# Environmental Sustainability Reporting and Market Performance of Listed Manufacturing Firms in Nigeria

*Sunday Ayodele Olakojo[1], Olusola Esther Igbekoyi[2], Alexander Ifejola[3], Niyi Solomon Awotomilusi[4], Oluyinka Isaiah Oluwagbade[5], Muyiwa Emmanuel Dagunduro[6]*

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**Abstract.** Low global market performance has continued to affect firms' performance and long-term sustainability, especially in the manufacturing industry in Nigeria. This motivated the study to assess the effect of environmental sustainability reporting on the market performance of listed manufacturing companies in Nigeria and to provide new empirical data in an emerging economy. The research design used was ex post facto, with secondary data analysed from annual reports, sustainability disclosures, and financial databases of manufacturing companies listed on the Nigerian Exchange Group (NGX) as of 31 December 2023. A sample of 46 listed firms was purposely selected from the population of 67 listed companies to include those in full compliance with the sustainability disclosure requirement. The study spanned 12 years (2012-2023) to examine long-term trends and the dynamic role of environmental reporting in market performance. The study employed descriptive and inferential statistical analyses, including regression techniques. The findings showed that environmental protection costs disclosure had a positive and significant impact on market performance ($\beta = 9.867$, $p = 0.001$). In contrast, environmental pollution control disclosure had a negative yet significant impact ($\beta = -8.473$, $p = 0.014$). Furthermore, the environmental waste management cost disclosure had a negative, albeit insignificant, impact ($\beta = -3.799$, $p = 0.271$); similarly, environmental research and development cost disclosure had a positive, albeit insignificant, impact on market performance ($\beta = 4.308$, $p = 0.223$). The originality of the research change lies in the integrative nature of the methods, as various groups of environmental costs

[1] Sunday Ayodele Olakojo
Postgraduate Student, Department of Accounting, College of Social and Management Sciences, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria, Email: solakojo@abuad.edu.ng, https://orcid.org/0009-0006-7527-6249
[2] Olusola Esther Igbekoyi
Associate Professor, Department of Accounting, Faculty of Social and Management Sciences, Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria, Email olusola.igbekoyi@aaua.edu.ng, https://orcid.org/0000-0001-9887-3755
[3] Alexander Ifejola
Department of Accounting and Finance, University of Dundee, Dundee, Scotland, Email: excellentgbenga@gmail.com https://orcid.org/0009-0003-9165-472X
[4] Niyi Solomon Awotomilusi
Senior Lecturer, Department of Accounting, College of Social and Management Sciences, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria, Email: awotomilusi@abuad.edu.ng, https://orcid.org/0000-0001-9561-4520
[5] Oluyinka Isaiah Oluwagbade
Associate Professor, Department of Accounting, College of Social and Management Sciences, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria, Email: oluwagbadeoi@abuad.edu.ng, https://orcid.org/0000-0001-8453-4728
[6] Muyiwa Emmanuel Dagunduro (Corresponding Author)
Researcher, Department of Accounting, College of Social and Management Sciences, Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria, Email: dagundurome@pg.abuad.edu.ng, https://orcid.org/0000-0002-1177-7101

were incorporated into a single analytical framework to assess their varying impacts on market performance. The research concludes that improved visibility of environmental protection and research projects enhances investors' perceptions, thereby boosting the market value and competitiveness of the firms.

**Keywords:** Environmental sustainability reporting, environmental pollution costs disclosure, environmental protection costs disclosure, environmental waste management disclosure, , market performance.

## INTRODUCTION

Market performance is a crucial measure of economic viability and investor confidence, reflecting the effectiveness of firms in creating value in ever-competitive, globalised markets (Awotomilusi et al., 2025). Mature financial systems developed technology and stable governance, making developed economies like the United States, Germany, and Japan more profitable because they encourage innovation and operational efficiency (Carandang & Ferrer, 2020). On the contrary, emerging markets, especially in Africa, have had to contend with challenges such as underdeveloped regulatory systems, low liquidity, and high investment risks (Dagunduro et al., 2025; Olowookere et al., 2021). Such difficulties are also aggravated by infrastructural shortages, economic instability, and political instability, which hinder stable market development. Despite these limitations, companies operating in developing countries tend to be resilient and capable of innovating within their resource constraints to keep up with competition and create stakeholder value (Agyemang et al., 2023; Amosun et al., 2022; Hanif et al., 2023; Somjai et al., 2020).

The manufacturing industry in Nigeria has experienced chronic underperformance, casting doubt on the contribution of environmental sustainability disclosure to market performance (Dagunduro et al., 2024). Despite manufacturing accounting for about 13.5% of Nigeria's GDP in 2024, the listed manufacturing companies have reported unsteady performances in the market, indicative of poor competitiveness, rising production costs, and structural inefficiencies (World Bank and Trading Economics, 2024). The capitalisation of the manufacturing equities on the market is volatile, with such examples as Dangote Cement experiencing sudden losses because of liquidity and credit issues, and such companies as Nestle Nigeria Plc and Nigerian Breweries Plc gaining and losing at the same time (DMarketForces, 2025; Fitch &Reuters, 2024; MarketScreener, 2025). These dynamics reveal the instability of the market recovery and the importance of sustainability disclosure in increasing investor confidence and stabilising market value (National Bureau of Statistics, 2024).

Environmental sustainability reporting (ESR) has come to the centre of corporate accountability globally, enabling companies to openly communicate their environmental policies, actions, and performance (Lawal et al., 2024). The harmonisation of disclosures and the improvement of comparability are guided by such international frameworks as the EU Corporate Sustainability Reporting Directive (EU CSRD) (EU, 2022), IFRS S1 and S2 standards (KPMG, 2025; FRC Nigeria, 2023) and the Global Reporting Initiative (GRI) Standards (Nielsen, 2023). These norms help investors assess a company's environmental efficiency and consider ESG factors in decision-making. ESR is therefore a strategic instrument for streamlining corporate activities to meet stakeholder expectations and ensure the sustainable operations of the business in both developed and emerging markets.

In Nigeria, sustainability reporting has developed in response to institutional and legal changes, such as the NGX Sustainability Disclosure Guidelines (Omiyale, 2023) and national environmental laws, including the Environmental Impact Assessment Act (Cap E12 LFN, 2004) and the National Environmental Regulations (Aliyu et al., 2024). Nevertheless, these efforts are ineffective, and disclosure practices remain rather uneven, which reduces the usefulness of sustainability reporting in improving investor trust and promoting industrial growth (Moses, 2022; Upaa & Iorlaha, 2023). Research has shown that strong sustainability practices can also improve market performance through better risk management, strategic planning, and corporate reputation (Arumona et al., 2021; Carandang & Ferrer,

2020; Dagunduro et al., 2024; Hanif et al., 2023; Latifah & Soewarno, 2023).

