Influence of environmental accounting information on creditor decision-making in Nigeria

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Abstract
This study examines the main factors that influence environmental accounting Information in Nigeria using Exploratory Factor Analysis (EFA). Given the increasing importance of environmental sustainability in corporate reporting, understanding the factors that drive environmental disclosures in Nigeria is crucial. The research analysed data from a sample of Nigerian companies across different industries using EFA to identify the key factors that shape their environmental accounting practices. Structured questionnaire was distributed to respondents with the view to compare their perception and experience on prevailing factors. The findings revealed several significant indicators, which are grouped across four factors namely; Environmental Expenditure Reporting, Carbon Emission Disclosure and Environmental Liability Recognition and Creditors Decision Making. Also, companies may need to focus more on immediate, tangible aspects of environmental accounting rather than broader, long-term sustainability initiatives to satisfy current market and regulatory demands. And recommended that, companies' needs to understand the specific environmental factors that influence creditor decision-making, such as Carbon Emission Disclosure and Environmental Liability Recognition, can aid in tailoring reports to meet stakeholder expectations, particularly those of financial institutions.

Keywords: Corporate reporting, Environmental accounting, Exploratory Factor Analysis, Sustainability

1. Introduction

In recent years, the growing prominence of sustainability has reshaped the background of corporate reporting, spreading beyond traditional financial metrics to comprise environmental accounting information (Jebe, 2019). As companies progressively disclose their environmental performance, this information is becoming a critical component of financial analysis and decision-making (Brooks, & Oikonomou, 2018). Environmental accounting, which comprises the identification, measurement, and reporting of environmental costs and liabilities, provides stakeholders with an understanding of a company's environmental impact and sustainability practices (Maama, & Appiah, 2019). For creditors, who are responsible for assessing the solvency of firms, the enclosure of environmental factors in financial reports presents both challenges and opportunities (Falavigna, & Ippoliti, 2022).

The influence of environmental accounting information on creditor decision-making is particularly pertinent in today's financial markets, where the risks related to environmental liabilities, such as regulatory penalties, cleanup costs, and reputational damage, are becoming more apparent (Al-Shaabaney, 2022). Creditors, who traditionally depend on financial metrics like profitability, cash flow, and asset valuation, now face the task of integrating environmental considerations into their risk assessments (Campiglio, et al., 2019). This shift is determined by the understanding that environmental performance can have substantial consequences for a company's long-term financial health and, consequently, its ability to meet debt obligations (Chiesa, 2019).

The increasing emphasis on sustainability and corporate responsibility has led to a growing demand for transparency in environmental accounting information (Sari, & Muslim, 2024). Creditors, as key stakeholders in corporate financing, are becoming more concerned with how companies manage their environmental risks, which can significantly impact a firm's financial stability and creditworthiness (Zhang, et al., 2021). The motivation for this study stems from the need to understand how environmental accounting information such as environmental expenditures, carbon emissions disclosures, and environmental liability recognition influences creditors' decision-making processes. As companies face increased scrutiny from regulators, investors, and the public, the integration of environmental factors into financial evaluations is becoming essential for long-term risk management and investment strategies.

While numerous studies such as Kimmel, et al. (2020) have explored the role of financial information in creditor decision-making. There is a significant gap in understanding the specific impact of environmental accounting information on lending decisions. Although the importance of environmental disclosure is growing in areas like equity markets and corporate governance, its influence on creditors who are traditionally more focused on financial ratios and balance sheet strength remains under-researched (Lee, & Zakota, 2022). This study seeks to address this gap by empirically examining the relationship between environmental accounting information and creditor decision-making, thereby contributing to the literature on sustainable finance and providing insights into how environmental performance metrics can shape the terms of corporate lending.

2. Literature review

2.1 Conceptual review

Integrating environmental accounting into corporate reporting reveals a broader shift toward sustainability in the business setting (Schaltegger, & Burritt, 2017). Environmental accounting comprises the systematic tracking and disclosure of environmental expenditure reporting, carbon emission disclosure, and environmental liability recognition (Islam, 2023). This discipline provides a more complete view of a company's performance, covering beyond traditional financial metrics to include environmental impacts and responsibilities (Alshehhi, et al., 2018). The importance of environmental accounting has grown alongside increasing regulatory demands and stakeholder anticipations for transparency in environmental performance, placing it as a critical component in the financial analysis conducted by various stakeholders, including creditors (Nicholls, 2020).

