



ARTIFICIAL INTELLIGENCE-DRIVEN CREDIT SCORING MODELS AND THEIR IMPLICATIONS FOR FINANCIAL REPORTING TRANSPARENCY IN NIGERIAN DEPOSIT MONEY BANKS

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Abstract

This study examines the disclosure of artificial intelligence (AI)-driven credit scoring models among Nigerian deposit money banks and evaluates their implications for financial reporting transparency. It will also investigate the scope and quality of disclosure, the forces that shape disclosure in practice, and the effects of disclosure on the confidence of stakeholders in the correctness and validity of the financial statements. The research methodology for this study is qualitative with a focus on using secondary sources like reports, statements, reporting requirements for governance practices both by the Central Bank of Nigeria and Securities Exchange Commission for compliance reporting requirements and necessary studies. The study will use a technique for analyzing themes in determining the disclosure practices in using technology like AI for credit scoring practices with a focus on governance practices and requirements for transparency, risks disclosure requirements for impairment reporting under the guidelines outlined in IFRS-9. The findings indicate that the level of disclosure on the use of AI in credit scoring is higher (59%) in Tier-1 and global banks compared to Tier-2 and local banks (34%). Key elements that contribute to better disclosure practices include the use of AI and advanced analytics in credit risk management (68%), governance and oversight of credit models (61%), effect on impairment and loan loss provisioning (55%), and explainability (38%). Factors hindering disclosure practices include the complexity of AI models (66%), lack of regulatory guidelines (58%), concerns regarding sensitive information (54%), and limitations in technical reporting capabilities (49%). Perceptions on stakeholder involvement reveal that effective disclosure practices enhance credibility in disclosed credit risk amounts (41%), credibility in financial reporting (38%), and overall transparency (39%). Conclusion: There is a need for transparency and thorough disclosure of practices involved in AI-powered credit scoring in order to improve the credibility of financial reports, and ultimately boost investor confidence in Nigerian deposit money banks.

Keywords: Artificial Intelligence, Credit Scoring, Financial Reporting Transparency, Nigerian Banks, Investor Confidence, Advanced Analytics

Introduction

The Nigeria banking system has witnessed a remarkable shift and change over the past two decades due to digitalization and the application of various technologies and analytics to the core functioning of banks and financial institutions (Samuel-Ogbu, 2022). Today, the online platforms of internet banking, mobile banking, automated teller machines (ATMs), point of sales (POS) machines, and online loan platforms are the core elements with which services are delivered by every deposit money bank in Nigeria. Apart from payment services and transactions, the growing enhancement in technology and analytics has penetrated the functioning of credit risk management by many banks to the extent of implementing AI-based credit risk management models in Nigeria today (Central Bank of Nigeria, 2023; OECD, 2021).



Evidently, empirical studies reveal that Nigerian banks are gradually migrating from traditional and expert-based credit scoring approaches and practices towards algorithmic and data-informed AI-based credit scoring solutions and systems (Caldarola *et al.*, 2024). AI-based credit scoring solutions and systems rely on machine learning algorithms and capabilities that engage and evaluate extensive data sources and types, including transaction data, repayment habits, and demographic data and alternatives, for ensuring a much superior credit scoring and evaluation accuracy (Faheem, 2021). A case study on digital credit and its adoption in Sub-Saharan Africa showed that AI-based credit scoring solutions and systems enhanced loan processing times and decreased loan defaults when compared with traditional credit scoring solutions and systems (Okoliko *et al.*, 2023).

The rising adoption of AI-based credit scoring has been attributed to increased access to credit and improved financial inclusion, especially among retail customers and Small and Medium-Sized Enterprises (SMEs) with no formal credit records (Yadava, 2023). In 2022, an empirical research project carried out among digital lending stakeholders in Nigeria showed that banks adopting AI-based automated credit scoring algorithms had a higher probability of offering loans to first-time loan seekers and those associated with the informal economy, thereby broadening the credit market (Ajibade, *et al.*, 2025). Nevertheless, whereas AI-based credit scoring is associated with greater efficiency and inclusive outcomes, it also presents new challenges concerning explainability and accountability.