The research fills in the literature gaps because it discusses the impact of ESR on market performance within the manufacturing sector in Nigeria, and incorporates a range of types of environmental costs disclosure, including protection, pollution control, waste management, and research and development in a single study. The study offers new empirical data on the positive effects of transparent environmental reporting on investors' confidence, market valuation and sustainable industrial competitiveness. Placing the analysis in both international and country-specific ESG frameworks as well as the regulatory context of Nigeria, the study contributes to the understanding that is pertinent to policymakers, investors, and stakeholders of the industry who endeavour to enhance their governance, advance sustainable business procedures, and boost the performance of firms in the emerging market conditions.

## LITERATURE REVIEW

This section highlights the empirical evidence and theoretical basis underpinning this study.

### Conceptual Review

This section elucidates the concepts and variables used in the study, providing comprehensive definitions and explanations. Such clarity lays a strong foundation for the research, enabling both readers and researchers to understand and replicate the study with accuracy.

### Market Performance

The performance of the market reflects the performance of financial markets and corporate strategies in attaining economic and strategic goals. Defined it as the result of other policies affecting the selling prices, costs, efficiency of production, and innovation. Important indicators include stock market indexes, bond yields, trading volumes, liquidity, and investor sentiment (Alade et al., 2024; Awotomilusi et al., 2025). High liquidity, clear pricing, and effective resource allocation contribute to economic growth associated with high market performance (Fabozzi et al., 2015). This is usually measured using benchmark indices or historical records to assess the market's strength and stability, which informs investment and policy decisions (Agyemang et al., 2023; Appanna et al., 2023). Dagunduro et al. (2024) also emphasise market performance as an indicator of financial market efficiency for capital allocation and asset pricing, and highlight the importance of marketing policies, including revenue growth, customer expansion, and brand recognition, for overall performance. Market performance in this study refers to the degree to which listed companies attain their financial and strategic objectives, including value creation and competitive advantage, and is assessed using Tobin's Q.

#### *Environmental Sustainability Reporting*

Environmental sustainability reporting is a non-financial disclosure system that enables organisations to present their environmental performance, risks, and sustainability initiatives to stakeholders (Dagunduro et al., 2024). It entails systematically gathering, quantifying, and reporting on issues such as energy consumption, greenhouse gas emissions, waste disposal, and biodiversity conservation, thereby facilitating transparency and accountability (SASB, 2016). By making such disclosures, firms can demonstrate that they are good stewards of the environment, improve their reputation, and build stakeholder trust (Olowookere et al., 2021). These reports differ in structure and content based on industry standards and stakeholders' expectations, and may include environmental policies, performance metrics, compliance rates, and sustainability objectives. The Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and International Integrated Reporting Council (IIRC) are among the international reporting frameworks that guide reporting practices and offer principles for consistent disclosure (Global Reporting Initiative, 2018).

#### *Environmental Research and Development Disclosure*

ER&D disclosure involves reporting an organisation's investments, efforts, and outcomes related to environmental innovation and sustainability (Carandang & Ferrer, 2020). It improves transparency by informing stakeholders, such as investors, regulators, and customers, of corporate commitments to environmental progress and allowing them to assess the effectiveness and outcomes of these efforts on sustainable performance (Laine, Tregidga & Unerman, 2022). The ER&D disclosures of organisations should also be consistent and comparative, and this is facilitated by frameworks like the Global Reporting

Initiative (GRI) Standards and the Sustainability Accounting Standards Board (SASB) guidelines (Global Reporting Initiative, 2018; Sustainability Accounting Standards Board, 2016). By openly reporting on achievements and failures, companies are found to be more accountable, stakeholders trust them, and they enhance their environmental stewardship, which eventually leads to long-term sustainability and a better corporate image (KPMG, 2020).

***Environmental Waste Management Disclosure***

Environmental waste management disclosure involves organisations disclosing their policies and practices, as well as their performance in waste management generated by their operations, such as waste reduction, recycling, treatment, and disposal programs (Marshall, Brown & Plumlee, 2009; Latifah & Soewarno, 2023). It includes quantitative and qualitative information, such as the amount of waste generated, the origin of the waste, the process of its disposal, and reports on environmental performance and sustainability initiatives (GRI, 2018). This kind of disclosure can increase transparency by giving investors, regulators, and the general public an understanding of how a firm manages its environmental impacts and adheres to waste management regulations (Kolawole et al., 2023). Frameworks such as the Global Reporting Initiative (GRI) Standards or ISO 14001 for environmental management systems provide organisations with guidance on how to present similar information on waste management practices (Global Reporting Initiative, 2018; International Organisation for Standardisation, 2015).

***Environmental Pollution Cost Disclosure***

Environmental pollution cost disclosure is the public reporting of financial costs associated with pollution-related activities of an organisation, such as the costs of prevention, control, remediation, and compliance with environmental regulations, and fines, penalties and liabilities arising in the event of non-compliance (Arumona et al., 2021; Olowookere et al., 2021). Included as well are indirect financial effects, such as health expenses, ecosystem destruction, and reputational threats. This type of disclosure contributes to increased transparency and accountability by offering the interested parties, such as investors, regulators, customers, and communities, a perspective on the financial consequences of the environmental footprint of a firm and the efficiency of the management policies and strategies (Agyemang et al., 2023; Somjai et al., 2020). Furthermore, exposing the economic costs of pollution will motivate companies to take a proactive stance towards environmental management and invest in pollution prevention, thereby helping reduce long-term risks and enhancing corporate sustainability performance.

***Environmental Protection Cost Disclosure***

The concept of environmental protection cost disclosure is the transparent reporting of an organisation's financial obligations for reducing and managing environmental impacts, such as spending on pollution control, waste management, resource conservation, and regulatory compliance (Appannan et al., 2021). It includes direct and indirect expenses associated with eliminating and mitigating environmental harm, thereby demonstrating a firm's commitment to sustainability and an environmentally responsible business (Kolawole et al., 2023). The principal aim of this disclosure is to promote accountability and transparency by giving stakeholders, including investors, regulators, and the community, insight into a company's environmental stewardship and risk management practices (Somjai et al., 2020). Global reporting standards, such as the Global Reporting Initiative (GRI) Standards and the Sustainability Accounting Standards Board (SASB) guidelines, provide systematic mechanisms for consistent reporting (Global Reporting Initiative, 2018; Sustainability Accounting Standards Board, 2016). Finally, cost disclosure for environmental protection enhances corporate image, builds trust with stakeholders, and promotes the goals of long-term sustainable development (Marshall, Brown & Plumlee, 2009).