Creditor decision-making traditionally revolves around assessing a company's capacity to repay loans and manage debt, primarily through the analysis of financial indicators like cash flow, asset quality, and profitability (Boateng, & Dean, 2020). However, the rise of environmental, social, and governance (ESG) considerations has introduced new dimensions which are credit risk assessment, loan terms, and overall financial evaluations (Landi, et al., 2022). These factors can significantly influence its long-term financial health and risk profile. Creditors are now identifying that poor environmental performance can lead to financial risks, including regulatory fines, legal liabilities, and reputational damage, which may affect a company's solvency (Ebegbodi, 2024).

2.2 Empirical review

2.2.1 Environmental Accounting Information

In recent years, empirical research has increasingly highlighted the importance of environmental accounting information as a significant factor influencing various aspects of corporate decision-making, financial performance, and stakeholder behavior (Giannarakis, et al., (2020). Companies that consistently measure, report, and disclose environmental accounting information, including environmental expenditures, carbon emissions, and environmental liabilities, tend to experience positive outcomes in areas such as attracting investments, improving creditworthiness, and complying with regulations (Gao, et al., 2024). Firms that provide detailed environmental accounting information are often seen as more transparent and responsible, which can increase investor confidence and lead to a lower cost of capital. Additionally, Ding, et al., (2022) suggest that creditors take environmental accounting information into account when assessing credit risk, and companies with strong environmental management practices often receive more favorable loan terms. Furthermore, regulators and policymakers are increasingly relying on this information to enforce environmental standards and encourage corporate sustainability. Also, environmental accounting information has been shown to have a significant impact on a company's financial health, stakeholder relations, and long-term sustainability (Nicholls, 2020).

2.2.2 Environmental Expenditure Reporting

Environmental expenditure reporting is crucial for measuring environmental accounting information as it provides concrete data on a company's financial commitment to environmental management and sustainability (Susanto, 2019). Companies that provide detailed and transparent environmental expenditure reporting are generally seen as environmentally responsible by stakeholders (Camilleri, 2015). This reporting includes costs related to pollution control, waste management, energy efficiency, and compliance with environmental regulations (Mazzi, et al., 2020). Such detailed disclosures not only reflect a company's proactive approach to environmental management, but also enhance its credibility and reputation among investors, customers, and regulators. Companies excelling in environmental expenditure reporting are often regarded as leaders in sustainability, which can lead to competitive advantages in attracting capital and maintaining stakeholder trust (Charles, et al., 2017).

Adams, et al., (2016) suggest that companies making significant investments in environmental protection and transparently reporting these expenditures often experience long-term financial benefits. Moreover, firms that transparently report their environmental expenditures are more likely to attract socially responsible investors, who prioritize sustainability in their investment decisions (Oncioiu, et, al. 2020). Despite the positive correlations between environmental expenditure reporting and financial performance, some studies highlight challenges in this area. The quality and comprehensiveness of environmental expenditure reporting can vary significantly across companies and industries, often due to differing regulatory requirements, corporate strategies, and the level of stakeholder pressure (Braam, et, al. 2016).

2.2.3 Carbon Emission Disclosure

According to Syam, et, al. (2024), Carbon emission disclosure has become crucial in measuring environmental accounting information, demonstrating a company's dedication to transparency and sustainability in the face of global climate challenges. Companies providing detailed information about their carbon emissions are generally viewed more favorably by investors, regulators, and other stakeholders (Li, & Xu, 2024). This type of disclosure usually includes data on Scope 1, Scope 2, and increasingly, Scope 3 emissions. These cover direct emissions, indirect emissions from purchased energy, and all other indirect emissions along the value chain, respectively (Hettler, & Graf-Vlachy, 2024).

