Integrating Artificial Intelligence into Credit Risk Assessment (A Comparative Study of Islamic and Conventional Banks)

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Abstract

The purpose of this research is to investigate the ways in which Islamic and conventional banks can incorporate Artificial Intelligence (AI) into credit risk assessment. Based on existing academic literature, industry reports, and regulatory documents, it takes a descriptive–analytical approach. The study looks into how AI methods like decision trees, machine learning, and neural networks can make credit risk evaluations more accurate, quick, and consistent. It also compares the adoption of AI by Islamic and conventional banks, particularly in terms of ethical principles, transparency, and regulatory requirements.

The prohibition of Riba (interest), the promotion of risk sharing, and the protection of fairness and transparency in financial transactions are all Shariah principles that Islamic banks must adhere to when integrating AI. Data quality, algorithmic bias, explainability, cybersecurity, and institutional readiness are all examined in the study as potential and potential drawbacks of employing AI in a Shariah-compliant setting.

The findings are expected to show that AI can significantly enhance credit risk assessment in both banking models, but successful adoption in Islamic banks requires tailored frameworks for Shariah governance, explainable AI, and ethical data use. The study offers a conceptual framework for incorporating AI into credit risk assessment that takes into account Islamic ethical values as well as technological efficiency.

Keywords: Artificial Intelligence; Credit Risk; Islamic Banking; Conventional Banking; Shariah Compliance; Machine Learning

1. Introduction

1.1. Background of the Study

As a result of rapid digitalization and the increasing availability of large-scale financial data, the global banking industry is undergoing significant transformations. One of the most significant technological advancements in this transformation is Artificial Intelligence (AI).

AI has evolved into a crucial tool for enhancing decision-making processes, particularly in credit risk assessment. Unlike traditional statistical models, AI-based systems are capable of processing high-dimensional data, identifying non-linear relationships, and generating predictive insights with greater speed and accuracy.

Recent empirical studies highlight the ability of AI and machine learning applications to outperform traditional scoring models in credit risk assessment. Financial institutions are able to process large and complex datasets, identify non-linear risk patterns, and improve the accuracy of credit default prediction thanks to advanced AI-driven approaches (Nallakaruppan et al., 2024; Ayari, 2025).

The role of Explainable Artificial Intelligence (XAI) frameworks in enhancing transparency, regulatory compliance, and ethical accountability in automated credit decision-making processes has been emphasized further in recent literature. Financial institutions can use explainable techniques to interpret model outputs and justify credit decisions, thereby maintaining high predictive performance and increasing trust in AI-based risk assessment systems (Nallakaruppan et al., 2024; Kakkar, 2025; Pathak, 2025).

In addition, research that compares AI adoption across dual banking systems reveals that the integration of AI technologies in Islamic and conventional banks may have distinct effects on operational efficiency and credit risk outcomes. Contractual structures, risk-sharing mechanisms, and ethical foundations that vary within Islamic finance are largely to blame for these differences (Meero, 2025). These results, taken as a whole, point to the ever-evolving role that AI is playing in modern credit risk management, where interpretability and compatibility with ethical, institutional, and regulatory contexts across banking systems must go hand in hand with predictive efficiency.

AI has been widely used in conventional banking systems to automate loan evaluation, monitor borrower behavior, and improve credit scoring. Banks are able to assess default risk more

effectively and rely less on manual judgment thanks to machine-learning models. However, the integration of AI into Islamic banking presents additional complexities due to the ethical and legal requirements imposed by Shariah principles, including the emphasis on fairness and risk sharing, the prohibition against interest (riba), and the avoidance of excessive uncertainty (gharar).

Islamic banks operate within a dual-banking environment alongside conventional institutions in many regions, particularly in the Middle East and Southeast Asia. Since the contractual frameworks and ethical underpinnings of the two banking models are vastly different from one another, but they share similar regulatory pressures, this coexistence presents an opportunity for comparative analysis. Understanding how AI can be incorporated into credit-risk assessment across these two systems is therefore essential for advancing financial stability, technological innovation, and ethical compliance.

1.2. Problem Statement

While AI technologies have demonstrated strong potential in improving credit-risk assessment within conventional banking systems, their application in Islamic banking remains limited and cautious. Most existing AI credit-scoring models are designed for interest-based lending structures and do not adequately account for Shariah-related constraints, ethical screening, or Islamic contractual arrangements.