***Legal and Regulatory Framework for Environmental Sustainability Reporting (ESR) in Nigeria***

The legal and regulatory framework for environmental sustainability reporting (ESR) in Nigeria is strengthening, with its disclosures anchored on evolving domestic and global requirements. The Financial Reporting Council of Nigeria (FRC), International Sustainability Standards Board (ISSB) and Nigerian Exchange Group Regulation Limited (NGX RegCo) together introduced the global IFRS S1 and

IFRS S2 standards of sustainability disclosure in the country in June 2023, becoming the first African country to implement the ISSB baseline (FRC Nigeria, 2023; BusinessDay, 2023). In the meantime, the Environmental Impact Assessment Act (Cap E12 LFN 2004) makes major projects prepare a detailed environmental impact statement and present it to the National Environmental Standards and Regulations Enforcement Agency (NESREA) before implementation (Aliyu et al., 2024). Even with all this progress, implementation remains uneven: only around half of the listed companies have fully incorporated sustainability reporting into their annual reports, and such rules as those issued by NGX are not always mandatory for issuers (Omiyale, 2023). These trends imply that Nigerian companies will align with international ESG reporting standards and national legislation. Still, the adherence discrepancy indicates that stricter requirements and stronger controls over ESG activities should be implemented.

**Theoretical Review**

This study extensively reviewed and grounded itself in sustainability theory.

***Sustainability Theory***

The interdependence of economic growth, environmental protection and social well-being is emphasised in the sustainability theory that was developed under the strong influence of the Brundtland Report. It encourages a long-term perspective; thus, current actions do not adversely affect future generations (Jeurissen, 2000). The theory's relevance is supported by empirical research, and Somjai et al. (2020) and Olowookere et al. (2021) also reported positive correlations between environmental accounting disclosures and firm-level performance. In contrast, Mohammad et al. (2020) investigated sustainability reporting in the oil and gas industry in Nigeria. These results endorse the use of the theory in the comprehension and enhancement of the sustainability practice. Sustainability theory has provided a useful guide for organisations seeking to balance profitability and environmental responsibility in the business world today. In industries with significant environmental impacts, such as the oil and gas industry, sustainability reporting helps companies remain legitimate, comply with laws and regulations, and gain stakeholder trust (Jeurissen, 2000). It may also reduce risks, operational expenses, and financial performance (Clarkson et al., 2011). Nonetheless, researchers like Laine, Tregidga and Unerman (2022) and Grey (2006) also emphasise issues with implementation, such as the inability to quantify sustainability outcomes. The issues relating to greenwashing (Laufer, 2003), lack of conceptual clarity, economic interests (Banerjee, 2003), and inconsistent regulatory settings (Visser, 2009) also demonstrate shortcomings of the theory.

***Theoretical Underpinnings***

Institutional and legitimacy theories are the basis of this study. Institutional theory can provide general insights into the reporting of environmental sustainability by listed manufacturing companies in Nigeria. According to the theory, organisations respond to regulatory, normative, and coercive forces to align with the societal and industry standards (DiMaggio & Powell, 2000; Scott, 2014). In the manufacturing industry within Nigeria, growing pressures by regulatory authorities (like the Financial Reporting Council (FRC) and the Nigerian Exchange Group (NGX)) have compelled companies to incorporate sustainability disclosure in their operations, which is in tandem with international frameworks like the Global Reporting Initiative (GRI) and the Sustainable Development Goals (SDGs). These institutional forces compel companies to be accountable, transparent and good stewards of the environment, thus shaping their reporting behaviour. Since the regulatory environment is dynamic, manufacturing companies consider sustainability reporting a means to maintain operational legitimacy and align with broader institutional norms (Chukwudi, 2024).

On the same note, legitimacy theory points out that companies engage in sustainability reporting to ensure that society grants them a green light to continue operations and to secure a social licence (Deegan, 2002; Suchman, 1995). With the environmental issues of pollution, waste management, and resource depletion becoming increasingly high in the Nigerian environment, manufacturing companies resort to sustainability reporting to inform their environmental performance and alleviate the threat of legitimacy. Investors, regulators, local communities, and other stakeholders want firms to be responsible, reflected in corporate disclosure practices that increase the firm's perception among the general

population and maintain competitiveness (Bellucci et al., 2018). By means of transparent environmental reporting, companies enhance stakeholder trust and, possibly, improve market performance by attracting environmentally aware investors and expanding their corporate image. Therefore, both the Institutional and Legitimacy Theories make significant contributions to sustainability reporting in the manufacturing industry of Nigeria, given their formation by external forces and societal demands.

**Empirical Review**

This research examined pertinent literature concerning environmental sustainability reporting and market performance in accordance with the study's specific objectives and hypotheses.

***Environmental Research & Development Cost Disclosure and Market Performance***

In the meta-analysis, Liao, Liu and Liu (2021) summarised the results of other studies regarding environmental R&D cost disclosure and company performance. Their overall overview showed a positive correlation between transparency in environmental R&D spending and the financial performance of firms across industries and geographic areas. This implies that transparency in environmental reporting, in terms of companies reporting their environmental R&D costs, is likely to result in better financial performance for those companies. Besides, Zhang et al. (2014) found that companies with strong corporate governance frameworks enjoyed greater financial advantages by reporting environmental R&D spending, highlighting the impact of governance practices on the use of environmental programs to enhance company performance.

In addition, the positive correlation between environmental R&D cost disclosure and firm performance is supported by research by Chiu et al. (2020), Park and Kim (2019), and Yang and Lee (2018). Found that the degree of environmental R&D cost disclosure has a positive correlation with the level of firm profitability in the manufacturing industry, which shows that the company that concentrates on environmental innovation would be more successful than the rest. Moreover, Chiu et al. (2020) identified a strong relationship between environmental R&D spending and the market valuation of Chinese companies, indicating that higher disclosure rates are associated with greater investor trust and higher market valuation. The works by Kim and Lee (2020) also emphasise the beneficial effect that environmental R&D costs disclosure may have on financial performance measures, such as the ratio of returns on assets, market value, access to capital, and cost of capital, which highlights the significance of environmental reporting practice when it comes to the financial success of firms. The study hypothesis was as follows:

**$Ho_1$:** Environmental research and development disclosure does not have a significant effect on the market performance of listed manufacturing firms in Nigeria.

***Environmental Waste Management Disclosure and Market Performance***

Khairollahi et al.'s (2016) research aimed to examine the effect of disclosed environmental waste management on the financial performance of manufacturing companies in Iran. Based on a panel data analysis of 150 manufacturing companies listed on the Tehran Stock Exchange, they found a significant positive correlation between environmental waste management disclosure and firm performance. Hence, it is observed that the more environmentally friendly companies' practices, the better their financial performance. In a similar vein, Jung et al. (2025) examined the impact of environmental waste management reporting on the market performance of South Korean companies. Their mixed-method design incorporated both quantitative regression analysis and qualitative case studies, showing that companies with greater environmental disclosure performed better in the stock market, underscoring enhanced investor confidence and improved share valuations. The nexus between environmental waste management disclosure and firm performance was also positive, as indicated by Nguyen et al. (2025).