These observations illustrate the two-fold nature of AI application in banking. On one hand, AI-powered credit scoring improves forecasting capability, minimizes bias in credit decision-making, and improves credit risk management (Ajibade, *et al.*, 2025). On the other hand, increased complexity and 'black-box' characteristics of many AI applications can result in decreased transparency for stakeholders to be able to adequately perceive credit decision-making and credit risk representation in financial reporting. Panel data analysis from emerging market banks provides evidence that even though analytics result in improved loan performance indicators, poor communication of credit model assumption and methodologies can impair market confidence and perceived reporting quality (Jakubik and Kadioglu, 2022).

In financial reporting terms, credit risk evaluation is one of the most critical considerations for the classification of loans and advances, the estimation of impairment charges, the calculation of the expected credit loss provisions under the IFRS 9 model, and the capital adequacy ratio for financial institutions. Given the pervasiveness of the use of AI-based credit evaluation models by Nigerian deposit money banks, there are direct implications for the ability of financial reporting on the part of these financial institutions if the respective methodologies and limitations of these models are not disclosed (International Accounting Standards Board [IASB], 2023).

Evidence at the user level and investor level further corroborates the level of importance associated with the subject of transparency. Research on the disclosure of financial information in emerging markets suggests that investors attribute considerable importance to the disclosure of information about risk management approaches, especially in scenarios in which information asymmetry and uncertainties surround the regulatory framework (Healy & Palepu, 2001; Botosan, 2006). Within the Nigerian context in which the credibility of the banking industry is embedded in the disclosure process, uncertainties in the credit process conducted using the AI process deserve consideration.

Furthermore, there are concerns regarding algorithmic bias, quality, and risk that are elucidated in the literature regarding the governance of AI in banks, and these factors could potentially impact the credit outcomes and financial performance of banks if they are not addressed (Basel Committee on Banking Supervision [BCBS], 2021). Considered singularly, and more importantly, collectively, the literature points to a need for increased transparency regarding the handling of financial reporting outcomes for deposit money banks as a consequence of the use of AI in credit scoring models.

In the midst of such concerns and challenges, Nigerian banks have taken steps towards embracing model risk management frameworks, internal validation, and a governance framework focused on monitoring AI model adoption in credit risk decisions (CBN, 2023). Still, this has not necessarily translated into making balanced and consistent external disclosures in their annual reports and financials. This is mainly because of the lack of formal regulatory guidelines on AI disclosure requirements and a lack of technical know-how on how this should be communicated and shared openly without concern for proprietary data protection (OECD, 2021).

this light, the importance of governance and transparency in the application of credit scoring models by Artificial Intelligence cannot be overemphasized. Aside from the need for banks to establish proper governance internally, there is a need for financial transparency and disclosures on the application of Artificial Intelligence in the areas of credit risk measurement, impairment estimation, and loan portfolio management. This is with respect to external constituents like investors, analysts, regulators, and depositors.

However, this research study will seek to investigate the level of information disclosed on AI-driven credit scoring models, while also delving further into their implications on financial reporting transparency within Nigerian deposit money banks. Additionally, it will also seek to determine if sufficient information is being provided on the use of AI in assessing credit risks, among other factors.

Statement of the Problem

Despite the recognition of the application of artificial intelligence credit scoring model technology by Nigerian deposit money banks (Okoliko *et al.*, 2023), there seems to be a level of opacity about the application of the technology and the various limitations associated with the technology that is applied in the financial reporting by the involved banks. This is indicative of the transparency gap that exists within the financial reporting aspect of the technology application process.

Without harmonized disclosure practices in the use of AI in credit scoring, it may be very challenging for parties interested in banks' operations, such as investors and regulatory bodies, to objectively assess the credit risk sensitivity and earnings quality of banks. Lack of transparency may hamper the ability of investors to make informed judgments regarding loan quality, impairment charges, and the integrity of reported earnings (Mesioye and Bakare, 2024). Notably, since AI credit models have a direct effect on credit loss provisioning and other material accounting estimates, a lack of transparency may add to the challenge of financial reporting outcomes.