Additionally, Islamic banks face concerns related to algorithmic transparency, explainability, and accountability. It is difficult to justify decisions made by opaque “black box” models to Shariah boards, regulators, and customers. As a result, there exists a clear gap between the technological capabilities of AI and its practical, Shariah-compliant implementation in Islamic credit-risk assessment.

1.3. Research Objectives

This study aims to:

1. Examine how AI techniques contribute to improving credit-risk assessment in banking systems.
2. Compare the adoption of AI-based credit-risk tools in Islamic and conventional banks.
3. Identify the ethical, regulatory, and Shariah-related challenges faced by Islamic banks when integrating AI.
4. Propose a conceptual framework for AI-based credit-risk assessment that aligns with Shariah principles.

1.4. Research Questions

1. How can AI improve credit risk assessment's accuracy and efficiency?
2. What differences exist between Islamic and conventional banks in adopting AI for credit-risk evaluation?
3. AI implementation in Islamic banking is affected by what ethical, regulatory, and Shariah constraints?
4. How can AI-based credit-risk models be aligned with Islamic legal and ethical requirements?

1.5. Significance of the Study

By providing a structured comparison of AI integration in Islamic and conventional banking systems, this study adds to the growing body of research on Islamic finance and financial technology. The findings are expected to benefit academics, banking practitioners, and policymakers by clarifying the opportunities and limitations of AI adoption while emphasizing the importance of ethical and Shariah-compliant governance frameworks.

1.6. Scope and Limitations

The study is conceptual and relies exclusively on secondary sources, including academic literature, regulatory reports, and institutional publications. It focuses on Islamic and conventional banks, particularly in regions where Islamic finance plays a significant role. Since no empirical datasets or statistical models are used, the conclusions remain theoretical and analytical in nature.

2. Literature Review

2.1. Overview of Islamic and Conventional Banking

The fundamentally different financial, ethical, and regulatory principles under which Islamic and conventional banking operate directly influence their approaches to credit risk assessment. Interest-based lending, profit maximization, and risk transfer mechanisms are the foundations of conventional banking. (Ahmed & Ullah, 2020).

Decisions about credit risk are typically influenced by statistical scoring, the credit history of the borrower, and predictive algorithms made to maximize financial returns. (Zhang & Chen, 2020).

In contrast, Islamic banking adheres to the Shariah's principles, which forbid unethical investment practices, excessive uncertainty (gharar), and interest (riba). Islamic finance emphasizes risk sharing, asset-backed financing, and contractual transparency. (Haniffa & Hudaib, 2022).

When it comes to incorporating Artificial Intelligence (AI) into Islamic credit-risk assessment, these differences present distinct challenges as well as opportunities. Islamic banks must ensure that technological adoption is compatible with Shariah governance, ethical compliance, and socio-economic justice, whereas conventional banks may implement AI models without significant ethical restrictions. (Rabbani et al., 2021).

2.2. Credit Risk in Banking

Credit risk refers to the likelihood that a borrower may fail to meet agreed repayment terms. Due to its significant influence on a bank's liquidity position, profitability, and overall financial sustainability, credit risk is considered a core component of financial risk management (Bissoondoyal-Bheenick & Treepongkaruna, 2021).

Banks employ several approaches to evaluate credit risk, including the analysis of borrowers' financial statements, the use of credit-scoring models, ratio-based financial assessments, expert-based judgment, and the appraisal of collateral pledged against financing facilities.

Despite their long-standing application in banking practices, these techniques face notable limitations. Issues such as information asymmetry between lenders and borrowers, along with complex and non-linear financial interactions, reduce the effectiveness of traditional credit-risk evaluation methods (Zhang & Chen, 2020).

In the context of Islamic banking, assessing credit risk becomes more complex. This is because Shariah-compliant contracts such as Murabaha, Mudaraba, Musharaka, and Ijara are characterized by distinct contractual arrangements, risk-sharing principles, and compliance requirements, each of which necessitates a tailored risk assessment framework (Lahsasna, 2020).

2.3. Artificial Intelligence in Financial Services

By enabling automated decision-making, real-time data processing, and predictive modeling, AI has revolutionized the financial industry. Core AI techniques used in credit-risk assessment include: (Machine Learning (ML); Neural Systems; Random Forests & Decision Trees; Support Vector Machines (SVM); Natural Language Processing (NLP)

AI models significantly outperform traditional methods by detecting complex borrower patterns, providing faster and more accurate predictions, reducing human bias, and enhancing fraud detection (Khandani et al., 2019; Ryu, 2020). Loan underwriting, credit scoring, fraud monitoring, and portfolio management are all common applications of AI in conventional banking (Huang et al., 2022).

