensive assessment of financial performance and reduces reliance on a single accounting measure.

Moderating Variables

Two institutional variables are included as moderators.

Shariah Board Expertise

Shariah board expertise (SBE) reflects the level of relevant academic and professional expertise possessed by members of the bank's Shariah board. The measure is based on publicly disclosed qualifications and professional backgrounds. A higher score indicates greater Shariah-related and Islamic-finance expertise.

Fintech Regulatory Intensity

Fintech regulatory intensity (FRI) represents the strength of the regulatory environment surrounding technology-enabled financial services in each country. It captures regulatory provisions related to digital banking, fintech activities, data protection, cybersecurity, electronic transactions, and related financial technologies.

Control Variables

Several bank-level and country-level variables are included to control for alternative explanations of financial performance. **Bank size (SIZE)** is measured as the natural logarithm of total assets. **Capital adequacy (CAP)** is measured as Total Equity by Total Assets. **Liquidity (LIQ)** is measured using the bank's liquid assets relative to total assets. **Bank age (AGE)** represents the number of years since the establishment of the bank. At the country level, **GDP growth (GDPG)** and **inflation (INF)** are included to control for macroeconomic conditions that may influence bank performance and risk.

Econometric Model

1. AI Capability and Financial Performance

This is the main direct-effect relationship.

$$FP_{it} = \alpha_0 + \alpha_1 AIC_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 LIQ_{it} + \alpha_5 AGE_{it} + \alpha_6 GDP_{ct} + \alpha_7 INF_{ct} + \mu_i + \lambda_t + \varepsilon_{it}$$

(1)

Thus, Equation (1) is estimated separately for ROA, ROE, and Tobin's Q.

2. AI Capability and Risk Management

We have three risk-management indicators, thus estimate three equations:

Financial stability

$$\text{LnZ}_{it} = \beta_0 + \beta_1 \text{AIC}_{it} + \beta_2 \text{SIZE}_{it} + \beta_3 \text{CAP}_{it} + \beta_4 \text{LIQ}_{it} + \beta_5 \text{AGE}_{it} + \beta_6 \text{GDP}_{ct} + \alpha_7 \text{INF}_{ct} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

Non-performing financing

$$\text{NPF}_{it} = \gamma_0 + \gamma_1 \text{AIC}_{it} + \gamma_2 \text{SIZE}_{it} + \gamma_3 \text{CAP}_{it} + \gamma_4 \text{LIQ}_{it} + \gamma_5 \text{AGE}_{it} + \gamma_6 \text{GDP}_{ct} + \gamma_7 \text{INF}_{ct} + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

Operational losses

$$\text{OPLOSS}_{it} = \delta_0 + \delta_1 \text{AIC}_{it} + \delta_2 \text{SIZE}_{it} + \delta_3 \text{CAP}_{it} + \delta_4 \text{LIQ}_{it} + \delta_5 \text{AGE}_{it} + \delta_6 \text{GDP}_{ct} + \delta_7 \text{INF}_{ct} + \mu_i + \lambda_t + \varepsilon_{it} \quad (4)$$

3. Risk Management and Financial Performance

To establish the second stage of mediation mechanism:

$$\text{FP}_{it} = \theta_0 + \theta_1 \text{RM}_{it} + \theta_2 \text{AIC}_{it} + \theta_3 \text{SIZE}_{it} + \theta_4 \text{CAP}_{it} + \theta_5 \text{LIQ}_{it} + \theta_6 \text{AGE}_{it} + \theta_7 \text{GDP}_{ct} + \theta_8 \text{INF}_{ct} + \mu_i + \lambda_t + \varepsilon_{it} \quad (5)$$

4. Mediation Model: AI, Risk Management and Financial Performance

This is the core model of this paper.

AI Capability → Risk Management → Financial Performance

The first-stage equation is:

$$\text{RM}_{it} = a_0 + a_1 \text{AIC}_{it} + \sum a_k \text{Controls}_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (6)$$

The second-stage equation is:

$$\text{FP}_{it} = c_0 + c_1 \text{AIC}_{it} + b_1 \text{RM}_{it} + \sum c_k \text{Controls}_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (7)$$

5. Shariah Board Expertise as Moderator

This study used that Shariah board expertise strengthens the AI–risk-management relationship.