Further studies have explored the financial implications of carbon emission disclosure. Han, et, al. (2023) reveals that companies with strong carbon reporting practices often enjoy long-term financial benefits. Hoang, (2024) suggests that transparent carbon disclosure can lead to lower costs of capital, as investors increasingly consider climate-related risks and favor proactive companies. Also, companies that effectively disclose and manage their carbon emissions can identify and implement energy efficiencies, leading to cost savings and operational improvements. However, the impact of carbon emission disclosure on financial performance can vary depending on the industry and the rigor of regulatory frameworks (Wang, 2023). In sectors with high carbon intensity, such as energy and heavy manufacturing, the financial benefits of carbon disclosure are more pronounced, whereas in less carbon-intensive industries, the effects may be subtler but still significant in terms of long-term sustainability and investor relations (Griffin, & Sun, 2024). Carbon emission disclosure is increasingly recognized as a critical component of environmental accounting information, offering valuable insights into a company's environmental impact and its commitment to mitigating climate change (Alsaifi, et al., 2020).

2.2.4 Environmental Liability Recognition

Environmental liability recognition is an important factor in environmental accounting (Nicholls, 2020). It involves a company acknowledging and quantifying potential environmental risks and costs associated with its operations (Morrison, et al., 2023). Recognizing and reporting environmental liabilities can enhance a company’s reputation for responsibility and transparency in the eyes of stakeholders such as investors, regulators, and the public (Lipton, 2020). Recognition of these liabilities entails estimating the financial impact of potential environmental clean-ups, compliance with environmental regulations, and other related costs. Industries with significant environmental risks, such as oil and gas, mining, and chemicals, are more likely to comprehensively report environmental liabilities (Schneider, et al., 2017).

Wang, & Sarkis, (2017) have also looked into the link between environmental liability recognition and corporate financial performance. By setting aside adequate reserves for potential environmental liabilities, companies can avoid sudden financial shocks resulting from unexpected regulatory fines or litigation costs. Strong environmental liability recognition practices can also lead to lower costs of capital, as investors view these companies as less risky (Lumpkin, 2010). However, the financial impact of environmental liability recognition can vary depending on the industry and the stringency of the regulatory environment. In heavily regulated industries, recognizing environmental liabilities thoroughly is crucial for maintaining regulatory compliance and avoiding costly penalties (Karkkainen, 2019). Environmental liability recognition is an essential aspect of environmental accounting information, providing valuable insights into a company's risk management practices and its long-term financial sustainability (Dimitropoulos, & Koronios, 2021).

2.3 Creditor Decision-Making

Empirical research on creditor decision-making has extensively examined the factors that influence lenders' assessments of a borrower's creditworthiness and the terms of lending (Ferretti, 2021). Creditor decision-making is influenced by various financial and non-financial factors, such as the borrower's financial health, risk profile, industry conditions, and increasingly, environmental, social, and governance (ESG) considerations (Palmieri, & Geretto, 2024). Traditional financial indicators like profitability, liquidity, and leverage are important in creditors' evaluations. However, recent evidence suggests that creditors are also starting to consider ESG-related risks, especially environmental performance when making lending decisions (Ebegbodi, 2024). Companies with poor environmental practices or significant exposure to environmental liabilities may face stricter loan terms, higher interest rates, or even denial of credit due to the perceived increase in risk. On the other hand, firms with strong environmental credentials and transparent sustainability reporting often receive more favorable lending conditions (Basu, et, al. 2022). This trend reflects the increasing importance of non-financial factors in creditor decision-making, indicating a broader shift toward sustainable finance and responsible lending practices (Moneva, et, al. 2023).

2.3.1 Credit risk assessment

According to Kanapickiene, & Spicas, (2019), Credit risk assessment is a major aspect of financial decision-making, encompassing the evaluation of a borrower's ability to meet debt obligations. Traditionally it has concentrated on financial metrics such as profitability, liquidity, leverage, and cash flow as primary indicators of credit risk. Studies have consistently revealed that these financial ratios are critical predictors of default risk, with higher profitability and liquidity associated with lower credit risk, while higher leverage often indicates increased risk (Naili, & Lahrichi, 2022).

Studies, such as (Pyka, & Pyka, (2023), Yu, et al., (2024), and Bonacorsi, et, al. (2024)) have extended the scope of credit risk assessment by including non-financial factors, particularly those related to environmental, social, and governance (ESG) issues. The incorporation of ESG factors, especially environmental performance, into credit risk models is one of the variables used in measuring creditor's decision-making. Freund, et al., (2023) establishes that companies with strong environmental practices tend to have lower default rates and better credit ratings. Conversely, firms with poor environmental records may face higher credit risk due to potential regulatory penalties, litigation costs, and reputational damage. This shift reflects a growing recognition that traditional financial metrics alone may not fully capture the complexities of credit risk in the modern business environment.