Building on this knowledge, Kolawole et al. (2024) examined how environmental waste management practices affect the profitability of agricultural companies in Nigeria. They found a significant positive impact of environmental waste management disclosure on the firm's profitability, and that environmental practices could be made more transparent, leading to a better financial situation in the agricultural sector. Similarly, Zhengfa and Penetrante (2025) examined the relationship between environmental waste management disclosure

and the financial performance of Chinese industrial companies. Using a longitudinal study spanning 10 years, they have discovered that environmental waste management reporting largely enhances operational efficiency and financial results, proving the economic effectiveness of sustainable environmental management. The study hypothesis was as follows:

**$Ho_2$:** Environmental waste management disclosure does not have a significant effect on the market performance of listed manufacturing firms in Nigeria.

***Environmental Pollution Cost Disclosure and Market Performance***

Nurshabrina et al. (2024) conducted a study comparing the financial performance of 2019-2021 and the disclosure in PT Jamkrindo's Sustainability Report regarding economic, environmental, and social issues. They discovered better financial performance, especially in profitability ratios and variations in solvency and liquidity ratios, by using a descriptive quantitative approach. In the year 2020, the Sustainability Report received the highest score, with the economic aspect prevailing. This work provides information on PT Jamkrindo's financial performance and sustainability reporting. On the contrary, Etim and Akpan (2023) investigated the effect of sustainability disclosure on the financial performance of oil and gas companies from 2012 to 2021. Their results demonstrated substantial positive effects of sustainability disclosures on return on capital employed; therefore, there is a strong need for disclosure of financial outcomes in the oil and gas industry to improve financial performance. In the same manner, Luo et al. (2024) found that corporate size and performance have a positive impact on the quality of Environmental Information Disclosure, implying actions to improve corporate competitiveness and values. Elsewhere, Kolawole et al. (2023) investigated the effects of environmental accounting practices on the financial performance of aviation companies in Nigeria and found a complex interrelationship between environmental activities and the aviation industry's financial performance.

In the study by Ibrahim et al. (2023), the relationship between environmental reporting and the financial results of listed industrial and consumer goods corporations in Nigeria over 10 years was examined, and the researchers found a strong negative effect on the value of return on assets (ROA). In their research, they note the massive implications of environmental reporting practices for firms' financial performance and the key role of environmental reporting in determining these companies' financial trends. Comparatively, Odugbemi and Igbekoyi (2021) investigated the effects of environmental practice disclosure on the economic performance of Nigerian-based oil and gas companies. They found mixed impacts of various environmental practices on earnings per share (EPS). Further, Igbekoyi et al. (2021) investigated the relationships among profitability, liquidity position, and environmental reporting practices of manufacturing firms. They found that profitability plays a strong role in environmental reporting practices related to environmental sustainability. This study will be tested according to the hypothesis:

**$Ho_3$:** Environmental pollution cost disclosure does not have a significant effect on the market performance of listed manufacturing firms in Nigeria.

***Environmental Protection Cost Disclosure and Market Performance***

Adhania and Nurdiana (2024) conducted a study examining the correlation between financial performance and firm size, age, and sustainability report disclosure among non-financial companies listed on the IDX. Using quantitative secondary data from financial reports and multiple linear regression, they found that profitability was crucial for the disclosure of sustainability reports. Still, firm size and company age were not significant. Gerged et al. (2024), on the other hand, examined how environmental management accounting (EMA) can enhance the performance of firms, particularly Pakistan-based SMEs. They concluded that there was a strong, direct relationship between EMA and firm performance, which was further strengthened through primary data collected via questionnaire surveys. On the contrary, Igbekoyi et al. (2021) examined how firms' profitability and liquidity positions affect their environmental reporting. They used an ex post facto research design and secondary data analysis. They found that profit after tax had a significant effect on environmental sustainability reporting practices among manufacturing firms. In contrast,

earnings per share had a positive but non-significant effect, and the liquidity ratio had a negative but non-significant relationship.

Solanke et al. (2021) examined the impact of environmental accounting disclosures on the financial performance of Information and Communications Technology (ICT) companies in Nigeria. Their research, using secondary data from annual financial reports over 10 years and multiple regression analysis, revealed a positive correlation between environmental accounting disclosure and return on assets (ROA) and a negative correlation with earnings per share (EPS). On the other hand, Wasara and Ganda (2019) examined the relationship between corporate sustainability disclosures and returns on investment and found that environmental disclosures are negatively associated with returns on investment. Moreover, the study investigated the effects of sustainability disclosure on environmental and social responsibility on the performance of healthcare and consumer goods companies listed on the Nigerian Stock Exchange, without significant effects of environmental sustainability disclosure on the firms' performance. Similarly, Saman (2019) investigated the correlation between environmental accounting disclosure and financial performance in the oil and gas industry in Nigeria and found a negative relationship between the two variables using multiple regression analysis. Therefore, the state hypothesis of this study is as follows:

**$H_{04}$:** Environmental protection cost disclosure does not have a significant effect on the market performance of listed manufacturing firms in Nigeria.

**Conceptual Framework**

The relationship between the study variables is shown in Figure 1 below. Environmental Sustainability Reporting (ESR) is an independent variable expressed through four proxies: Environmental Research and Development Disclosure (ERDD), Environmental Waste Management Disclosure (EWMD), Environmental Pollution Control Disclosure (EPCD), and Environmental Protection Cost Disclosure (EPCD). Market Performance is the dependent variable, measured by Tobin's Q. This model emphasises that different aspects of environmental sustainability reporting can affect organisations' market performance.