2.4. AI Adoption in Islamic Banking

Despite the fact that Islamic banks are aware of the potential of AI, adoption is still more sluggish than in conventional banks for a number of reasons.

2.4.1. Shariah Compliance

Artificial Intelligence applications in Islamic banking must undergo rigorous review to ensure alignment with Shariah principles. This includes preventing the support of unethical financing behaviors, avoiding reliance on interest-based datasets, ensuring that automated decisions do not contradict Islamic values, and minimizing the presence of gharar (excessive uncertainty) that may arise from non-transparent or opaque algorithmic models. Consequently, Shariah governance frameworks impose additional limitations on the implementation of AI technologies within Islamic financial institutions (Moghul & Ahmed, 2021).

2.4.2. Algorithmic Transparency

Most AI-driven credit assessment models function as "black-box" systems, which limits the ability of Shariah supervisory boards to fully understand the rationale behind automated decisions. As a result, Islamic banks increasingly rely on Explainable Artificial Intelligence (XAI) techniques to enhance transparency, accountability, and interpretability in credit-risk evaluation processes (Rabbani & Khan, 2022).

2.4.3. Ethical Data Use

Principles of Islamic ethics place strong emphasis on justice, fairness, and the prevention of exploitation. Accordingly, the use of unbiased and representative datasets is essential, along with the adoption of AI decision-making processes that are transparent, equitable, and consistent with ethical standards (Karim & Archer, 2021).

2.4.4. Institutional Readiness

In order to effectively implement AI, many Islamic banks lack the necessary infrastructure, skilled workforce, and regulatory clarity (Rabbani et al., 2021). In spite of these difficulties, AI offers chances to enhance Shariah compliance monitoring and assess credit risk.

2.5. Comparative Studies: Islamic vs. Conventional AI Adoption

Table 1: Comparison of AI Adoption in Islamic and Conventional Banks

Aspect	Conventional Banks	Islamic Banks
AI Adoption Speed	Fast	Moderate

Regulatory Demand	Efficient, risk-based	Ethical + Shariah-based
Model Transparency	Not required	Essential
Data Use	Broad datasets	Restricted by Shariah filters
Loan Structure	Interest-based	Asset-backed / risk-sharing

Source: Prepared by the researcher based on Ali et al. (2020) and Karim & Archer (2021).

Conventional banks benefit from technological freedom, enabling rapid innovation (Ali et al., 2020). Islamic banks must integrate AI while preserving principles of justice, transparency, and Shariah integrity (Karim & Archer, 2021).

2.6. Gaps in the Literature

The literature reveals several gaps:

• The lack of empirical research on Islamic AI-based credit scoring (Alam et al., 2019)

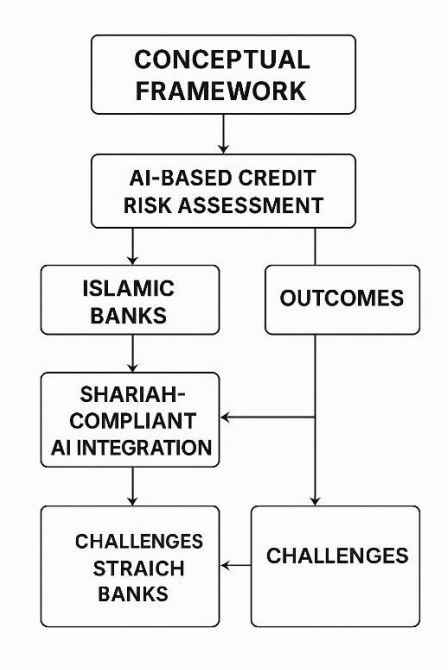
• There are no AI frameworks that comply with Shariah (Moghul & Ahmed, 2021)

• There aren't many studies comparing Islamic AI adoption to conventional AI (Rabbani & Khan, 2022).

• Insufficient research on XAI (Explainable AI) for Islamic finance (Rabbani et al., 2021)

These gaps justify the development of this study's conceptual framework

Figure 1: Conceptual Framework for AI Integration into Credit Risk Assessment



Source: Developed by the researcher based on existing literature.

Through a structured, multi-stage procedure, this conceptual framework demonstrates how Artificial Intelligence (AI) supports credit risk assessment in both conventional and Islamic banks. The model begins with the adoption of AI-based credit-risk assessment systems, which serve as the central mechanism for evaluating borrower behavior, financial data, and default probability.