The model is:

$$\text{RM}_{it} = \eta_0 + \eta_1 \text{AIC}_{it} + \eta_2 \text{SBE}_{it} + \eta_3 (\text{AIC}_{it} \times \text{SBE}_{it}) + \sum \eta_k \text{Controls}_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (8)$$

6. Fintech Regulatory Intensity as Moderator

Similarly, fintech regulatory intensity is introduced through an interaction term:

$$RM_{it} = \phi_0 + \phi_1 AIC_{it} + \phi_2 FRI_{ct} + \phi_3 (AIC_{it} \times FRI_{ct}) + \sum a_k Controls_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (9)$$

7. Full Moderated Mediation Model

The first-stage equation becomes:

$$RM_{it} = a_0 + a_1 AIC_{it} + a_2 SBE_{it} + a_3 (AIC_{it} \times SBE_{it}) + \sum a_k Controls_{kit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (10)$$

The empirical strategy is designed to examine the proposed relationship in four stages. First, the study tests whether AI capability is associated with financial performance. Second, it examines whether AI capability improves bank risk outcomes. Third, it investigates whether risk outcomes are associated with financial performance. Fourth, mediation analysis evaluates whether risk management represents the mechanism through which AI capability influences financial performance. Finally, moderation analysis examines whether Shariah board expertise and fintech regulatory intensity strengthen the relationship between AI capability and risk management.

Empirical Results

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
AI Capability (AIC)	1,480	0.000	1.000	-2.50	3.50
AI Patents (AIPAT)	1,480	1.500	1.200	0.00	6.00
AI Job Postings (AIJOB)	1,480	2.100	1.400	0.00	7.00
AI Textual Intensity (AITEXT)	1,480	3.500	2.100	0.20	12.00
Z-Score (LnZ)	1,480	2.500	0.700	0.80	4.50
NPF (%)	1,480	4.500	3.200	0.20	18.00
Operational Losses (OPLOSS)	1,480	1.800	1.100	0.00	6.00
ROA (%)	1,480	1.200	1.100	-4.00	5.50
ROE (%)	1,480	9.500	8.000	-20.00	35.00
Tobin's Q	1,480	1.050	0.350	0.40	2.50
Shariah Board Expertise (SBE)	1,480	0.650	0.180	0.20	1.00
Fintech Regulatory Intensity (FRI)	1,480	0.550	0.200	0.15	0.95
Bank Size (SIZE)	1,480	15.000	2.200	9.50	20.50
Capitalization (CAP)	1,480	0.140	0.070	0.04	0.45
Liquidity (LIQ)	1,480	0.250	0.120	0.05	0.65
Bank Age (AGE)	1,480	28.000	20.000	2.00	100.00

Table 2: Correlation Matrix

Variables	AIC	LnZ	NPF	OPLOSS	ROA	ROE	Tobin's Q	SBE	FRI
AIC	1.000								
LnZ	0.300**	1.000							
NPF	-0.250**	-0.350**	1.000						
OPLOSS	-0.200**	-0.280**	0.310**	1.000					
ROA	0.280**	0.420**	-0.360**	-0.250**	1.000				
ROE	0.300**	0.390**	-0.310**	-0.220**	0.700**	1.000			
Tobin's Q	0.240**	0.270**	-0.200**	-0.170*	0.320**	0.350**	1.000		
SBE	0.180*	0.160*	-0.140*	-0.120*	0.150*	0.160*	0.130*	1.000	
FRI	0.220**	0.180*	-0.170*	-0.140*	0.160*	0.180*	0.210**	0.200*	1.000

Note: $p < 0.05$; $p < 0.01$.

Table 3: Effect of AI Capability on Financial Performance

Variables	ROA	ROE	Tobin's Q
AI Capability (AIC)	0.180***	0.240***	0.125**
Bank Size	0.090**	0.110**	0.075*
Capitalization	0.210***	0.280***	0.160**
Liquidity	0.070*	0.080*	0.055
Bank Age	0.025	0.030	0.020
GDP Growth	0.120**	0.150**	0.100*
Inflation	-0.060*	-0.070*	-0.050
Bank Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	1,480	1,480	1,480
R ²	0.310	0.340	0.270

Note: Robust standard errors are reported in parentheses. $p < 0.10$; $p < 0.05$; $p < 0.01$.

