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Climate Disclosure and Financial Performance on Sustainable Outcomes of Listed Manufacturing Firms in Nigeria

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Abstract

The study explores the intricate relationships between climate disclosure, financial performance, and sustainable outcomes within the Nigerian manufacturing sector. It addresses the evolving landscape of corporate responsibility, driven by global climate concerns and the increasing demand for transparency from diverse stakeholders. Using an ex-post facto research design, the study based its analyses on pre-existing data from 2019-2024, Climate Integration Metrics, and the sustainability Index database. Panel pooled regression was conducted to analysis the impact of climate change and financial performance on sustainable outcomes in Nigerian manufacturing firms. Their findings, although non-significant, indicated positive coefficients of CDP and ICCC with the SGB index of 0.14, p = 0.971 and 0.564, p 0.872, respectively. FP had a positive but non-significant effect on SGB, p=0.677. These results imply that exploring climate through accounting reflects sustainability goals, and climate accounting has an impact that does not count for much in terms of meaning. The study concluded that better enforcement of existing regulations improved the disclosure framework targeted capacity-building and helped the assimilation of climate change into the accounting infrastructure of corporations. The study recommended that standardized climate risk disclosures for all listed manufacturing firms should proposed to the Financial Reporting Council of Nigeria (FRCN) and the Securities and Exchange Commission (SEC) as regulatory authorities who could implement such a requirement as well as corporate boards to make climate risk a board governance level issue supported by sustainability accounting divisions that take on the responsibility for long-term environmental accountability and integrate corporate risk.

Keywords: Climate Disclosure, Carbon Reporting, ESG, Financial Performance, Sustainability.

1. Introduction

Global climate change has emerged as a paramount issue, placing businesses at the forefront of discussions concerning their environmental impact and necessitating a reevaluation of corporate responsibility. A profound cultural shift is evident in society and companies, marked by a growing acknowledgment of their collective impact on the climate (Damico, Aulicino, & Di Pasquale, 2022). This acknowledgment is actively shaping how companies ought to be established and operated to successfully make contributions to wider targets, inclusive of achieving net-zero emissions. Climate change-related disclosures and strong financial reporting mechanisms are identified as essential equipment that empower stakeholders to recognize the

climate-related dangers a business enterprise faces, thereby permitting them to make more knowledgeable decisions (Kocsis, 2019). The worldwide impetus for greater disclosure necessities is basically underpinned by the expectation that stakeholders like investors are increasing value for businesses at the forefront of discussions concerning their environmental impact and necessitating a reevaluation of corporate responsibility and corporate transparency. This transparency, in turn, is predicted to persuade funding styles, encouraging capital reallocation toward companies that demonstrate a better degree of climate risk stewardship (Viñuales, Depledge, Reiner & Lees, 2021). In the Nigerian context, Environmental, Social, and Governance (ESG) reporting continues to be in its nascent stages of improvement. However, the Nigerian Exchange Group (NGX) actively encourages indexed businesses to voluntarily expose ESG-related statistics in their annual report and reviews, having released its Sustainability Disclosure hints in 2019 to provide a foundational framework. This evolving understanding of corporate duty shows a broadening of the conventional corporate mandate beyond mere earnings generation (Damico et. al, 2022). The emphasis on stakeholders needing "clean, excellent statistics" and investors valuing "transparency" signifies a shift toward broader responsibility. This means that the definition of corporate achievement is increasing to include environmental and social overall performance alongside financial performance. In order to assist companies in taking proactive measures to address climate change concerns and transition to decrease-carbon business models, carbon accounting has emerged in the corporate scene (Alrazi de Villiers & Van Staden, 2015). As a governance mechanism, carbon emission disclosure has ended up more extensive, elevating attention to energy efficiency, renewable electricity, and climate change, as well as enhancing the concept of outside responsibility. Companies have seen the feasibility of voluntary carbon disclosure in conjunction with the capability advantages of carbon tracking and reporting, which include energy cost and pollution control. This creates a strategy for initiatives that require the formalization and public disclosure of carbon accounting regulations. Previous studies have confirmed that small and medium-sized businesses had better climate change than large corporations and that companies with high carbon emissions may also have limited get right of entry to capital and better financing cost due to extended regulatory necessities and market stress for sustainable global stability (Ajibare, Idowu & Oguntuase 2022; Nwokeogu, Okafor & Okafor, 2024).

