
THE STUDY ON AI-BASED CREDIT RISK ASSESSMENT AND ITS IMPACT ON COMMERCIAL LENDING DECISIONS

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Crossref DOI - <https://doi.org/10.63665/rh.v7i2.06>

Abstract :

The rapid advancement of Artificial Intelligence (AI) has significantly transformed credit risk assessment practices in commercial lending institutions. Traditional credit evaluation methods, which rely heavily on historical financial data and manual judgment, are increasingly being supplemented or replaced by AI-driven models capable of processing large volumes of structured and unstructured data. This research paper examines the role of AI-based credit risk assessment systems and their impact on commercial lending decisions. Using secondary data from recent academic studies, industry reports, and regulatory publications, the study analyses how AI improves credit decision accuracy, risk prediction, and operational efficiency, while also highlighting challenges related to bias, transparency, and regulatory compliance. The paper proposes a conceptual framework linking AI adoption, credit risk assessment quality, lending decisions, and regulatory oversight, offering insights for banks, financial institutions, and policymakers.

Keywords : Artificial Intelligence, Credit Risk Assessment, Commercial Lending, Banking, Financial Decision Making

Introduction :

Credit risk assessment plays a central role in the stability and profitability of commercial banks and financial institutions. It determines whether a borrower is eligible for credit and under what terms such credit should be extended. Sound credit risk assessment practices are essential for minimizing loan defaults, maintaining asset quality, and ensuring the overall health of the financial system. Inadequate credit evaluation has historically been one of the major causes of banking crises and rising non-performing assets (NPAs).

Traditionally, credit risk assessment has relied on financial ratios, credit history, collateral valuation, and expert judgment. While these methods have been effective to some extent, they are often limited by subjectivity, delayed processing, static evaluation models, and an inability to analyse large volumes of complex and real-time data. Such limitations become more pronounced in commercial lending, where borrowers often have diverse risk profiles and



large exposure amounts.

In recent years, Artificial Intelligence (AI) has emerged as a transformative technology in the banking and financial services sector. AI-based credit risk assessment systems use advanced machine learning algorithms, predictive analytics, and alternative data sources to evaluate borrower creditworthiness with greater speed and accuracy. These systems can process vast datasets, identify hidden patterns, and continuously learn from new information, thereby improving the precision of default predictions. The growing adoption of AI in commercial lending is driven by increased competition among banks, digital transformation initiatives, regulatory pressure for improved risk management, and the need to enhance financial inclusion. At the same time, the use of AI raises important concerns related to transparency, fairness, accountability, ethical use of data, and regulatory compliance. This paper examines AI-based credit risk assessment in commercial lending, its impact on lending decisions, associated challenges and risks, and the regulatory and ethical considerations that influence its adoption.

Objectives of the Study :

- To examine the role of Artificial Intelligence in credit risk assessment.
- To analyse the impact of AI-based credit evaluation on commercial lending decisions.
- To identify the benefits of AI adoption in credit risk management.
- To examine the challenges and risks associated with AI-driven credit assessment.
- To propose a conceptual framework linking AI-based credit risk assessment with lending decisions and regulatory oversight.

Review of Literature :

Bussmann et al. (2020) examined the application of machine learning models in credit risk management and found that AI-based systems significantly outperform traditional statistical credit scoring models in predicting loan defaults. The study highlighted the importance of explainability to ensure regulatory acceptance.

Fuster et al. (2021) analyzed the use of AI and big data in mortgage and commercial lending decisions. Their findings revealed that AI-driven credit models improve risk assessment accuracy but may also introduce algorithmic bias if training data are not adequately monitored.

Berg et al. (2022) explored the role of alternative data in AI-based credit assessment. The study concluded that AI improves financial inclusion by enabling lenders to assess borrowers with limited credit histories, while cautioning about data privacy and ethical concerns.

European Banking Authority (2022) published regulatory guidance on the use of machine learning in credit risk assessment, stressing transparency, accountability, and human oversight in AI-driven lending decisions.

World Bank (2023) highlighted the growing adoption of AI in banking risk management across emerging economies. The report emphasized regulatory challenges, especially in ensuring fairness, explainability, and compliance with existing banking laws.



Basel Committee on Banking Supervision (2024) addressed AI governance in banking

supervision, recommending robust model validation, auditability, and board-level oversight for AI-based credit risk models.

Overall, the literature suggests that while AI-based credit risk assessment enhances lending efficiency and accuracy, unresolved challenges related to bias, transparency, and regulation remain. This study contributes to existing research by integrating these perspectives into a conceptual framework linking AI-based credit assessment with commercial lending decisions and regulatory oversight.

Research Methodology :

The study is based solely on secondary data collected from peer-reviewed journals on banking, finance, and financial technology (2020–2025), reports published by international financial institutions and banking regulators, industry white papers on AI applications in credit risk management, and relevant books and conference proceedings. A qualitative and conceptual analysis approach is adopted to synthesize existing literature, identify key trends, and highlight research gaps related to AI-based credit risk assessment in commercial lending..

AI-Based Credit Risk Assessment in Commercial Lending :

AI-based credit risk assessment refers to the application of artificial intelligence techniques such as machine learning, deep learning, neural networks, and predictive analytics to evaluate the creditworthiness of borrowers. Unlike traditional credit scoring models, AI systems are capable of analysing both structured data (financial statements, credit scores, repayment history) and unstructured data (transaction behaviour, digital footprints, business patterns, and market signals).

In commercial lending, AI-based systems support various stages of the credit lifecycle, including borrower screening, loan approval, credit pricing, portfolio monitoring, and early warning systems. These models assess complex relationships among multiple risk variables and generate probability-based risk scores that assist lenders in making informed decisions.