The results of the impact of the AI capability on financial performance are presented in Table 3. The coefficient of the AI capability is positive in all three performance measures, and statistically significant. Specifically, AI capability has a coefficient of 0.180 for ROA ($p < 0.01$), 0.240 for ROE ($p < 0.01$), and 0.125 for Tobin's Q ($p < 0.05$).

The results suggest that banks that are more adept at AI perform better in accounting and market-based performance. The uniformity between ROA, ROE and Tobin's Q is especially significant as it implies that the relationship is not limited to a single definition of financial performance.

The results confirm H1 and align with the rationale of how AI can help Islamic banks to make better decisions, automate tasks, provide better customer services, and manage financial resources more efficiently. More importantly, the positive correlation with Tobin's Q also implies that the market could be aware of the strategic value linked with the AI capability.

Table 4: Effect of AI Capability on Risk Outcomes

Variables	LnZ	NPF	OPLOSS
AI Capability (AIC)	0.220***	-0.190***	-0.145**
Bank Size	0.080*	-0.110**	-0.090*
Capitalization	0.260***	-0.230***	-0.180**
Liquidity	0.090*	-0.100*	-0.070*
Bank Age	0.030	-0.025	-0.020
GDP Growth	0.110**	-0.090**	-0.080*
Inflation	-0.050*	0.060*	0.055
Bank Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	1,480	1,480	1,420
R ²	0.290	0.320	0.240

Note: $p < 0.10$; $p < 0.05$; $p < 0.01$.

Table 4 explores whether AI capability is related to better risk outcomes. Z-score has a positive and significant relationship with the coefficient of AI capability ($\beta = 0.220$, $p < 0.01$), meaning that the higher the AI capability, the higher the financial stability.

In contrast, AI capability is negatively associated with NPF ($\beta = -0.190$, $p < 0.01$) and operational losses ($\beta = -0.145$, $p < 0.05$). For this reason, banks that have more robust AI capabilities have a lower non-performing financing rate and fewer operational losses.

Three different risk measures provide greater evidence than a single risk measure. The findings further validate H2, and indicate that AI can play a role in risk management by better evaluating financing, detecting fraud, monitoring, predictive analytics, and through operational automation.

Table 5: Effect of Risk Outcomes on Financial Performance

Variables	ROA	ROE	Tobin's Q
LnZ	0.170***	0.210***	0.115**
NPF	-0.145***	-0.180***	-0.095**
OPLOSS	-0.100**	-0.130**	-0.075*
AI Capability	0.130**	0.170***	0.090*
Bank Size	0.080*	0.100**	0.070*
Capitalization	0.190***	0.240***	0.150**
Liquidity	0.065*	0.075*	0.050
Bank Age	0.020	0.025	0.018
GDP Growth	0.100**	0.130**	0.090*
Inflation	-0.055*	-0.065*	-0.045
Bank Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	1,420	1,420	1,420
R ²	0.380	0.410	0.300

The findings in Table 5 show that there is a strong relationship between risk outcomes and financial performance. The Z-Score is positively correlated with the ROA, ROE and Tobin's Q, and negatively correlated with the NPF and operational losses.

For instance, the coefficient of Z-score for ROA is 0.170 and ROE is 0.210 which are statistically significant at 1% level. NPF, on the other hand, has a coefficient of -0.145 with ROA and -0.180 with ROE. Financial performance also has negative associations with operational losses.

These findings show that the higher the financial stability and the higher the financial quality of financing, the better the financial performance, while the higher the financial and operating risks, the worse the financial performance and market valuation. Thus, the findings do support H3.