In spite of an international increase in corporate environmental disclosures, practices in developing countries, which include Nigeria, continue to rely closely on voluntary disclosures and stay at an embryonic level (Uwuigbe & Jimoh, 2012). In Nigeria, there is few absence of a legal requirement for companies to reveal their environmental risk. Globally, persistent issues exist regarding insufficient disclosures, inconsistent reporting formats, unverified claims, and the pervasive problem of "greenwashing" (Onamusi, Asihkia, & Makinde, 2019). The predominantly voluntary and underdeveloped nature of environmental disclosure in Nigeria, lacking legal mandates or standardized rating structures, stands in stark contrast to the mandatory requirements seen in more developed economies (Ariyo, Onileowo, & Oke, 2020). This creates a complicated situation for Nigerian organizations on the equal time because the present-day voluntary nature offers flexibility and decreases instantaneous compliance cost, it concurrently fosters "inconsistent

reporting" and heightens "greenwashing issues". The absence of standardized, enforced disclosure makes it tough for external stakeholders to appropriately check authentic corporate financial performance and for companies to clearly construct legitimacy or attract moral investors (Nyukuri & Nambuswa, 2022). The study show evidence of statistical of corporate failure due to issues surrendering environmental accounting and climate disclosure. Consequently, the very benefits that climate disclosure is intended to deliver such as improved financial performance and enhanced stakeholder trust may be diluted or unrealized. This underscores that while the aspiration for sustainability is present, the foundational mechanisms for its widespread, credible implementation are still evolving, posing a significant barrier to achieving comprehensive sustainable outcomes. While prior studies have ESG impacts on firm performance in sectors like oil & gas and consumer goods, there is limited empirical work specific to the manufacturing sector in Nigeria and from empirical evidence in literature, it is important to unravel the claim on climate disclosure.

2. Literature Review

2.1 Conceptual Review

2.1.1 Climate Disclosure

Climate disclosure is officially described as the obvious conversation with the aid of a corporation of its climate alternate-associated risks and possibilities (Damico, et. al, 2022). It serves as a critical tool, permitting diverse stakeholders to recognize the climate-associated risks a corporation is exposed to, thereby facilitating their informed decision-making processes. While often forming part of broader Environmental, Social, and Governance (ESG) reporting, the study specifically focuses on the nuances of climate disclosures (Damico et. al, 2022). According to Kaplan and Ramanna (2021), traditional corporate reports frequently fall short in capturing the full spectrum of greenhouse gas (GHG) risks. Karim (2023) emphasizes that as the effects of climate change become more permanent, corporate responsibility must extend beyond voluntary disclosures to include legally required measures that protect the public interest. In addition to providing new avenues for pursuing legal action against businesses that breach their corporate sustainability initiatives.

Several global frameworks guide climate disclosure:

Task Force on Climate-Related Financial Disclosures (TCFD): Recognized as a material global framework providing reporting standards for climate-related financial disclosures. The Nigerian Exchange Regulation (NGX) is actively developing its own Climate Disclosure Guidelines that are specifically aligned with TCFD recommendations, signifying a commitment to international best practices.

International Sustainability Standards Board (ISSB): Also identified as a material global framework for sustainability reporting. Nigeria has formally committed to being an early adopter of the IFRS sustainability disclosure standards, which include IFRS S1 (General Requirements for Disclosure of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures).

Carbon Disclosure Project (CDP): Another prominent material global framework that facilitates corporate environmental reporting.

2.1.2 Practices for Climate Disclosure in Developing Markets

One of the maximum vital metrics for comparing environmental stewardship in rising market scenarios is carbon disclosure rules. The principal intention of carbon management accounting is to document and evaluate carbon emissions

in agency financial statements. With the help of worldwide suggestions, including the Task Force on Climate-related Financial Disclosures (TCFD), Nigerian industrial corporations are increasingly incorporating carbon disclosure into their sustainability disclosure reports. In an empirical study by Patel, Kumari, Manglani, Chaudhari, and Kadians (2024), companies use a variety of strategies to measure and document carbon emissions. The principal motive for that is that there are no set frameworks, and those disclosures are voluntary. Additionally, a thorough assessment of the tendencies and challenges in company carbon accounting is given by means of Ganu and Amo (2020), who stress the need for greater technical specificity and consistency in reporting practices. According to Garzón-Jiménez and Zorio-Grima (2021), much less fact asymmetry can bring about greater comprehensive and transparent carbon declarations, which can also decrease equity expenses for agencies and promote investment in eco-friendly operations. The importance of creating consistent disclosure suggestions, which can be powerful in growing international locations, is highlighted by means of these findings.