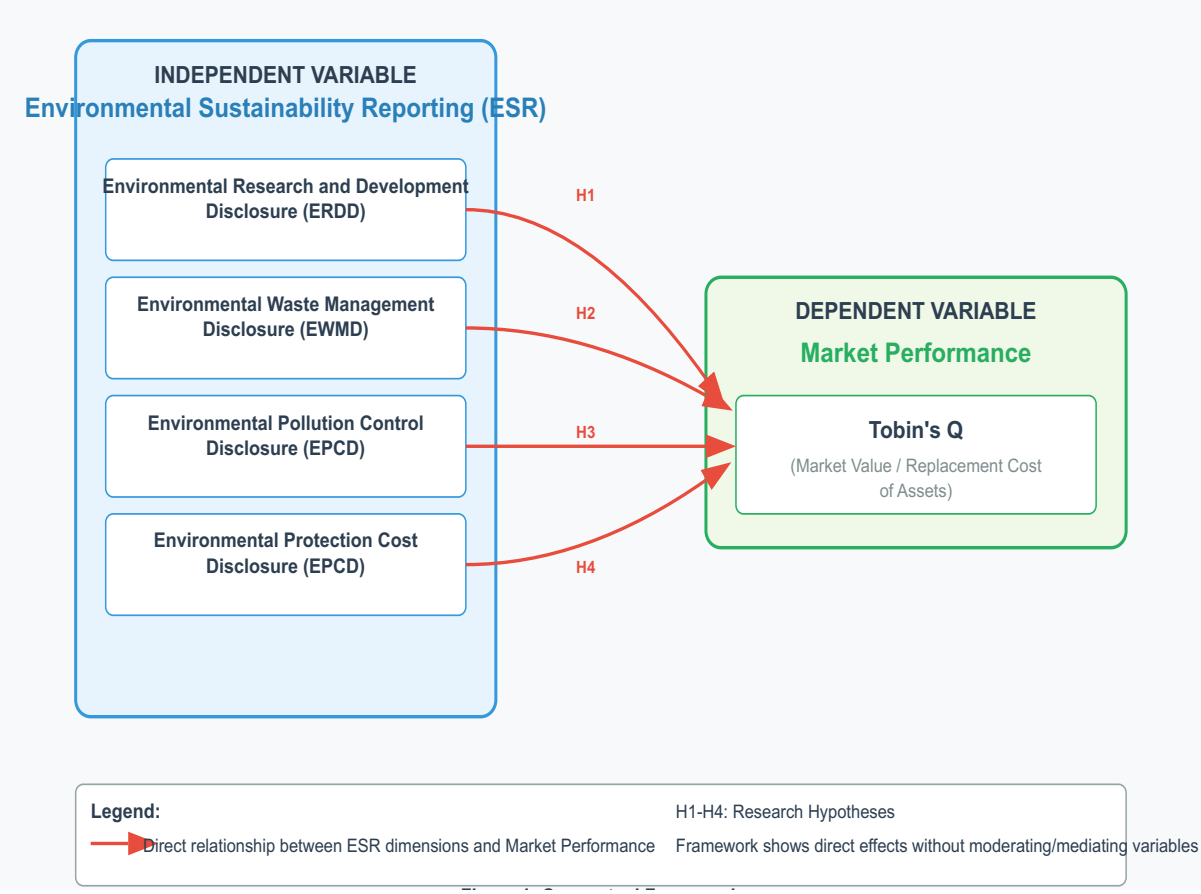


**Figure 1:** Conceptual Framework

*Source:* Authors' Design (2025)

## METHODOLOGY

### Research Design

The research design applied in this study was an ex post facto design, which is suitable when the researcher wants to analyse the existing state and associations of the study variables without controlling them. The rationale for selecting this design is that the data needed to report on environmental sustainability and market performance are already contained in audited, publicly available documents; thus, experimental manipulation is neither possible nor required. Data were collected from the content analysis of annual reports, sustainability disclosures, and financial databases of manufacturing consumer goods firms listed on the Nigerian Exchange Group (NGX) as of 31 December 2023. This practice is also supported because it guarantees reliability and objectivity, as publicly reported information is under regulatory control, increases comparability among companies, and contributes to a healthy assessment of disclosure policies and financial performance.

### Population of the Study

The study population comprised 67 listed manufacturing companies in Nigeria, representing the total population of companies in the manufacturing industry listed on the Nigerian Exchange Group during the research. This method is valid because it enables all sectors to be covered in detail, allowing the results to be generalised to all companies listed in the manufacturing industries in Nigeria.

### Sample Size and Sampling Technique.

The relevant and appropriate sample for the study, in line with the research objectives, was selected using a purposive sampling technique, targeting 46 listed manufacturing companies that were fully compliant with the sustainability disclosure requirements. The study's time frame was 12 years, 2012-2023, to capture trends, patterns, and the long-term effects of environmental sustainability reporting on market performance. This longer period was supported because it would provide a stronger analysis that could take into account time variations and provide adequate information for evaluating both short- and long-term impacts of sustainability practices.

### Model Specification

This research model was based on the study by Kurawa and Shaibu (2022) on the relationship between environmental disclosure and the financial performance of listed non-financial companies in Nigeria. Tobin's Q was used in this research instead of the earnings per share as a dependent variable.

$$TQ_{it} = \alpha 0 + \beta_1 ERDD_{it} + \beta_2 EWMD + \beta_3 EPCD_{it} + \beta_4 EPCDit + \varepsilon_{it} \ldots . (i)$$

Where:

$TQ_{it}$ = Tobin's Q

$ERDD_{it}$ = Environmental Research & Development Expenditure Disclosure

$EWMD_{it}$ = Environmental Waste Management Control Cost Disclosure

$EPCD_{it}$ = Environmental Pollution Control Cost Disclosure

$ENPD_{it}$ = Environmental Protection Cost Disclosure

$\alpha$ = Constant Term

$\beta$ = Coefficient Term

i = No of firms

t = Time Period

$\varepsilon$ = Error term

***A priori expectation***= $\beta_1 > 0; \beta_2 > 0; \beta_3 > 0$

### Measurement and Description of Variables

Table 1 presents the descriptions, measurements, data sources, and literature evidence for the investigated variables.

**Table 1:** Measurement and Description of Research Variables

| SN | Variable | Description | Measurement | Literature Evidence |
|---|---|---|---|---|
| **1a** | Tobin's Q (TQ) | Tobin's Q is an economic metric that compares the market value of a company's assets to the replacement cost | Measured as market capitalization divided by total asset | Oluwagbade et al. (2023); Awotomilusi et al. (2025) |

| | | | | |
|---|---|---|---|---|
| | | of those assets. It is named after the economist James Tobin, who proposed this ratio as a way to assess whether a company is overvalued or undervalued. | | |
| **2a** | Environmental Research and Development Disclosure (ERDD) | Environmental Research and Development (R&D) Disclosure involves the reporting of a company's investments, initiatives, and outcomes related to environmental research and development activities. | The Environmental Disclosure Index (EDI) receives a score of 3 when fully compliant with the Global Reporting Initiative (GRI), a score of 2 when partially compliant, a score of 1 when not compliant, and a score of 0 when no environmental information is disclosed by the investigated firms. | Mohammad et al. (2020); Kurawa and Shuaibu (2022) |
| **2b** | Environmental Waste Management Disclosure (EWMD) | Environmental Waste Management Disclosure involves the reporting of a company's practices, policies, and performance related to the management and disposal of waste generated from its operations. | The Environmental Disclosure Index (EDI) receives a score of 3 when fully compliant with the Global Reporting Initiative (GRI), a score of 2 when partially compliant, a score of 1 when not compliant, and a score of 0 when no environmental information is disclosed by the investigated firms. | Mohammad et al. (2020); Kurawa and Shuaibu (2022) |
| **2c** | Environmental Pollution Control Disclosure (EPCD) | Environmental Pollution Control Disclosure involves the reporting of a company's efforts, initiatives, and outcomes related to controlling and reducing pollution from its operations. | The Environmental Disclosure Index (EDI) receives a score of 3 when fully compliant with the Global Reporting Initiative (GRI), a score of 2 when partially compliant, a score of 1 when not compliant, and a score of 0 when no environmental information is disclosed by the investigated firms. | Mohammad et al. (2020); Kurawa and Shuaibu (2022) |
| **2d** | Environmental Protection Cost Disclosure (EPND) | Environmental Protection Cost Disclosure involves the reporting of a company's expenditures, investments, and activities related to environmental protection measures. | The Environmental Disclosure Index (EDI) receives a score of 3 when fully compliant with the Global Reporting Initiative (GRI), a score of 2 when partially compliant, a score of 1 when not compliant, and a score of 0 when no environmental information is disclosed by the investigated firms. | Mohammad et al. (2020); Kurawa and Shuaibu (2022) |

*Source:* Researchers' compilation (2025)

**Data Analysis Techniques**

In the present research, descriptive statistics (mean, median, variance, standard deviation, skewness, and kurtosis) were used to describe and understand the distribution, central tendency, and variability of the data. These steps allowed gaining an idea of the overall trends and specifics of the variables being studied. In addition, inferential statistics, including panel regression and correlation analyses, were used to test the hypotheses and determine the nature and strength of the relationship between Environmental Sustainability Reporting (ESR) and Market Performance. The use of descriptive and inferential statistics was deemed suitable, as it provided a comprehensive understanding of the data: descriptive statistics provided background information, whereas inferences allowed for legitimate conclusions and generalisation about the population being studied.