2.3.2 Loan terms

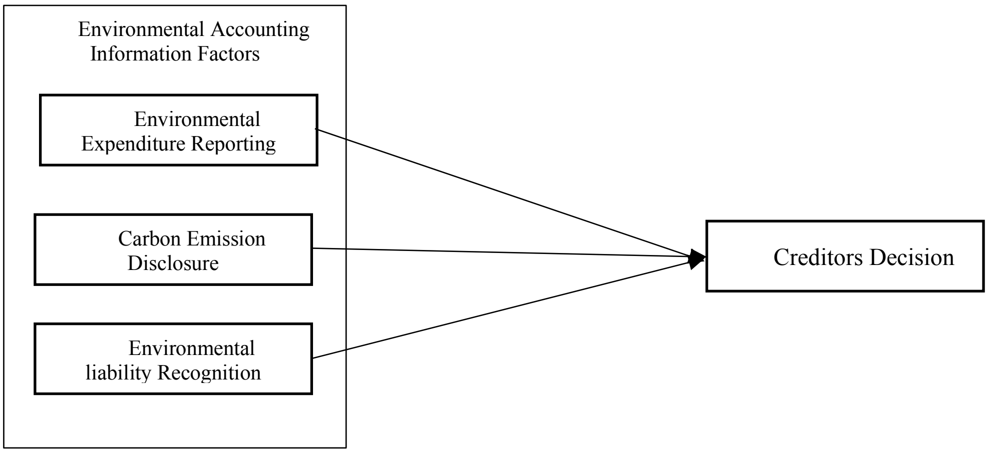
Loan terms, which include interest rates, loan maturity, collateral requirements, and covenants, are critical components of the lending process that reflect the perceived risk of the borrower. A loan term has traditionally focused on how the financial characteristics of the borrower, such as creditworthiness, leverage, and liquidity, influence these terms (Naumenkova, et, al. 2020). Loan term is one of the variables used to measure creditor's decision-making. Conversely, borrowers with higher financial risk often face stricter loan conditions, such as higher interest rates, shorter maturities, and the imposition of collateral requirements and covenants to mitigate the lender's risk (Choy, et, al. 2024).

Studies have begun to explore the impact of non-financial factors, particularly those related to environmental, social, and governance (ESG) considerations, on loan terms (Jámbor, & Zanócz, 2023). There is growing evidence that lenders are increasingly factoring in a borrower's ESG performance when determining loan conditions. Choy, et, al. (2024) postulate companies with strong environmental practices may benefit from more favorable loan terms, including lower interest rates and less stringent covenants, as lenders perceive them as lower risk. This is particularly evident in the rise of sustainability-linked loans, where the loan terms are directly tied to the borrower's achievement of specific ESG targets. In the same vein, borrowers with poor environmental performance or significant exposure to environmental risks may face higher interest rates and stricter covenants due to the perceived increase in risk. Moessa de Souza, (2024) the influence of ESG factors on loan terms varies across industries and regions, reflecting differences in regulatory environments, market expectations, and industry-specific risks.

2.3.4 Overall Financial Evaluations

Overall financial evaluations, which encompass the assessment of a company's financial health, profitability, risk profile, and growth potential, are critical for decision-making by investors, creditors, and other stakeholders (Akash, et al., 2024). Research in this domain has traditionally focused on quantitative financial indicators such as earnings, cash flow, return on assets, and debt ratios. It was also demonstrated that these financial metrics are reliable predictors of a company's performance and stability (Zakhidov, 2024). Profitability ratios like return on equity (ROE) and return on assets (ROA) are consistently linked to higher valuations and lower perceived risk, while high levels of debt and poor liquidity are associated with lower valuations and higher risk (Al-Ardah, & Al-Okdeh, 2022). The scope of the studies has expanded the financial evaluations by incorporating non-financial factors, particularly environmental, social, and governance (ESG) criteria. These studies suggest that ESG performance can have a significant impact on overall financial evaluations (Khamisu, et al., 2024). Companies with strong ESG practices are often seen as less risky and more sustainable in the long term, which can enhance their financial valuations. Also, firms with high ESG ratings tend to enjoy higher market valuations, lower cost of capital, and greater investor confidence. Equally, companies with poor ESG performance may face discounted valuations, as investors and other stakeholders increasingly view ESG risks as material to financial performance (Moessa de Souza, 2024). The empirical evidence underscores the growing importance of integrating ESG considerations into financial evaluations. While traditional financial metrics remain central to assessing a company's value and risk, the inclusion of ESG factors provides a more comprehensive view of a company's long-term prospects and sustainability. This shift reflects a broader trend in financial markets towards incorporating sustainability into investment and financing decisions, driven by increasing awareness of the material impact that ESG factors can have on financial performance and stability (Jámbor, & Zanócz, 2023).