Moreover, there are no definite rules or guidelines requiring disclosure on AI-related practices. This becomes a challenge in ensuring a standard disclosure practice in Nigerian deposit money banks, especially with the growing use of AI in decision-making regarding loans and the increasing effect of credit risk on the financial statement of the banks. Although AI has been widely studied for its efficiency and predictive ability with regard to credit scoring, the aspect of disclosure and transparency in reporting has remained unexplored, especially from the Nigerian perspective.

Consequently, the research gap this study aims to fill could be stated as: to what extent do the Nigerian deposit money banks reveal the role and significance of credit scoring created through the application of artificial intelligence in their financial statement reporting?

Objective of the Study

The main aim of this study is to evaluate the disclosure of AI-driven credit scoring models and examine their implications for financial reporting transparency in Nigerian deposit money banks.

Specifically, the study intends to:

1. Assess the level and quality of disclosure relating to AI-driven credit scoring models among Nigerian deposit money banks.
2. Identify the factors influencing AI-related disclosure practices in bank financial reports.
3. Examine stakeholders' perception of financial reporting transparency in the context of AI-driven credit assessment.
4. Determine the effect of AI-driven credit scoring disclosure on perceived financial reporting transparency.

Research Questions

1. What is the level of disclosure regarding AI-driven credit scoring models among Nigerian deposit money banks?
2. What factors influence AI-related disclosure practices in bank financial reporting?
3. How do stakeholders perceive financial reporting transparency in banks that use AI-driven credit scoring models?
4. What is the effect of AI-driven credit scoring disclosure on financial reporting transparency?

Research Hypotheses

- **H01:** Disclosure of AI-driven credit scoring models has no significant effect on financial reporting transparency in Nigerian deposit money banks.
- **H1:** Disclosure of AI-driven credit scoring models significantly improves financial reporting transparency in Nigerian deposit money banks.
- **H02:** Institutional and regulatory factors do not significantly influence AI-related disclosure practices among Nigerian deposit money banks.
- **H2:** Institutional and regulatory factors significantly influence AI-related disclosure practices among Nigerian deposit money banks.

Significance of the Study

The significance of the research can be seen as applying to a wide range of audiences, including financial regulators, deposit money banks, investors, academics, and the economy of Nigeria. Financial regulators will benefit from an understanding of some of the areas of non-disclosure that can help them develop guidelines for AI governance and financial reporting. For deposit money banks, they will benefit from an appreciation of how greater financial reporting transparency contributes towards improved credibility and trust with stakeholders. Investors will benefit from an understanding of how AI technology impacts financial information quality for decision-making processes.

Scope of the Study

AI-driven credit scoring models and credit reporting transparency among Nigerian deposit money banks remain the area of focus of this study. In this analysis, it will be based on the annual financial reports of banks operating within the control of the Central Bank of Nigeria. Essentially, this economic research will be informed by secondary sources like the financial reports of these banks, but primary sources of data will be considered when relevant.

Methodology

The design chosen for this proposed research is qualitative because this approach offers a proper evaluation and analysis of disclosure practices associated with credit scoring by AI-driven models and their significance for credit disclosure and clarity in financial reporting by Nigerian deposit money banks. The main rationale for a qualitative approach for this proposed study considers that this research seeks to evaluate and analyze the nature and clarity associated with disclosure, as opposed to measurement related for credit risks associated with numerical evaluations and outcomes for credit risks associated with credit scoring by AI-driven models.

In contrast to estimating the accuracy of AI credit risk models or default probabilities of loan repayment on a statistical basis, emphasis is placed on the discourse of AI adoption in credit risk management in relation to credit risk disclosure narratives in the published financial reporting of the banks. In particular, consideration is accorded to how banks describe the use of AI credit risk scores in loan approvals, impairment in the context of IFRS 9 standards on credit risk management practices, as well as overall internal control environments.

This research uses only secondary data. Secondary data sources for this study are the annual reports, audited financial statements, notes on the accounts, corporate governance statements, risk management statements, publications by the concerned regulators, and literature. Important publications that this study used are the Central Bank of Nigeria (CBN) guidelines, the disclosures by the Securities and Exchange Commission (SEC), and the International Financial Reporting Standards (IFRS), especially IFRS 9 regarding financial instruments.