The framework indicates that in the Islamic banking stream, AI must undergo an additional layer of Shariah-Compliant AI Integration to guarantee that algorithmic decisions adhere to Islamic ethical principles like transparency, fairness, risk sharing, and the prohibition of riba and gharar. The governance, explainability, and dataset restrictions aspects of this procedure present unique difficulties.

On the conventional banking side, AI adoption leads directly to outcomes, such as improved predictive accuracy, operational efficiency, and faster decision-making. Challenges include cybersecurity risks, algorithmic bias, and high implementation costs.

Both banking models ultimately face contextual challenges, but Islamic banks must specifically address Shariah governance constraints in addition to technological and regulatory barriers.

Therefore, the framework demonstrates how Shariah-aligned considerations influence the implementation process in Islamic banking and highlights the comparative path of AI adoption.

3. Methodology:

3.1. Research Design:

A descriptive–analytical research design is used in this study, which is good for conceptual and theoretical studies that use secondary data.

The analytical section critically compares the two models and synthesizes findings from the literature, while the descriptive section aims to explain how Artificial Intelligence (AI) contributes to credit risk assessment in both Islamic and conventional banking systems.

The study remains entirely theoretical and is based on existing scholarly and institutional sources because it does not involve human participants, surveys, or quantitative modeling.

3.2. Research Approach:

The study follows a qualitative literature-based approach, focusing on academic journals, regulatory reports, industry publications, and existing AI frameworks. Through thematic classification, the research identifies patterns in AI adoption, Shariah governance considerations, technological barriers, and ethical constraints.

By highlighting the conceptual, regulatory, and operational differences between Islamic and conventional banks, this strategy permits a comprehensive comparison.

The purpose of this study is to investigate how Islamic and conventional banks can incorporate AI into credit risk assessment.

The methodology focuses on synthesizing existing academic findings, comparing conceptual models, and identifying thematic patterns in previous research because the study does not rely on primary data or statistical estimation.

- There are three stages to the analysis:

First, an extensive literature review is conducted to collect insights from peer-reviewed journals, industry reports, central-bank publications, and international regulatory frameworks.

To ensure that the review reflects the most recent advancements in AI applications and credit-risk management, studies published between 2018 and 2025 receive priority.

AI-based scoring systems, machine learning techniques in finance, Islamic banking risk assessment practices, and comparative studies of Islamic and conventional financial institutions are among the topics covered in the selected literature.

Second, the literature is categorized according to major themes that are relevant to the study's goals using a thematic analysis method.

These themes include:

(1) the role of AI in improving credit-risk prediction,

(2) Islamic and conventional banks differ structurally and ethically,

(3) challenges related to transparency, explainability, and data governance, and

(4) global digital transformation trends in dual-banking systems This thematic structure allows the study to organize findings systematically and highlight the recurring concepts that shape AI-enabled credit-risk practices.

Third, a comparative analysis is used to evaluate how Islamic and conventional banks differ in their adoption of AI-based credit-risk tools.

The comparison focuses on regulatory environments, governance requirements, risk-management frameworks, and the unique constraints of Shariah-compliant finance.

The study is able to identify not only similarities but also the most important institutional and ethical aspects that set Islamic banks apart from conventional ones thanks to this approach.

Because the research is conceptual rather than empirical, no statistical models or numerical estimations are applied. Instead, the methodology's strength lies in its capacity to combine a variety of academic perspectives, incorporate findings into a coherent conceptual framework, and offer a balanced and structured comparison of banking systems. Without relying on proprietary datasets or quantitative models, this approach is appropriate given the study's goal of understanding how AI can reshape credit-risk assessment in both conventional and Islamic banks.

3.3. Data Sources:

Since this is a non-empirical study, all data were collected from secondary sources, including:

- Articles in journals with peer review.
- Academic theses and books.
- Reports from the Islamic Financial Services Board, Basel Committee, AAOIFI, and central banks
- Publications on AI, machine learning, and credit-risk modelling
- Reports on financial technology (FinTech) and white papers on the industry.

In order to ensure that the results reflect the most recent advancements in AI, recent literature (2018–2025) was given priority.

3.4. Data Collection Procedures:

The data collection process involved three stages:

Keywords are identified. Among the search terms were Banking AI, AI Credit Scoring, Islamic Banking Risk Assessment, Shariah Governance, Machine Learning Models, and Comparative Banking Systems are all examples of banking AI.