Figure 1 Conceptual Framework of Factors of Environmental Accounting Information (FEAI)



2.4 Theoretical review

The consideration of environmental accounting information in creditor decision-making is supported by various theoretical frameworks, such as stakeholder theory, legitimacy theory, and risk management theory. According to Desjardins, et al., (2023) stakeholder theory, organizations are responsible not only to shareholders but also to a wider array of stakeholders, including creditors, who are interested in the company's environmental performance. Crossley, et al., (2021) posit Legitimacy theory suggests that companies endeavor to validate their operations by conforming to societal expectations, which increasingly stress environmental stewardship. Risk management theory underscores the significance of recognizing and addressing risks, including those associated with environmental factors, to safeguard financial stability. This comprehensive examination integrates these theoretical viewpoints to underscore the importance of environmental accounting information as a critical element in creditor decision-making, influencing how financial institutions evaluate and handle credit risk within the evolving environmental landscape.

3. Methodology

Using a cross-sectional survey method, data were collected from the annual reports of the listed environmentally oriented companies, across various industries in Nigeria, these include; Dangote Cement Plc, Total Energies Nigeria Plc, Lafarge Africa Plc, Seplat Energy Plc, Guinness Nigeria Plc, MTN Nigeria Communications Plc, Nestlé Nigeria Plc, Oando Plc, Unilever Nigeria Plc, and Zenith Bank Plc by issuing a structured questionnaire instrument. Further, only those companies that have their environmental accounting practices reported were purposively selected to choose the sample for the study. In whole 370 questionnaire were distributed to accounting, works housing and management staff selected by simple random sampling. A total of 350 responses from the respondents were retrieved, thus, returning a response rate of about 95%. The data processing tool used is Structural equation modelling using AMOS software version 23. The validity and reliability of the questionnaire were tested which correlates with the total item score in one variable. Then after that, the data analyses were carried out.

4. Result and Discussion

The research data from the questionnaires were run in the SEM-AMOS 23.0 program; the following are the results of the analysis;

Fig 2 AMOS result analysis

The result of the running data shows the impact of each latent variable, **Environmental Expenditure Reporting (EER), Carbon Emission Disclosure (CED), Environmental Liability Recognition (ELR)**, and **Creditors' Decision-Making (CDM).** And the model is mutually acceptable because prediction errors are allowed to enter the variable.