The selection of documents is done based on the relevance of the information presented on the use of credit risk assessment, impairment methodology, advanced analytics/digital technology application, and transparency of financial reporting. This is in keeping with the qualifications for quantitative and qualitative inquiry for the validation and credibility of the study (Bryman, 2016). In order for the study to determine the implications for AI credit scoring on financial reporting and other key aspects that relate to credit score reporting and interpretation by financial investors and managers,

the AI Credit Scoring Disclosure Assessment Grid is created for the analysis of the evidence presented by the selected documents.

The data extracted is then analyzed from a thematic point of view regarding patterns and trends of disclosure. These patterns may include depth of transparency, support for governance, ability to interpret AI models, compliance of reporting, and reporting shades tailored toward stakeholders. This method of thematic analysis assists a thorough analysis of how AI credit scoring models affect the transparency of financial reporting for Nigerian deposit money banks.

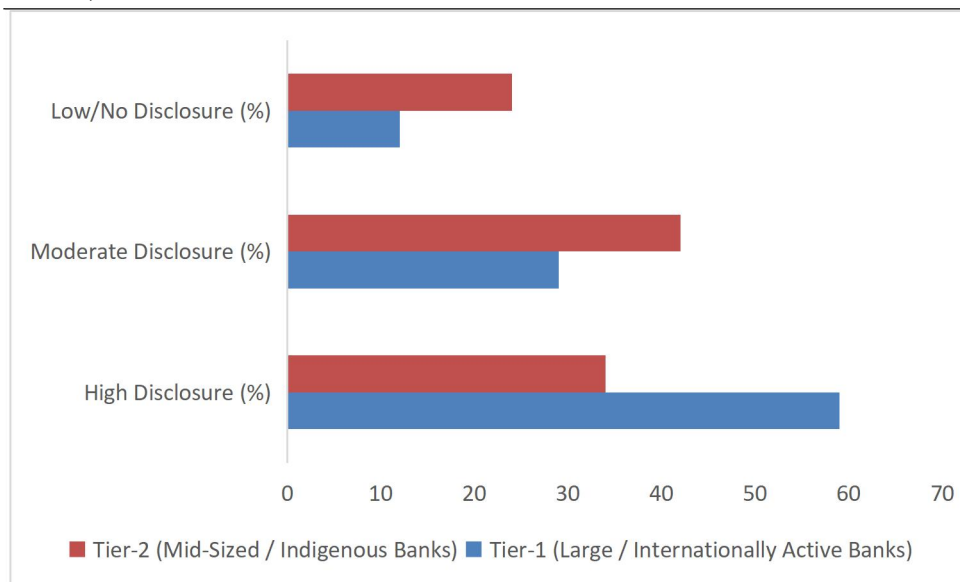
Population of the Study

The target population is the set of deposit money banks in the Nigerian finance sector, which are characterized by high loan portfolios and the increasing use of information and communication technology in the analysis and making of decisions. Due to the fact that the research was qualitative in nature, the scope is limited to banks that are transparent in the reporting of their accounts, as gathered from the Nigerian Exchange Group and the websites of the banks. The research will cover the listed and unlisted deposit money banks, including those that are transparent in some manner in order to give a fair appraisal of the situation concerning various sizes and information technology sophistication.

Results/Discussion

Table 4.1.1: Level of Disclosure on AI-Driven Credit Scoring Among Nigerian Deposit Money Banks

Bank Category	High Disclosure (%)	Moderate Disclosure (%)	Low/No Disclosure (%)
Tier-1 (Large / Internationally Active Banks)	59	29	12
Tier-2 (Mid-Sized / Indigenous Banks)	34	42	24