**Data Analysis and Discussion of Findings**

This section explains the characteristics of the variables utilised, the data analysis, and the study results.

***Descriptive Statistics***

The descriptive statistics provided in Table 2 show that the sampled manufacturing companies had an average Tobin Q of 3.54 and a standard deviation of 6.922, indicating that the majority of companies produced positive value added with a wide variance around the mean. The lowest Q for the Tobin was 0.0248, and the highest was 31.943, with a total of 1,951.91, indicating that the firm values were widely distributed and positively skewed, and hence exhibited an abnormal distribution. The low standard error of 0.294 indicates that the sample mean is representative of the population mean. Likewise, disclosure practices varied moderately, with the firms' mean environmental protection disclosure (ENPD) of 0.509 and a standard deviation of 0.411. The lowest and highest disclosure scores were 0 and 3, respectively, for a total of 281.05. The ENPD data were skewed positively and also distributed normally.

Additionally, the findings indicate that the environmental pollution control disclosure (EPCD) had a mean of 0.521 and a standard deviation of 0.408, suggesting moderate variability across firms. The lowest and highest EPCD values were 0 and 3, respectively, and the total sum was 287.70. The data is skewed to the negative and normally distributed. The mean for environmental waste management disclosure (EWMD) was 0.528, with a standard deviation of 0.405, indicating moderate variability; the environment research and development disclosure (ERDD) was 0.537, with a standard deviation of 0.404, indicating similar variability. The lowest and highest values of both EWMD and ERDD were 0 and 3, respectively, so the total values are 291.34 and 296.53. The skewness of both datasets was negative, and the distributions were normally distributed, indicating that the variables of environmental disclosure were moderately distributed and were generally similar across the manufacturing companies examined.

**Table 2:** Descriptive Statistics

| Stats | Tobin's Q | EVPCD | PLCD | EVWM | EVRD |
|---|---|---|---|---|---|
| **Obs** | 552 | 552 | 552 | 552 | 552 |
| **Mean** | 3.536 | 0.509 | 0.521 | 0.528 | 0.537 |
| **S.D.** | 6.922 | 0.411 | 0.408 | 0.405 | 0.404 |
| **Se(mean)** | 0.295 | 0.017 | 0.017 | 0.017 | 0.017 |
| **Min** | 0.025 | 0 | 0 | 0 | -0.760 |
| **Max** | 31.940 | 3 | 3 | 3 | 3 |
| **Sum** | 1951.910 | 281.050 | 287.700 | 291.340 | 296.530 |
| **Skewness** | 3.079 | -0.316 | -0.377 | -0.402 | -0.485 |
| **Kurtosis** | 12.125 | 1.146 | 1.189 | 1.213 | 1.401 |

*Source:* Researcher's Computation (2025)

Table 2 shows the results of the analysis of the mean, number of observations, minimum and maximum statistics, standard deviation, skewness, and kurtosis.

**Test of Variables**

To ensure a robust regression analysis, all variables were included to confirm the analysis's assumptions. This involves pre-estimation and post-estimation tests because they are important for precise estimation.

***Pre-estimation Test***

The following tests were conducted to ensure that the assumptions of the selected model were satisfied and that the selected data were suitable for analysis. They are also useful for avoiding misspecification errors and ensuring the model's results are valid.

***Unit Root Test***

The panel variables tend to be non-stationary at the level, which may affect the model's parameter stability and consistency. Nonetheless, the study applies the Levin-Lin-

Chu unit root test to test for stationarity of the variables. The null hypothesis of a unit root assumes that all panels have unit roots, while the alternative hypothesis is that some panels are stationary. Table 3 presents the outcome of unit root tests. It reveals that all the variables are incorporated in order zero, that is, 1(0), which is significant at the 5 per cent level. As such, we reject the null hypothesis and conclude that the series is stationary. That is why there is no need to perform the co-integration test to identify the long-term relationship between the variables. The panel's square can estimate a more efficient model and is less prone to spuriousness.

**Table 3:** Panel Unit Root Test

| **Variable** | **Levin-Lin-Chu unit-root test** | |
|---|---|---|
| | z-statistics | P-value |
| **TOBINSQ** | -23.2090 | 0.0000 |
| **ENPD** | -4.3648 | 0.0000 |
| **EPCD** | -3.9556 | 0.0000 |
| **EWMD** | -3.9108 | 0.0000 |
| **ERDD** | -4.6165 | 0.0000 |

*Source:* Author's Computations (2025)

Table 3 shows the results of unit root tests conducted for this study.

**Correlation Analysis**

The data in Table 4 show a statistically significant positive correlation between market performance (Tobin Q) and the key elements of environmental sustainability reporting. The direct relationship between environmental protection cost disclosure (ENPD) and the Tobin Q is 0.1289 (p-value = 0.0024). This is evident in pollution control cost disclosure (PLCD/EPCD), which shows a positive correlation with market performance, with a coefficient of 0.1203, indicating that an increase in pollution control disclosures is expected to raise the Tobin Q by 12.03 per cent. The findings also indicate positive linear relationships between environmental waste management disclosures (EWMD), environmental research and development disclosures (ERDD), and market performance. In the case of EWMD, a coefficient of 0.1361 and a p-value of 0.0014 indicate the association is significant.

**Table 4:** Correlation Analysis of Study Variables

| **Variables** | **Pairwise Correlation** | **Tobin's Q** | **ENPD** | **EPCD** | **EWMD** | **ERDD** |
|---|---|---|---|---|---|---|
| **Tobin's Q** | Coefficient Sig. | 1.0000<br>- | | | | |
| **ENPD** | Coefficient Sig. | 0.1289*<br>(0.0024) | 1.0000<br>- | | | |
| **EPCD** | Coefficient Sig. | 0.1203*<br>(0.0047) | 0.8218*<br>(0.0000) | 1.0000<br>- | | |
| **EWMD** | Coefficient Sig. | 0.1361*<br>(0.0014) | 0.7604*<br>(0.0000) | 0.8317*<br>(0.0000) | 1.0000<br>- | |
| **ERDD** | Coefficient Sig. | 0.0956*<br>(0.0246) | 0.6997*<br>(0.0000) | 0.7079*<br>(0.0000) | 0.7770*<br>(0.000) | 1.0000<br>- |

*Source:* Researchers' Computation (2025)

Table 4 shows the pairwise correlation coefficients for the variables investigated in this study.