2. Screening of Sources

Relevance, publication quality, credibility, and methodological contribution clarity were the criteria used to evaluate the articles.

3. Getting thematic insights extracted Literature was broken down into themes like:

• Artificial intelligence in credit scoring

• Islamic vs. conventional banking principles

• AI considerations that adhere to the Shariah

• Challenges and opportunities

• Governance and ethical issues

This ensured a structured and comprehensive review of current knowledge.

3.5. Analytical Method:

The study employs thematic and comparative analysis:

3.5.1. Thematic Analysis

In order to comprehend how AI affects credit risk assessment and how Islamic banks differ from conventional banks in their adoption of these technologies; themes were derived from the literature.

3.5.2. Comparative Analysis

Islamic and conventional banks were compared across multiple dimensions, including:

• The level of AI adoption

• Regulatory constraints

• Norms of ethics and Shariah

• Strategies for assessing risks

• Obstacles posed by technology

The distinct paths and limitations of AI implementation in each system are made clear by this comparison.

3.6. Conceptual Framework Development

The most important results from previous research on the following topics were combined to create the conceptual framework:

- Credit risk assessment procedures based on AI
- Shariah-compliant AI integration
- The advantages and disadvantages of each banking model

The framework visually demonstrates how AI functions differently within Islamic and conventional systems, highlighting unique Shariah constraints and governance requirements.

3.7. Ethical Considerations

Ethical guidelines were upheld in the research, even though no human subjects were used:

- Accurate referencing and citation
- Preventing plagiarism
- Use of credible and authoritative sources

- Openness when interpreting previous research

Because the study concerns Islamic finance, ethical integrity also requires ensuring that interpretations of Shariah compliance are sourced from recognized scholarly bodies.

3.8. Limitations of the Methodology

The study's limitations include:

- Dependence on secondary sources rather than empirical testing
- The possibility of varying the quality of the reviewed literature
- There aren't enough real-world banking datasets to verify conceptual assumptions
- The framework is still theoretical and must be evaluated empirically in the future.
- The approach is suitable for the creation of conceptual models and foundational insights despite these limitations.

3.9. Reliability and Validity of the Method

To ensure methodological rigor, reliability was enhanced by relying on peer-reviewed academic studies, reputable financial reports, and established regulatory documents. Validity was strengthened by comparing multiple authoritative sources to confirm the consistency of findings related to AI adoption, Shariah governance, and risk-assessment practices. The triangulation of literature academic, regulatory, and industry-based supports the accuracy of the themes extracted and reinforces the credibility of the comparative analysis.

3.10. Inclusion and Exclusion Criteria

The following criteria were used to select the included studies:

- Relevance to AI adoption in banking
- Islamic or conventional credit risk assessment coverage
- Publication within the period 2018–2025
- Availability of full-text peer-reviewed material

The following studies were not included:

- Isolated from other AI applications
- Was unclear in terms of the method
- Lacked sufficient specificity for thematic extraction

These criteria ensured that only high-quality and directly relevant sources contributed to the analysis.

4. Analysis and Discussion

This chapter builds on the methodological structure described in Chapter 3 by applying thematic and comparative analysis to discuss AI-related credit-risk determinants as reported in prior literature. A theoretical and conceptual analysis of AI-based credit-risk factors in Islamic and conventional banking systems is provided in accordance with the study's objectives.

4.1. Introduction

This chapter provides an integrated discussion of how Artificial Intelligence (AI) enhances credit-risk assessment in Islamic and conventional banking systems, building on the literature synthesis in Chapter 2 and the methodology in Chapter 3. The analysis draws on the conceptual framework developed earlier, comparing adoption pathways, operational outcomes, governance requirements, and institutional challenges.

It also provides a theoretical analysis of how Artificial Intelligence (AI) approaches, particularly machine-learning and explainable-AI techniques, as discussed in prior literature, can support the assessment of credit-risk determinants in both Islamic and conventional banks. The theoretical interpretation of existing AI-related analytical frameworks illustrates how credit-risk drivers are understood in contemporary banking research, despite the fact that the current study does not conduct empirical modeling.

4.2. AI-Based Credit Risk Assessment in Conventional Banks

Machine-learning algorithms like Random Forest, XGBoost, LightGBM, and CatBoost are widely used to evaluate loan-loss provisions (LLP) and non-performing loans (NPLs). Studies typically compare these algorithms based on accuracy and error-reduction

capability, highlighting how AI provides deeper insights than traditional statistical approaches.