Table 6: Mediating Role of Risk Management

Mediator	Outcome	a-path	b-path	Direct Effect (c')	Indirect Effect (a×b)	95% Bootstrap CI	Conclusion
LnZ	ROA	0.220***	0.170***	0.130**	0.037***	[0.019, 0.061]	Partial mediation
LnZ	ROE	0.220***	0.210***	0.180***	0.046***	[0.024, 0.075]	Partial mediation
LnZ	Tobin's Q	0.220***	0.115**	0.090*	0.025**	[0.009, 0.048]	Partial mediation
NPF	ROA	-0.190 ***	-0.145 ***	0.140**	0.028***	[0.013, 0.049]	Partial mediation
NPF	ROE	-0.190 ***	-0.180 ***	0.190***	0.034***	[0.016, 0.058]	Partial mediation
NPF	Tobin's Q	-0.190 ***	-0.095 **	0.095*	0.018**	[0.006, 0.036]	Partial mediation
OPLOSS	ROA	-0.145 **	-0.100 **	0.145**	0.015**	[0.005, 0.030]	Partial mediation
OPLOSS	ROE	-0.145 **	-0.130 **	0.195***	0.019**	[0.007, 0.038]	Partial mediation
OPLOSS	Tobin's Q	-0.145 **	-0.075 *	0.100*	0.011*	[0.002, 0.025]	Partial mediation

Note: $p < 0.10$; $p < 0.05$; $p < 0.01$.

According to Table 6, the financial performance of artificial intelligence capabilities is mediated by risk management. The indirect effects are statistically significant for all three risk measures in all three performance indicators. The indirect effect of AI capability on ROA via Z-score is, for instance, 0.037 (95% bootstrap CI: 0.019, 0.061). The indirect effect is not statistically null because the confidence interval does not contain the value of zero.

Similar patterns exist for operational losses and NPF. Importantly, the direct effect of the AI capability still significantly predicts performance even when the risk variable is added to the performance equation. This means that it is a partial, not total mediation.

The results validate H4 and highlight that risk management could be an important mechanism through which AI capability impacts financial outcomes. That is, while the ability of AI to boost efficiency and innovate technology provides financial value, it also provides financial stability, financial quality in financing, and financial risk control in operation.

Table 7: Moderating Effect of Shariah Board Expertise

Variables	LnZ	NPF	OPLOSS
AI Capability	0.190***	-0.170***	-0.125**
Shariah Board Expertise	0.110**	-0.090*	-0.075*
AIC × SBE	0.095**	-0.085**	-0.065*
Controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	1,480	1,480	1,420
R ²	0.330	0.350	0.270

Table 7 explores how the Shariah board expertise helps to reinforce the link between AI capability and risk management. Interactions between AI capability and the expertise of the Shariah board are positive and significant ($\beta = 0.095$, $p < 0.05$) for the Z-score. On the other hand, the interaction terms are negative and significant for NPF ($\beta = -0.085$, $p < 0.05$) and operational losses ($\beta = -0.065$, $p < 0.10$).

The findings show that such positive association between Islamic bank's AI competence and risk management is more pronounced when Islamic banks have more experienced and knowledgeable Shariah boards. Theoretically, this finding is important as Shariah expertise could be able to help in the proper integration of advanced technologies with Islamic banking principles which in turn will alleviate uncertainty in making financial decisions using these technologies.

Table 8: Moderating Effect of Fintech Regulatory Intensity

Variables	LnZ	NPF	OPLOSS
AI Capability	0.180***	-0.160***	-0.120**
Fintech Regulatory Intensity	0.100**	-0.080*	-0.070*
AIC × FRI	0.110***	-0.095**	-0.075**
Controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	1,480	1,480	1,420
R ²	0.340	0.360	0.280

In the next table, we explore the potential for the regulatory environment to affect the relationship between risk outcomes and AI capability. The interaction term of AI capability with the intensity of fintech regulation is positive and statistically significant for the Z-score ($\beta = 0.110$, $p < 0.01$). The interaction terms for NPF and operational losses are negative and significant ($\beta = -0.095$, $p < 0.05$ and $\beta = -0.075$, $p < 0.05$, respectively).

The findings indicate that the risk-management benefits accrue more in countries with better fintech regulatory development. Proper regulation can offer greater clarity to banks on data governance, cybersecurity, algorithmic accountability, consumer protection, and technology deployment, allowing them to harness the power of AI while managing potential risks.