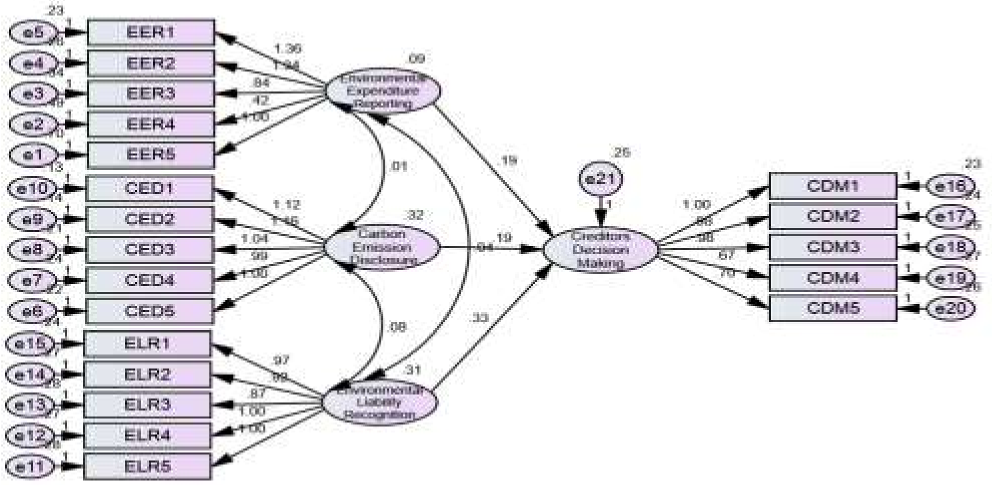


Table 1 Regression weight

Variable Codes/Path	Estimates	S. E	S.R	P-Value	Label
CDM <--- EER	.188	.100	1.879	.060	Not-Significant
CDM <--- CED	.190	.044	4.313	***	Significant
CDM <--- ELR	.325	.051	6.371	***	Significant

***= P-Value < 0.05

Environmental Expenditure Reporting (EER) and Creditor Decision Making (CDM)

Based on the result of AMOS calculation the result shows that Environmental Expenditure Reporting (EER) has no significant effect on creditor decision-making (CDM). This can be seen from the coefficients of the path with a positive sign of 0.09, with an SR value of 1.879, and a probability (p) of 0.60 is obtained which is greater than the specified significant Level of 0.05.

Carbon Emissions Disclosure (CED) and Creditor Decision Making (CDM)

Based on the result of AMOS calculation the result shows that Carbon Emissions Disclosure (CED) has a positive significant effect on creditor decision-making (CDM). This can be seen from the coefficients of the path with a positive sign of 0.032, with an SR value of 4.313, and a probability (p) of 0.00 is obtained which is smaller than the specified significant Level of 0.05.

Environmental Liability Recognition (ELR) and Creditor Decision Making (CDM)

Based on the result of AMOS calculation the result shows that Environmental Liability Recognition (ELR) has a positive significant effect on creditor decision-making (CDM). This can be seen from the coefficients of the path with a positive sign of 0.033, with an SR value of 6.371, and a probability (p) of 0.00 is obtained which is smaller than the specified significant Level of 0.05.

The path between EER and Creditors' Decision-Making (CDM) has a coefficient of **0.09**, suggesting a relatively weak and non-significant influence. This aligns with the findings in empirical studies where environmental expenditures may not always have a direct, substantial impact on creditors' decision-making processes (Tsendsuren, et al., 2021). This could imply that while companies report on their environmental expenditures, creditors may not view this information as critical when assessing credit risk, possibly because of the benefits of environmental spending are long-term and may not immediately affect the firm's financial performance.

The path between Carbon Emission Disclosure (CED) and Creditors' Decision-Making shows a stronger path coefficient of 0.32**,** indicating a significant positive relationship. This suggests that carbon emission transparency plays a more substantial role in creditor decision-making. Creditors likely view carbon emissions disclosures as a reflection of a company's environmental risks and long-term sustainability. Firms with strong emission disclosures could be seen as lower-risk investments, leading to more favorable lending terms. This result is consistent with the growing emphasis on carbon management due to regulatory pressures and increasing global attention on climate change (Dahlmann, et al., 2019).

The path from Environmental Liability Recognition (ELR) to Creditors' Decision-Making has a high path coefficient of **0.33**, indicating a significant and strong relationship. This reflects creditors' heightened sensitivity to the recognition of environmental liabilities. Companies that acknowledge and disclose their environmental liabilities are seen as more transparent, enabling creditors to better assess the potential financial risks. This transparency likely improves creditors' trust and mitigates concerns over unexpected future costs, making these companies more favorable to lend to (Erragragui, 2018).

5. Conclusion and Recommendations

These results suggest that creditors are increasingly factoring in environmental accounting information when making lending decisions. While environmental expenditure reporting may not have a significant immediate impact, carbon emission disclosure and environmental liability recognition are key drivers in creditor assessments. Companies that provide transparent and detailed information on these environmental dimensions are likely to benefit from more favorable credit terms, highlighting the growing importance of integrating environmental factors into corporate reporting for financial outcomes. This underscores the broader trend toward sustainable finance, where environmental performance is becoming a key criterion in financial decision-making. It is recommended that, Companies aiming to improve their credit standing should therefore prioritize carbon management and liability disclosure in their environmental accounting practices.

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