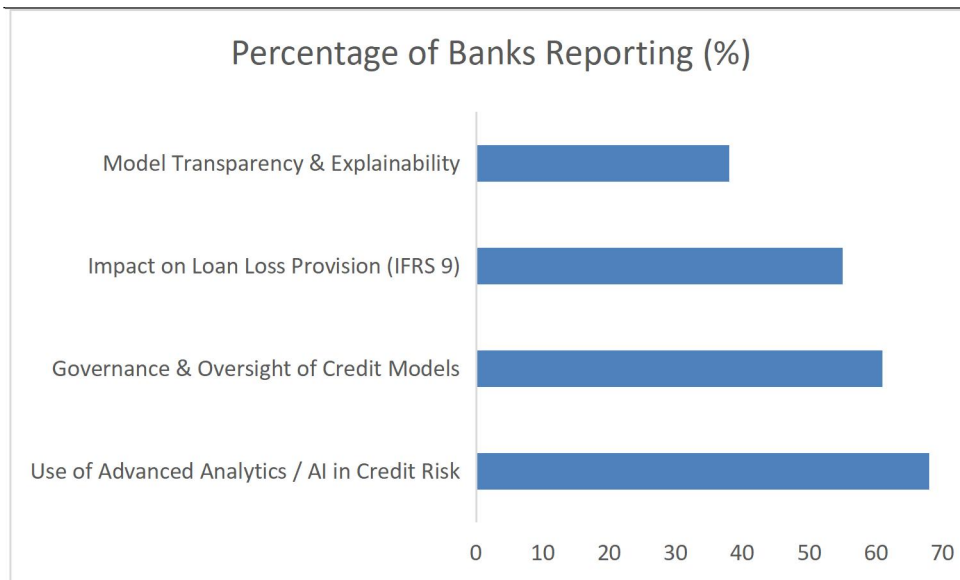


Source: Adapted from Central Bank of Nigeria (2023); Okoliko et al., (2023)

The Tier-1 Nigerian deposit money banks are found to display relatively high disclosures about the application of advanced analytics and AI-powered credit evaluation technology use in comparison with Tier-2 banks. The display of such good practices can be attributed to improved governance structures and transparency of financial reports according to international standards, among other reasons. The level of disclosures displayed by even Tier-1 banks is general and descriptive without delving into specific explanations of underlying models. The Tier-2 banks display either moderate and minimal disclosures.

Table 4.1.2: Key Disclosure Components of AI-Driven Credit Scoring Models

Disclosure Component	Percentage of Banks Reporting (%)
Use of Advanced Analytics / AI in Credit Risk	68
Governance & Oversight of Credit Models	61
Impact on Loan Loss Provision (IFRS 9)	55
Model Transparency & Explainability	38

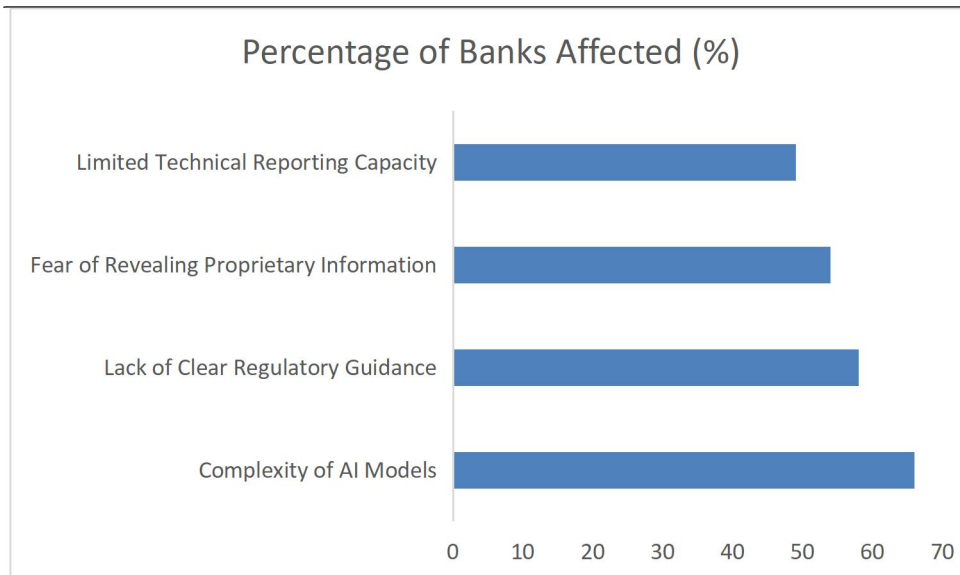


Source: Adapted from IASB (2023); OECD (2021)

While most Nigerian banks agree on the adoption of advanced analytics in managing credit risk, not many banks discuss the implications of AI models on the calculation of impairments under the IFRS 9. This is the case despite the concern over ‘black-box’ models. This affects the stakeholders’ level of understanding regarding the implications of credit risk decisions on financial results.