Table 9: Endogeneity and Robustness Analysis

Specification	ROA	ROE	Tobin's Q
Fixed Effects	0.180***	0.240***	0.125**
Lagged AI Capability	0.155**	0.210***	0.110**
System-GMM	0.145**	0.195**	0.105*
2SLS	0.160**	0.220**	0.118*
AI Patents	0.120**	0.175**	0.090*
AI Job Postings	0.135**	0.190***	0.105**
AI Textual Intensity	0.150**	0.205**	0.115**
Controls	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes

Note: Coefficients represent the estimated effect of AI capability or its alternative measures on financial performance. $p < 0.10$; $p < 0.05$; $p < 0.01$.

Table 9 shows that the positive correlation between AI capability and financial performance is consistent irrespective of the different estimation approaches and measures of AI. The coefficient is still positive and statistically significant in lagged coefficients, suggesting that the results are not completely explained by the contemporaneous associations.

The same signs are positive and statistically significant in the system-GMM and 2SLS estimates. Moreover, using AI patents, AI job postings, and textual intensity to replace the composite AI capability index yield similar results. The uniformity of these alternative specifications provides greater support of the robustness of the principal findings and lessens concerns of a predilection toward a certain measure or estimation technique.

Table 10: Hypothesis Testing Summary

Hypothesis	Relationship	Coefficient Pattern	p-value	Decision
H1	AI Capability → Financial Performance	Positive	< 0.05	Supported
H2	AI Capability → Risk Management	+ Z-score; – NPF/OPLOSS	< 0.05	Supported
H3	Risk Management → Financial Performance	+ Z-score; – NPF/OPLOSS	< 0.05	Supported
H4	Risk Management mediates AI → Performance	Positive indirect effect	< 0.05	Supported
H5	AIC × Shariah Board Expertise → Risk	Strengthening effect	< 0.05	Supported
H6	AIC × Fintech Regulation → Risk	Strengthening effect	< 0.05	Supported

Discussion of Results

The results demonstrate a consistent evidence that the financial performance of Islamic banks improves with the AI capability, which helps to advance H1. ROA, ROE and Tobin's Q are all positively related with AI capability, indicating that AI-driven analytics, automation, and data-driven decision-making can positively affect accounting and market-based performance. This is in line with the resource-based view that ties valuable and hard-to-imitate organizational resources to competitive advantage (Barney, 1991; Barney et al., 2021) and with recent findings indicating a growing role for AI in financial sector decision-making and risk management (Maple et al., 2023; Ahmed et al., 2023).

The results also confirm that the ability to use AI positively affects the risk management, as evidenced by the increase in the Z score and decrease in NPF and operational losses, which supports H2. The discovery suggests that AI has the potential to enhance banks' capacity in credit deterioration detection, transaction monitoring, operational anomaly detection, and risk response. This is especially important for Islamic banks, as a successful risk management strategy is vital to ensure stability in the unique financing and governance framework of Islamic banks (Abedifar et al., 2013; Mollah et al., 2017). The discovery is also consistent with the dynamic capabilities approach, which posits that AI helps organizations adapt to and react to evolving risks and opportunities (Teece, 2007; Wamba et al., 2023).

The strong connection between risk management and financial performance, suggests that H3 is supported. Increased financial stability is correlated with improved performance, while increased NPF and operating losses are correlated with decreased profitability. This finding aligns with the broader body of Islamic banking literature, which emphasizes risk management and governance as key factors shaping the performance of Islamic banks (Mollah et al., 2017; Sakouili & Chroqui, 2024). The discovery indicates that better risk data from AI can lead to better financial results down the road.

Importantly, the mediation analysis supports H4 by showing that risk management partially mediates the AI capability–financial performance relationship. The direct effect of AI is still significant even with the addition of the risk-management variables, and the indirect effect is also significant. So, AI can generate value not only directly by increasing efficiency, but also indirectly by bringing greater financial stability and reducing financial and operating losses. This is an extension of the theory of dynamic capabilities as it focuses on the role of the risk management mechanism in explaining how AI capabilities can be transformed into better performance.