**Post-Estimation Tests**

The diagnostic tests presented in Table 5 indicate serious reliability issues with the model. The Ramsey RESET test again yielded a probability value of 0.0000, indicating omitted-variable bias, and further disclosure variables may enhance the model's predictive ability. The Breusch-Pagan/Cook-Weisberg test also indicates heteroscedasticity, with a p-value of 0.0000 (below 0.05), indicating that the assumption of constant variance in the residuals is not met. The Wooldridge test identified autocorrelation, reported a p-value of 0.0024, and rejected the null hypothesis of no first-order autocorrelation. The test for cross-sectional dependence also indicates cross-sectional dependence, with a statistic of 5.108 and a p-value of 0.0000. To address estimation difficulties, the research uses panel-corrected standard errors (PCSE) to control for heteroscedasticity, cross-sectional dependence, and autocorrelation. The Hausman test favoured the random-effects model, with a p-value of 0.0000, indicating that the difference in coefficients is not systematic. Lastly, the Breusch and Pagan Lagrangian multiplier test indicates that the random-effects model is superior to the pooled OLS, as the p-value of 0.0000 is significant.

**Table 5:** Summary of Post Estimation Test Results

| | | |
|---|---|---|
| **Ramsey RESET test** | | |
| **Null Hypothesis** | F-Statistics | Probability |
| **Ho: model has no omitted variables (P>0.05)** | 95.69 | 0.0000 |
| **Tolerance and VIF Value** | | |
| **Null Hypothesis** | VIF | Mean VIF |
| **There is no multicollinearity among the variables (1/VIF >0.10)** | - | 3.71 |
| **Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity** | | |
| **Null Hypothesis** | Chi2 Statistics | Probability |
| **Constant variance across the variables' residuals (P>0.05)** | 2323.60 | 0.0000 |
| **Wooldridge test for autocorrelation** | | |
| **Null Hypothesis** | F-Statistics | Probability |
| **No first-order autocorrelation (P>0.05)** | 10.320 | 0.0024 |
| **Pesaran's test of cross-sectional independence** | | |
| **Null Hypothesis** | Statistics | Probability |
| **There is no cross-sectional dependence (P>0.05)** | 5.108, | 0.0000 |
| **Hausman Test** | | |
| **Null Hypothesis** | Statistics | Probability |
| **Difference in coefficients not systematic (P>0.05)** | 0.73 | 0.9472 |
| **Breusch and Pagan Lagrangian multiplier test for random effects** | | |
| **Null Hypothesis** | Statistics | Probability |
| **Difference in coefficients not systematic (P<0.05)** | 24.23 | 0.0000 |

Researcher's Computation (2025)

Table 5 shows the results of post-estimation tests conducted for this study.

***Fixed- Effect Model Test, Random-Effect and Pooled Ordinary Least Squares***

All three regression models are statistically significant (with F-statistics not equal to zero). Nevertheless, they have very low explanatory power. The fixed-effect model yields an R-Sq of 2.74, the random-effect model 2.43, and the pooled OLS 2.45, indicating that the level of environmental sustainability disclosures accounts for only a small percentage of the variance in market performance, as measured by Tobin's Q. The environmental protection cost disclosure (ENPD) has a positive and significant

influence (t = 3.25, p = 0.001), and the environmental pollution cost disclosure (EPCD) has a negative and significant influence (t = -2.18, p = 0.030). There is a negative, non-significant effect of environmental waste management disclosure (EWMD) (t = -1.10, p = 0.273), and environmental research and development disclosure (ERDD) (t = 1.15, p = 0.252).

ENPD is significant and negative with the effect of z = 3.24, p = 0.001, and EPCD is insignificant with the effect of z = -2.27, p = 0.023 under the random-effects model. EWMD is negative and not significant (z = -1.24, p = 0.214), and ERDD is positive, but not significant (z = 1.28, p = 0.199). ENPD, EPCD, EWMD and ERDD are also positive and significant (ENPD t = 3.10, p = 0.001), negative and significant (EPCD t = -2.24, p = 0.026), negative and significant (EWMD t = -1.34, p = 0.181), and positive and insignificant (ERDD t = 1.43, p = 0.154) according to the pooled OLS results. In general, despite the significant individual impact of certain variables (ENPD and EPCD), the low R-squared values indicate that environmental sustainability disclosures have limited total explanatory power for market performance.

**Table 6:** Regression Results

| | **Fixed-Effect Model** | | | **Random-Effect Model** | | | **Pooled OLS Model** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Tobin Q** | Coeff. | t | P>\|t\| | Coeff. | z | P>z | Coeff. | t | P>\|t\| |
| **ENPD** | 9.1238 | 3.25 | 0.001 | 8.6219 | 3.24 | 0.001 | 8.154 | 3.10 | 0.002 |
| **EPCD** | -7.246 | -2.18 | 0.030 | -7.079 | -2.27 | 0.023 | -6.826 | -2.24 | 0.026 |
| **EWMD** | -3.275 | -1.10 | 0.273 | -3.588 | -1.24 | 0.214 | -3.921 | -1.34 | 0.181 |
| **ERDD** | 2.8783 | -1.15 | 0.252 | 3.015 | 1.28 | 0.2199 | 3.284 | 1.43 | 0.154 |
| **_cons** | 3.0060 | 1.90 | 0.058 | 3.5706 | 2.31 | 0.021 | 3.861 | 3.27 | 0.001 |
| **R-squared** | = | 0.0274 | | R-squared | = | 0.0243 | R-squared | = | 0.0245 |
| **F(4,501)** | = | 3.54 | | Wald chi2(4) | = | 14.44 | F(4, 547) | = | 3.43 |
| **Prob > F** | = | 0.0073 | | Prob > chi2 | = | 0.0060 | Prob > F | = | 0.0087 |

*Source:* Researcher's Computation (2025)

Table 6 shows the regression results of the fixed effect model, the random effect model, and the pooled OLS model

**Environmental Sustainability Disclosure and Market Performance of Listed Manufacturing Firms in Nigeria**

According to Table 7, the extent of the statistically significant impact of environmental sustainability disclosure on market performance is quite low. Still, the explanatory power is also low, with an R-square of 5.71 per cent. This implies that, as much as sustainability reporting is a factor in creating deviations in market performance, the majority of the factors that lead to these deviations are external to environmental disclosure practices. A more rigorous theoretical explanation for these results is drawn from signalling theory and stakeholder theory. According to signalling theory, disclosures signal investors about the firm's underlying quality or risk profile (Spence, 1973). Pollution control disclosures, unlike proactive environmental protection measures, may signal unresolved environmental liabilities or ongoing compliance challenges. Investors may interpret these disclosures as indicators of potential financial burdens from fines, remediation costs, or regulatory sanctions, thereby lowering confidence and market valuation. From a stakeholder theory perspective (Freeman, 1984), stakeholders, including investors, assess corporate actions based on perceived effectiveness and alignment with long-term value creation. When pollution control efforts are disclosed but perceived as inefficient, incomplete, or reactive rather than preventive, the market may interpret this as evidence of operational weaknesses or managerial inefficiency.