Non-linear relationships, complex interactions between multiple financial variables, and hidden patterns that significantly influence credit risk are all highlighted by AI methods in the literature.

These advantages make AI a valuable tool in understanding credit-risk behavior in Islamic and conventional banking systems.

Conventional banks have rapidly embraced AI technologies to modernize credit evaluation. Real-time evaluation of borrower behavior, default probability, and financial risk exposure is made possible by automated scoring systems, machine learning algorithms, and neural networks.

Improved predictive accuracy in comparison to manual underwriting and traditional logistic regression models, increased automation that speeds up loan processing and reduces operational

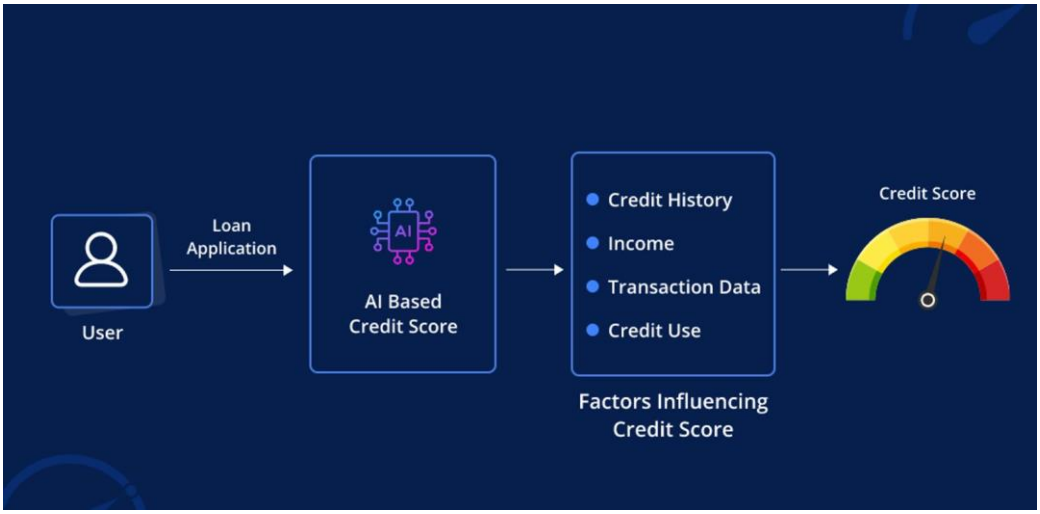
costs, improved fraud detection through advanced pattern-recognition techniques, and broader data utilization made possible by fewer ethical and regulatory constraints are all benefits of AI adoption in conventional banks.

However, several challenges persist:

In spite of these benefits, conventional banks face a number of obstacles when adopting AI, such as algorithmic bias, which may result in discriminatory outcomes, increased cybersecurity risks as a result of data-intensive systems, limited transparency as a result of black-box models, and high costs associated with infrastructure and skilled expertise.

The conventional system therefore benefits from innovation but remains vulnerable to ethical, technical, and regulatory risks.

Figure 2. AI-Based Credit Scoring Workflow in Conventional Banks.



The entire process of AI-driven credit risk assessment in conventional banking is depicted in this figure. When a user submits a loan application, the workflow begins. The application is then processed by an AI-based credit scoring system. The credit history, income level, transaction patterns, and credit utilization all play a significant role in the model's evaluation. The system's final credit score is influenced by all of these factors taken together. The AI engine improves prediction accuracy, speeds up lending decisions, and speeds up manual processing.

4.3. AI-Based Credit Risk Assessment in Islamic Banks:

Because decisions must adhere to Shariah principles like fairness, avoiding interest, risk-sharing, transparency, and ethical conduct, Islamic banks face unique challenges when implementing AI.

Islamic banks have AI opportunities, which include:

Shariah-compliant automation for transparent contracts like Murabaha, Ijara, and Musharaka, improved risk profiling for asset-backed financing, enhanced governance through automated compliance monitoring, and greater operational efficiency that reduces reliance on manual auditing are just a few of the AI-related opportunities available to Islamic banks.

However, Islamic banks must adhere to additional restrictions that slow the pace of AI adoption. These restrictions include the need for explainable AI to meet Shariah board requirements, ethical screening to ensure alignment with Islamic values, mandatory auditability of AI-driven decisions for compliance purposes, and restrictions on data usage due to interest-based indicators.

These constraints make AI adoption slower in Islamic banking compared to conventional banks, despite clear benefits.