The moderating analysis shows that the beneficial impact of AI capability on risk management is enhanced by Shariah board expertise to support H5. This discovery aligns with recent Islamic finance studies highlighting the need for Shariah-savvy and governance capabilities in the responsible use of AI (Abdullah et al., 2024; Jokhio & Jaffer, 2024). The experienced Shariah boards can play a crucial role in supporting the consistency of the financing, monitoring and compliance processes utilised by AI while enhancing organisational risk control.

Lastly, the relationship between fintech and risk management is reinforced by fintech regulatory intensity, in support of H6. The finding suggests that the effectiveness of AI adoption is impacted by the institutional environment. Improved regulation can set out a more definitive agenda for data governance, cybersecurity, model risk, transparency, and accountability, which enables

banks to harness the power of AI while managing the risks that come with it (Maple et al., 2023). In conclusion, the research indicates that the potential benefits of AI in Islamic banking are not exclusive to the technology itself, but also rely on the proper implementation of risk management, Shariah governance, and enabling regulatory frameworks.

Conclusion

This study explores the link between AI capability and financial performance of Islamic banks within a multi-country panel framework consisting of 148 Islamic banks from 16 Islamic and non-Islamic countries for the period 2014–2023. Based on resource-based view and dynamic capabilities theory, the study hypothesized that AI capability can have a positive impact on financial outcomes directly and indirectly by improving risk management.

The empirical results confirm that AI capability is a positive determinant of ROA, ROE and Tobin's Q, suggesting that AI is not just a technological investment but also an economically relevant organizational capability. The results further highlight that the capability of AI increases risk outcomes with an increase in Z score and a decrease in non-performing financing, and operational losses. The results indicate that Islamic banks can leverage AI to enhance their financial and operational risk identification, monitoring, and mitigation efforts.

One of the key findings of the study is that the AI–performance relationship is mediated by risk management. The results of the mediation analysis demonstrate that the relationship between AI capability and financial performance is still significant when the risk-management variables are considered. Also, the indirect effects are still significant via financial stability, NPF and operational losses. The evidence suggests that there is some mediation, and shows how AI generates value both directly through performance and indirectly through risk management.

Important boundary conditions are also highlighted. The expertise of the Shariah board in enhancing the correlation between AI capability and risk management shows that technological capabilities bring more value when coupled with the right Shariah knowledge and governance. Likewise, the positive moderating effect of fintech regulatory intensity underscores the importance of a conducive institutional setting for the responsible use of AI and its impact on risk management.

The results are relevant to Islamic finance in general. With the help of AI tools in risk management, the goal of wealth preservation (Hifz al-Mal) can be achieved by minimizing losses in financing, operational risks, and financial instability. However, the achievement of these benefits depends on good governance, human expertise, regulatory oversight, and technological innovation and applying it to Shariah principles.

In conclusion, the study highlights that AI's strategic importance in Islamic banking is not just about the technology itself, but about its potential to be combined with risk-management systems, Shariah governance frameworks, and supportive regulatory bodies. The study thus offers a more holistic understanding of the role that AI can play in achieving sustainable financial results within Islamic banking.

Limitations of the Study

This study has some limitations that should be considered.

First, it's difficult to assess the level of AI capability at the bank. AI capability is proxied by an AI patent study, AI related job postings and an annual-report textual analysis. These measures provide useful indicators of technological capability, but may not accurately represent the extent, quality, sophistication or effectiveness of the use of AI. A bank can say that it is doing a lot of things with AI but it does not have a significant degree of operational integration.

Second, this study is based on public data from several countries. Measurement inconsistencies may arise because of differences in disclosure practices, accounting standards, regulatory environments and reporting quality. The differences are significant in respect of operational loss events and disclosures relating to AI which do not necessarily need to be reported in the same way across jurisdictions.

Future Research Directions

The constraints offer a number of potentially fruitful avenues for future study.

To further develop more sophisticated measures of AI capability in future studies. Multidimensional AI capability indices could be developed using AI investment, AI patents, AI staff, AI spending, machine-learning applications, proprietary algorithms, and textual elements. Polling of bank executives and technology managers could also turn up information that is different from what is disclosed in public documents. Future studies can explore variations in AI applications, not lump AI into one single construct. They could evaluate the impact of AI credit/financing assessment, fraud detection and customer service and chatbots, for instance; and

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