Additionally, prospect theory (Kahneman & Tversky, 1979) offers insight into investor behaviour in response to negative information. Investors tend to overweight potential losses relative to gains, meaning that disclosures highlighting environmental risks or ongoing

pollution issues may evoke stronger negative reactions than equivalent positive signals from general environmental protection initiatives. This can explain why EPCD, although intended to signal transparency and accountability, may paradoxically reduce investor confidence. Industry-specific factors and regulatory strength also moderate this effect; unlike the oil and gas sector, where environmental disclosure is often tightly regulated and positively perceived (Etim & Akpan, 2023; Nurshabrina et al., 2024), manufacturing firms may face less stringent enforcement, making pollution disclosures more likely to be interpreted as a signal of risk rather than competence. While ENPD signals proactive risk management and long-term value creation, EPCD may inadvertently highlight existing environmental liabilities or inefficiencies, triggering negative market reactions. This theoretical framing reconciles the seemingly contradictory effects of environmental disclosures and underscores the nuanced role of disclosure type, firm efficiency, and investor perception in shaping market outcomes.

The disclosure of environmental waste management (EWMD) and environmental research and development (ERDD) was positive but insignificant, with a low market impact. Although ERRD is more aligned with long-term green innovation strategies, the lack of strong market impact suggests that investors are not yet ready to fully value the future significance of sustainability research. Nevertheless, international experience (e.g., Chiu et al., 2020) demonstrates that transparent environmental R&D reporting can positively impact market valuation, suggesting that better disclosure procedures and more efficient regulations should be pursued. In general, the results have significant policy implications: improving disclosure levels, ensuring control over compliance, and fostering motivation towards green innovation may improve the environmental and market performance of manufacturing companies in Nigeria.

**Table 7:** Panels Corrected Standard Errors Regression

| **Tobin's Q** | **Coef.** | **Panel--corrected Std. Err** | **z** | **P>\|z\|** |
|---|---|---|---|---|
| **ENPD** | 9.867 | 2.841 | 3.47 | 0.001 |
| **EPCD** | -8.473 | 3.432 | -2.47 | 0.014 |
| **EWMD** | -3.799 | 3.454 | -1.10 | 0.271 |
| **ERDD** | 4.308 | 3.533 | 1.22 | 0.223 |
| **_cons** | 4.748 | 2.317 | 2.05 | 0.040 |
| **OBS** | = 552 | Number of groups | = 46 | |
| **R-squared** | = 0.0571 | Rhos | = 0.7235 | |
| **Wald chi2(4)** | = 12.80 | Prob > chi2 | = 0.0123 | |

Researcher's Computation (2025)

Table 7 shows the regression results for the variables investigated in this study, with a significance level of 5% (0.05).

## CONCLUSION AND RECOMMENDATIONS

The paper analysed the connection between environmental sustainability reporting and the market performance of listed manufacturing companies in Nigeria. The results from panel-corrected standard errors regression indicated that disclosure of environmental sustainability has a statistically significant, small impact on market performance, explaining 5.71 per cent of the variance. The individual disclosures had mixed results: environmental protection cost disclosures had a positive and significant impact, pollution control disclosures had a negative and significant impact, and environmental waste management and environmental research and development disclosures had statistically insignificant effects. The results suggest that sustainability practices do generate economic value, but investors remain somewhat sceptical, especially when

disclosure indicates inefficiencies or a lack of control over environmental risks.

**Conclusion**

It is concluded that the role of environmental sustainability disclosure in determining the market performance of the Nigerian manufacturing companies is significant but minimal. The findings confirm aspects of institutional theory and legitimacy theory by showing how companies respond to regulatory pressure and societal expectations by reporting on sustainability. The outcomes of environmental protection disclosures included stronger market performance, demonstrating that open communication about environmental stewardship can reinforce legitimacy, enhance reputation, and build investor confidence. On the other hand, negative implications of pollution-control disclosures indicate that controlling pollution is financially costly and may be inefficient in environmental operations, thereby reducing perceived firm value. The findings are theoretically relevant; they demonstrate that the quality of disclosure and stakeholders' perceptions have varying effects on market outcomes in sustainability reporting. At the policy level, the study highlights the necessity to enhance regulatory frameworks and mechanisms, as well as harmonised sustainability reporting, to increase the credibility and usefulness of environmental disclosures.

**Recommendations**

Based on the findings and conclusions of this study, the following recommendations were formulated:

i. There is a need to have more stringent sustainability reporting guidelines by government agencies and stock market regulators to achieve uniformity, accuracy, and transparency.

ii. Companies are advised to focus on environmental research and development to be in line with the international green innovation benchmarks and enhance their future competitiveness.

iii. The firms ought to enhance efficiency in operations and technology to ensure that the efforts of pollution reduction are not symbolic.

iv. Stakeholders such as analysts and investors ought to be sensitised on how to interpret sustainability disclosures so that they do not create a false impression.

v. Integrating the frameworks of the Nigerian ESG reporting systems with international models like the GRI and the IFRS Sustainability Disclosure Standards will enhance comparative aspects and investor confidence.

vi. The government and the regulatory authority should offer incentives to those firms that show good environmental stewardship, such as tax rebates or recognition by the government.

**Suggestions regarding Future Research**

Future studies need to build on current research by adopting a cross-country comparative methodology to determine whether the effect of environmental sustainability disclosure on market performance varies across regulatory environments, cultures, and structures. Comparisons such as these may provide further understanding of how institutional strength and quality governance influence sustainability outcomes. Secondly, sectoral analyses would also be useful, especially by comparing manufacturing companies with other sectors such as oil and gas, telecom, agriculture, and financial services. This would help establish whether sustainability reporting is affected by industry-specific factors that determine its effectiveness and market relevance. One more direction with potential to develop is the institutional and organisational obstacles to the successful deployment of ESG frameworks. Research may focus on issues such as lax enforcement of regulations, insufficient technical skills, insufficient data, and poor corporate governance practices that negatively affect consistent sustainability reporting. Longitudinal designs can also be considered in future studies, as they can quantify the long-term impact of sustainability initiatives on firm value by capturing benefits that may not be reflected in short-term market performance indicators. The development of new directions, including digital sustainability reporting, the use of artificial intelligence for ESG analytics, and the implementation of sustainability metrics in investment decision-making, may also be informative. Lastly, the researchers should undertake an exploration of stakeholders' perceptions, particularly those of investors, customers, employees, and regulators, to understand how stakeholders perceive and respond to environmental disclosures, which ultimately shape market performance.

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