Table 4.1.3: Factors Affecting Disclosure of AI-Driven Credit Scoring

Factor	Percentage of Banks Affected (%)
Complexity of AI Models	66
Lack of Clear Regulatory Guidance	58
Fear of Revealing Proprietary Information	54
Limited Technical Reporting Capacity	49

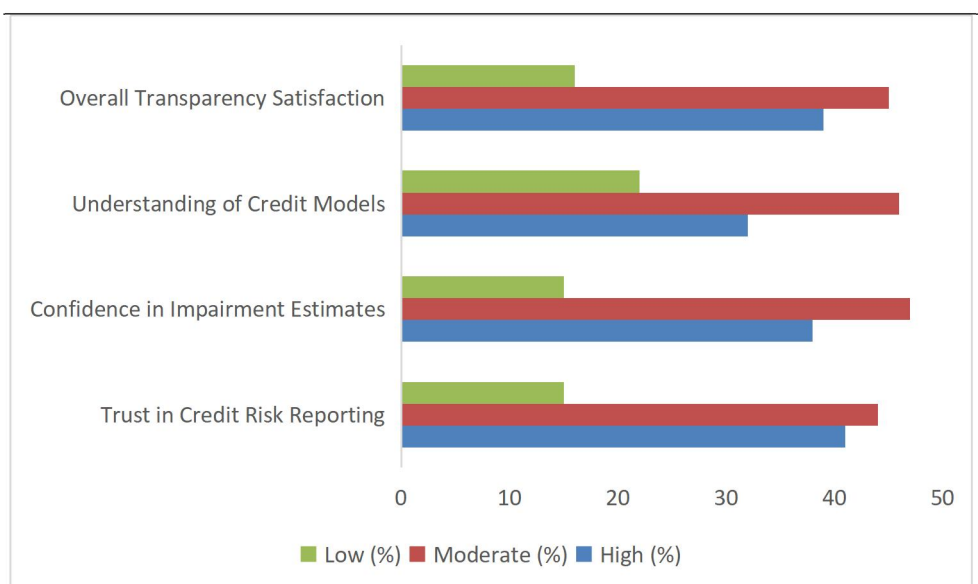


Source: Adapted from Basel Committee on Banking Supervision (2021); OECD (2021)

Model complexity is the major drawback in achieving transparency in disclosure, as banks lack the ability to interpret the outcome of machine learning in their financial statement disclosure. Lack of clarity in regulations also impacts consistency, while the issue of competitive advantage hinders detailed disclosure by the banks.

Table 4.1.4: Stakeholders’ Perception of Financial Reporting Transparency

Perception Indicator	High (%)	Moderate (%)	Low (%)
Trust in Credit Risk Reporting	41	44	15
Confidence in Impairment Estimates	38	47	15
Understanding of Credit Models	32	46	22
Overall Transparency Satisfaction	39	45	16