4.4. Comparative Discussion

A comparative analysis of Islamic and conventional banking systems indicates that both models can gain substantial advantages from the application of Artificial Intelligence, particularly in enhancing credit-risk evaluation and improving operational performance. However, the regulatory environment, governance frameworks, and ethical considerations governing AI adoption vary considerably between the two systems.

Table 2: Comparative Overview of AI Adoption in Conventional and Islamic Banks

Element	Conventional Banks	Islamic Banks
Regulatory Oversight	Banking regulators and Basel standards	Shariah boards and financial regulators
Data Utilization	Broad and largely unrestricted	Filtered according to Shariah principles
Financing Structure	Interest-based lending	Asset-backed and risk-sharing contracts
AI Transparency	Not strictly mandatory	Essential for Shariah compliance
Speed of Adoption	Relatively fast	Moderate due to governance layers

Overall, Islamic banks are required to integrate additional governance and supervisory layers when deploying AI technologies. Although this results in a slower pace of adoption compared to conventional banks, it enhances ethical alignment, transparency, and accountability within AI-driven decision-making processes.

4.5. Summary of the Discussion

This chapter demonstrates that across banking models, AI can alter credit-risk practices. While Islamic banks must incorporate AI within stricter Shariah-compliant frameworks, conventional banks benefit from faster adoption and greater data flexibility. The conceptual framework provides a clear illustration of these distinctions and emphasizes the necessity of governance structures that guarantee fairness, transparency, and ethical alignment. These theoretical interpretations highlight the multidimensional nature of AI-driven credit risk assessment and its implications for both Islamic and conventional banking models.

5. Conclusion and Recommendations:

5.1. Conclusion:

The use of artificial intelligence (AI) in credit risk assessment by Islamic and conventional banks was the subject of this study. The study showed that AI significantly improves prediction accuracy, operational efficiency, and decision-making processes in the banking sector by comparing the two systems. However, the adoption pathways differ substantially due to the ethical, regulatory, and structural requirements unique to Islamic banking.

Conventional banks benefit from rapid AI deployment because they operate within flexible regulatory environments and utilize broad datasets without religious constraints. Advanced machine-learning algorithms, automated workflows, and a wealth of historical and behavioral data underpin their AI-based credit scoring models. As a result, these institutions are able to process loans with greater efficiency and speed.

In contrast, Islamic banks must ensure full compliance with Shariah principles—such as transparency, fairness, and the prohibition of riba and gharar—before adopting AI systems. This introduces additional layers of governance, including Shariah board approvals, explainability requirements, and restrictions on the types of data used in model training. While these restrictions may hinder adoption, they also present opportunities for the creation of AI systems that are socially responsible, transparent, and ethical.

The study demonstrates that, despite their structural differences, Islamic and conventional banks face distinct implications for AI adoption. These implications include credit portfolio uncertainty, regulatory pressures, and data limitations. Islamic banks operate under Shariah principles that emphasize risk sharing, asset-backed financing, and ethical compliance, while conventional banks

rely on interest-based, risk-transfer mechanisms. These variations influence how each banking system collects data, evaluates borrowers, and interprets risk signals.

By modeling intricate patterns that conventional credit-scoring methods may not be able to capture, AI tools, particularly machine-learning methods, can assist in bridging these structural differences. The literature suggests that AI enhances predictive power, reduces human bias, and enables institutions to identify early warning signals of credit deterioration. The adoption of AI in Islamic banking, on the other hand, necessitates additional considerations, such as explainability, fairness, and adherence to Shariah requirements particularly the requirement of transparent decision-making and the exclusion of contractual elements that are prohibited.

The results of previous studies' comparative evidence regarding the banking system with the highest credit risk are mixed. Some studies find that Islamic banks exhibit greater resilience during economic downturns due to their conservative and asset-backed financing structures, while others suggest that limited diversification and profit-and-loss sharing mechanisms may increase risk exposure under certain conditions. The literature therefore supports the view that risk behavior cannot be generalized solely based on banking type; instead, it is shaped by governance quality, regulatory environments, and institutional design.

Overall, the study concludes that the integration of AI into credit-risk assessment provides meaningful opportunities for both Islamic and conventional banks. For Islamic banks, AI can support Shariah compliance, strengthen credit screening, and improve monitoring of asset-backed transactions. AI improves operational efficiencies and accuracy in credit scoring for conventional banks. Explainable AI frameworks are necessary for both systems to ensure fairness, transparency, and regulatory acceptance. Therefore, AI adoption in both banking models is not only feasible but also extremely advantageous. Yet, successful implementation requires alignment with each system’s ethical values, regulatory frameworks, and risk-management structures.