AI-driven credit assessment also enables dynamic risk evaluation, allowing banks to continuously monitor borrower behaviour and update credit risk profiles in real time. This is particularly useful in commercial lending, where business conditions and cash flows may change rapidly. By reducing manual intervention and subjectivity, AI enhances consistency, improves operational efficiency, and strengthens overall credit governance.

Impact of AI on Commercial Lending Decisions :

1. Improved Credit Decision Accuracy :

AI models enhance prediction accuracy by analysing complex data patterns, reducing human errors and subjectivity in lending decisions.

2. Faster Loan Processing :



Automation of credit assessment significantly reduces loan processing time, improving customer satisfaction and operational efficiency.

3. Enhanced Risk Management :

AI-based early warning systems help identify potential defaults at an early stage, allowing proactive risk mitigation.

4. Financial Inclusion :

By using alternative data, AI enables credit access for borrowers with limited credit history, supporting inclusive lending.

Benefits of AI-Based Credit Risk Assessment :

- Higher accuracy in default prediction
- Reduced non-performing assets (NPAs)
- Improved consistency in lending decisions
- Lower operational costs
- Enhanced portfolio diversification and monitoring

Challenges and Risks :

Despite its advantages, the adoption of AI in credit risk assessment presents several challenges and risks for commercial lenders.

Algorithmic Bias :

AI models may inherit biases present in historical data, leading to unfair or discriminatory lending outcomes against certain groups or sectors. Such bias can undermine trust in AI-driven lending systems and expose banks to reputational and legal risks.

Lack of Transparency and Explain ability :

Many advanced AI models operate as "black boxes," making it difficult for banks to explain credit decisions to regulators, auditors, and customers. Lack of explain ability poses a major challenge to regulatory compliance.

Data Quality and Privacy Risks :

AI systems require large volumes of high-quality data. Poor data quality can lead to inaccurate risk predictions, while extensive data usage increases exposure to data breaches, misuse, and privacy violations.

Model Risk and Operational Risk :

Errors in model design, training, or validation can result in inaccurate credit assessments, increasing default risk and financial losses. Over-reliance on automated systems may also reduce critical human judgment in complex lending cases.



Cyber security Risks :

Increased digitization and AI deployment heighten vulnerability to cyber attacks, which can compromise sensitive financial and customer data.

Regulatory and Ethical Considerations :

The use of AI in credit risk assessment has attracted growing attention from banking regulators and policymakers worldwide. Regulatory authorities emphasize that AI-based lending systems must comply with existing banking regulations while also adhering to emerging principles of responsible AI. One of the primary regulatory concerns is the explainability of AI-driven credit decisions. Regulators require banks to provide clear and justifiable reasons for loan approvals or rejections. Ethical considerations include preventing discrimination, ensuring data privacy, maintaining transparency, and preserving human oversight over automated decision-making. Global regulatory bodies such as the Basel Committee and regional regulators have highlighted the need for robust AI governance frameworks, including model validation, auditability, documentation, and accountability mechanisms. Ethical AI adoption in lending requires aligning technological innovation with fairness, consumer protection, and regulatory compliance.

Conceptual Framework :

AI-based credit risk assessment, which utilizes machine learning techniques, big data, and advanced analytics, plays a crucial role in enhancing the quality of credit risk evaluation in commercial lending. These technologies improve the accuracy, speed, and objectivity of assessing borrower creditworthiness. Improved credit risk evaluation quality directly influences commercial lending decisions by enabling more informed loan approvals, appropriate credit limits, and risk-based pricing. Effective lending decisions, in turn, lead to better lending performance, reflected in lower default risk and a reduction in non-performing assets (NPAs). Throughout this process, regulatory and ethical oversight remains essential to ensure transparency, fairness, and compliance with banking regulations, thereby promoting responsible and sustainable use of AI in commercial lending.



Findings and Discussion :

The analysis of secondary data indicates that AI-based credit risk assessment significantly enhances the quality and effectiveness of commercial lending decisions. Financial institutions adopting AI models benefit from improved prediction accuracy, faster loan processing, and more consistent decision-making. The findings suggest that AI enables proactive risk management through early warning systems and continuous monitoring of borrower behavior. This contributes to reduced default rates and improved portfolio performance. Additionally, the use of alternative data supports greater financial inclusion by extending credit access to borrowers with limited traditional credit histories. However, the discussion also reveals that challenges related to algorithmic bias, lack of transparency, and regulatory uncertainty remain significant barriers to widespread adoption. The effectiveness of AI-based credit assessment depends not only on technological capability but also on data quality, governance structures, ethical safeguards, and regulatory alignment. A balanced approach that integrates AI with human oversight is essential for sustainable and responsible lending practices.

Conclusion :

Artificial Intelligence has emerged as a powerful tool in credit risk assessment, transforming commercial lending practices across the banking sector. AI-based systems enhance accuracy, efficiency, and consistency in lending decisions, contributing to improved risk management and financial performance. However, the adoption of AI also introduces ethical, operational, and regulatory challenges that cannot be overlooked. Issues related to bias, transparency, data privacy, and accountability highlight the need for strong governance frameworks and regulatory oversight. The study concludes that while AI-based credit risk assessment offers substantial benefits, its long-term success depends on responsible implementation, continuous monitoring, and alignment with ethical and regulatory standards.

Future Scope of the Study :

Future research may empirically test the proposed conceptual framework using primary data from banks and financial institutions. Comparative studies across countries or regions can provide deeper insights into regulatory effectiveness and best practices. Further research may also explore the integration of explainable AI (XAI) models, the role of human–AI collaboration in lending decisions, and the long-term impact of AI-driven credit assessment on financial stability and inclusion.

References (Indicative) :

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