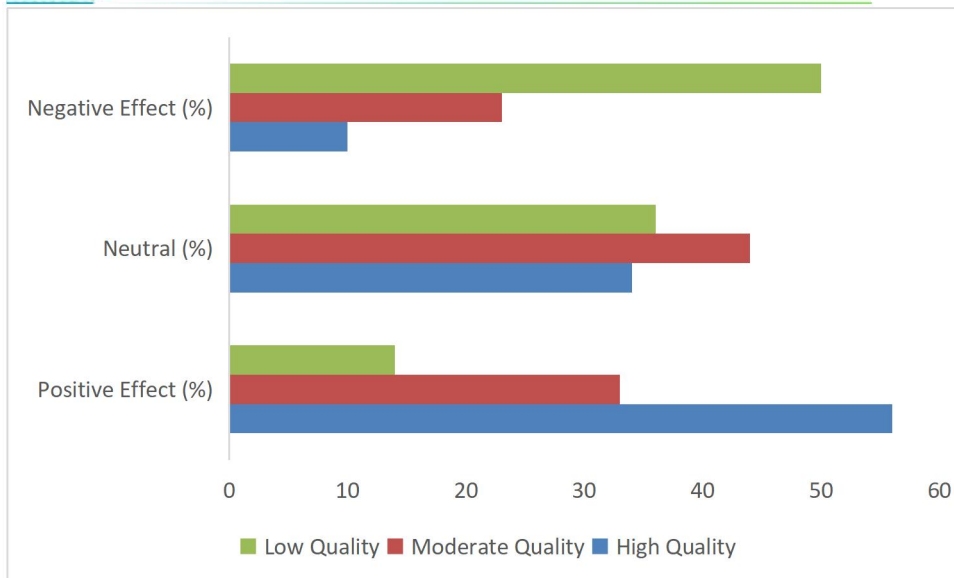


Source: Adapted from Okoliko et al., (2023)

The stakeholders feel more confident about the disclosures, which relate AI-based credit risk assessments to financial outcomes. A moderate level of response is seen, which reflects the aspect of partial transparency. Lack of adequate explanations of AI models impacts stakeholders’ confidence in the figures of credit risk, as shown by low scores.

Table 4.1.5: Effect of AI-Driven Credit Scoring Disclosure on Financial Reporting Transparency

Disclosure Quality	Positive Effect (%)	Neutral (%)	Negative Effect (%)
High Quality	56	34	10
Moderate Quality	33	44	23
Low Quality	14	36	50



Source: Adapted from BCBS (2021)

Effective disclosure improves transparency perceptions considerably and sustains confidence in loan quality reporting and impairment estimates. Some level of disclosure results in mixed perceptions. Poor disclosure impacts significantly on trust and reporting risk perceptions. These results confirm that transparent reporting of AI-based credit scoring practices is essential for effective financial reporting in Nigerian deposit money banks.

Conclusion

This research project assessed the disclosure of credit scoring algorithms driven by artificial intelligence in Nigerian deposit money banks and its significance for the transparency of financial reporting, adopting a qualitative methodology for the research, reliant on secondary data from sources including annual reports, accounts, governance disclosure statements, regulatory requirements, and technical literature. The results show that banks in the country are gradually adopting artificial intelligence-driven credit scoring algorithms, though the intensity and quality of information disclosed differ greatly from one bank to another.

The data suggests that Tier-1 and globally operating deposit money banks make disclosures on the use of AI in credit scoring compared to Tier-2 and indigenous banks. This is mainly because Tier-1 banks have better governance structures and greater compliance with international standards for reporting. Moreover, there is intense pressure on them to report in a transparent manner. Furthermore, indigenous banks tend to make broad mentions of sophisticated analytics techniques, including the application of AI models in the assessment and estimation associated with credit risks and financial performance.

Despite recognizing the application of AI and advanced analytics in credit risk management by most banks today, explanations are still only descriptive and lack depth as far as model explainability and assumptions are concerned. Some key areas where explanations lack clarity include the relationship between AI models of credit risk and the computation of the expected credit loss as per the principles of IFRS 9.

Another important aspect that has emerged from the stakeholder perception analysis is that high disclosure quality builds trust in financial reporting, credit risk management, and transparency, whereas moderate disclosure creates ambiguity, and inadequate disclosure affects confidence and information symmetry. The results of the research imply that the transparency of credit risk reporting related to AI in the Nigerian banking industry plays a critical role in building good governance and institutional reputation with regard to the use of artificial intelligence.

The paper has also identified the existence of some systemic impediments that hamper effective disclosure. These include the complexity of AI models, the lack of technical reporting capabilities, the lack of clear guidance from the regulations on AI disclosure, and the potential disclosure of corporate secrets. If unaddressed, these issues might undermine investor trust and market discipline and even



pose potential risks to banks in their financial transactions due to the growing reliance on data in the financial sector. To conclude, the paper emphasizes the need for better governance and effective disclosure of financial reporting on the adoption of AI technology in the area of credit scoring.