This study examined how Artificial Intelligence (AI) can enhance credit-risk assessment in both Islamic and conventional banking systems and explored the conceptual differences that shape risk behavior in the two models. By synthesizing findings from the existing literature, the study highlights that AI has the potential to significantly improve the accuracy, transparency, and efficiency of credit-risk evaluation across diverse banking environments.

The findings offer important implications for policy makers, regulators, and financial institutions. Strengthening data-governance frameworks, promoting responsible AI adoption, investing in

explainability tools, and adapting credit-risk models to each banking system's unique characteristics will be critical for advancing financial stability. Future research should further explore AI-based models using real-world banking datasets to validate conceptual insights and provide deeper evidence on the comparative performance of Islamic and conventional banks in AI-driven risk assessment

5.2. Contributions of the Study:

In a number of ways, this study adds to the existing body of knowledge:

1. Comparative Perspective: It provides a structured comparison of AI integration in Islamic and conventional banking systems.
2. The Conceptual Foundation: It develops a clear model illustrating the influence of AI on credit-risk processes within both systems.
3. Practical Knowledge: It identifies the operational, ethical, and regulatory obstacles to the implementation of AI.
4. Foundation for Future Research: It highlights the gaps that future empirical studies can explore, including dataset constraints, explainability tools, and Shariah-compliant AI design.

5.3. Recommendations:

Based on the findings, the following recommendations are proposed for practitioners, policymakers, and researchers:

- Develop AI systems that are explicitly aligned with Shariah principles, incorporating explainability and transparency to ensure ethical and compliant credit-risk assessment.
- Strengthen data governance frameworks by defining clear guidelines on the type and quality of data used in AI-based credit risk models.
- Encourage collaboration between AI developers and Shariah scholars to design models that balance predictive accuracy with religious compliance.
- Improve AI model explainability to enhance customer trust and reduce algorithmic bias, even in conventional banking systems where transparency is not legally mandated.
- Invest in robust cybersecurity measures to protect AI-driven credit risk infrastructures from data breaches and cyber threats.
- Implement ethical AI practices, including fair-lending protocols, to minimize bias in automated credit decision-making.

- Develop unified regulatory guidelines governing AI adoption in both Islamic and conventional banking systems, addressing transparency, fairness, data privacy, and model validation.
- Support innovation sandboxes that allow financial institutions to test AI applications under supervised regulatory environments.
- Encourage international standard-setting bodies to establish global criteria for Shariah-compliant AI governance.

5.4. Suggestions for Future Research:

Future research might investigate:

- An empirical assessment of AI-based credit scoring in actual Islamic banking settings.
- Comparative performance between Shariah-compliant AI models and conventional models.
- Development of explainable AI systems tailored for Islamic finance.
- How AI-driven lending is perceived by customers in various cultural and regulatory settings.

The ethical and technical difficulties associated with the application of AI to global banking systems will be better understood as a result of this research.

5.5. Revisiting the Research Objectives:

This study successfully achieved its primary objectives by examining how AI can be integrated into credit-risk assessment within both Islamic and conventional banks. The structural, ethical, and regulatory differences that influence AI adoption in each system were shown by comparative analysis. The conceptual framework was successful in demonstrating how the two banking models differ in terms of data flows, governance mechanisms, and model outputs. The findings, taken as a whole, demonstrate that AI improves the accuracy of credit evaluations while also highlighting the distinct compliance requirements that have an impact on Islamic banking operations.

5.6. Practical Implications:

The study offers several practical implications for the financial sector. Conventional banks can leverage AI to streamline credit assessment processes and reduce operational costs, while Islamic banks can utilize AI to strengthen Shariah compliance through automated monitoring and transparent decision-making tools. Regulators may adopt the insights of this study to develop AI governance guidelines that protect consumers and promote ethical financial practices. These implications demonstrate that integrating AI responsibly can improve the fairness, efficiency, and reliability of global credit-risk systems.

5.7. Final Remark:

As AI continues reshaping financial services worldwide, integrating these technologies responsibly within Islamic and conventional banking remains essential. Both systems can achieve more accurate, fair, and efficient credit-risk assessments by balancing innovation with ethical and regulatory obligations. This will support sustainable financial growth for diverse communities.

6. Acknowledgment:

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