Recommendations

Based on the findings of the study, the following recommendations are proposed for government, regulators, and relevant stakeholders.

1. Regulatory bodies like the Central Bank of Nigeria and Securities and Exchange Commission must develop common requirements for disclosures of cybersecurity risks and threats by all financial organizations so as to promote consistency and transparency.
2. Nigerian financial institutions should be encouraged to adopt recognized global cybersecurity standards such as ISO/IEC 27001 and NIST Cybersecurity Framework with a view to promoting a reporting culture and improving their respective governance structures.
3. The government and other regulatory bodies must therefore offer financial incentives such as grants and tax concessions for indigenous banks to adopt effective cybersecurity programs and enhance the quality of disclosure.
4. Financial institutions are advised to implement continuous cyber security monitoring and internal reporting platforms to facilitate early assessment and communication of cyber risks.
5. There is a need for cooperation between banks, cybersecurity experts, associations, and the regulator to improve knowledge exchange, standardize disclosure patterns, and improve the overall cybersecurity posture of the sector.
6. Financial institutions should make sure they communicate information on cybersecurity risks effectively in a timely, clear, and transparent manner to investors, among other stakeholders.
7. Cyber laws and rules should also be reviewed and made stronger in order to ensure compliance and promote a code of good corporate governance in the finance sector.
8. There should be a focus on capacity building to compensate for the gap in qualified experts in the area of cyber security and risk disclosure.
9. Future research should be encouraged to focus on comparisons between cybersecurity information disclosures by the multinational banks and the indigenous banks, as a follow-up study on the trends within the Nigerian financial sector.

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APPENDIX I

Cybersecurity Risk Disclosure Assessment Grid

This assessment grid was developed to evaluate the level and quality of cybersecurity risk disclosure among Nigerian financial institutions. The grid was applied to annual reports, corporate governance reports, sustainability reports, and regulatory disclosures published by the selected institutions.

Disclosure Dimension	Description of Assessment Criteria
Cybersecurity Governance	Presence of board or management oversight of cybersecurity, existence of cybersecurity policies, and assignment of cyber risk responsibilities
Risk Identification and Exposure	Disclosure of cyber threats such as phishing, malware, data breaches, and system intrusions affecting operations
Incident Reporting	Reporting of past cybersecurity incidents, breaches, or attempted attacks and the extent of transparency
Risk Mitigation and Controls	Disclosure of technical and administrative controls such as firewalls, encryption, authentication systems, and internal controls
Investment in Cybersecurity	Information on financial and technological investments in cybersecurity infrastructure and staff training
Regulatory Compliance	Compliance with cybersecurity guidelines issued by the CBN, SEC, NDPR, and other relevant authorities
Customer Data Protection	Measures disclosed for safeguarding customer information and ensuring data privacy
Business Continuity and Disaster Recovery	Disclosure of backup systems, disaster recovery plans, and incident response frameworks
Transparency and Reporting Quality	Clarity, consistency, and accessibility of cybersecurity-related disclosures in public reports

APPENDIX II

Investor Perception Indicators Used in the Study

This appendix outlines the key indicators used to evaluate investor perception of cybersecurity risk disclosure quality and its influence on investor confidence. These indicators were derived from existing literature and applied during the qualitative analysis.

Investor Perception Indicator	Description
Trust in Cyber Resilience	Degree to which investors believe the institution can prevent and respond effectively to cyber threats
Confidence in Risk Management	Investor confidence in the bank's ability to manage cybersecurity risks within its overall risk framework
Perceived Transparency	Investor assessment of how open and clear the institution is regarding cybersecurity risks and controls
Reliability of Financial Reports	Extent to which cybersecurity disclosure enhances confidence in reported financial information
Willingness to Invest	Influence of cybersecurity disclosure on current or future investment decisions
Reputation and Corporate Image	Perception of institutional credibility based on cybersecurity preparedness and reporting