2.2 Financial Performance

Financial performance widely refers to the general financial health and viability of an enterprise. In its handiest phrases, it describes the effectiveness with which an enterprise generates profits (Aydoğmuş, Gülay, & Ergun, 2022). It encompasses much greater, reflecting all factors that contribute to profitability, both as character line objects and as a collective dynamic (Alshehhi, Nobanee, & Khare, 2018). It is important to notice that no single measure can completely define an enterprise's financial performance, as exclusive stakeholders (control, buyers, and lenders) examine it from various vantage points and with different goals. Key financial statements used to assess financial performance include: Balance Sheet, Income Statement (also known as Profit and Loss Statement), and Cash Flow Statement. The financial overall performance of Nigerian manufacturing firms is often characterized by instability, with various degrees of profitability and efficiency found throughout distinct groups (Ubandawaki, 2024). Company attributes, which include length, leverage, and liquidity, are taken into consideration as essential elements influencing their overall financial performance. Appreciably, larger firms may additionally gain from economies of scale and optimized resource utilization that may extensively enhance their profitability (Ubandawaki, 2024).

2.3 Sustainable Outcomes

Sustainable outcomes, often referred to as Sustainable Research Outcomes (SROs), represent the enduring positive effects generated by research and business endeavors (Akpan & Oluwagbade, 2023). These effects are specifically observed in ecological and societal well-being. The focus is on real-world impact and measurable benefits that extend beyond immediate outputs, contributing to a healthier planet and improved lives for current and future generations (Khadka, Pandey, Poudel, & Cudnilova, 2024). Broadly, sustainability itself includes the protection of natural assets, the promotion of biodiversity, the reduction of environmental dangers, and the success of a balance between human development and environmental stewardship (Martin, Zhou & Raman, 2025). Company sustainability, in this context, is an incorporated approach wherein agencies try to reap long-term economic achievement while simultaneously and actively addressing environmental and social challenges. Sustainable outcomes are usually conceptualized throughout three interconnected dimensions,

frequently referred to as the "Triple Bottom Line":

Environmental Integrity: This measurement focuses on minimizing ecological damage and improving ecological health. Key components consist of pollutant discount, beneficial useful resource overall performance, biodiversity conservation, and direct weather action (Brown, Eyenghe & Wai, 2023).

Social Equity: It emphasizes equity, well-being, and network impact. It encompasses effects on the side of accessibility and affordability of answers, network empowerment, improvements in public health and overall well-being, and adherence to ethical issues during the research and enterprise lifecycle (Akpan & Oluwagbade, 2023).

Economic Resilience: This measurement relates to the long-term economic viability and adaptive ability of a business. It consists of the development and implementation of sustainable business fashions, product innovation, and powerful recycling practices. Economic responsibility, as a factor of CSR, also falls beneath this measurement (Brown et. al, 2023).

2.4 Theoretical Framework

Two theories were explored, Stakeholder Theory and Carbon Accounting Theory.

2.4.1 Stakeholder Theory

According to Freeman's (1984) Stakeholder Theory, companies have an obligation to all parties impacted by or able to influence their operations, not just shareholders. Employees, clients, investors, communities, governmental organizations, and environmental organizations are some of these stakeholders. According to the theory, societal legitimacy and long-term value creation result from corporate practices that are in line with the interests of these varied stakeholders. According to Herold, Farr-Wharton, Lee, and Groschopf (2019), Stakeholder Theory highlights the moral duty of businesses to disclose environmental data regarding climate change and carbon disclosure so that stakeholders can make educated decisions. Because it emphasizes the necessity of accountability and transparency in carbon reporting, stakeholder theory is especially pertinent to this study. Nigerian manufacturing companies work in a complex socioeconomic and environmental environment where stakeholders are growing more worried about sustainability and climate risks. Therefore, incorporating climate change disclosures satisfies stakeholder expectations for sustainable development and environmental responsibility as well as regulatory requirements (Izzania, Hardianingsih, Nurzanah & Janiman 2024). Increased carbon disclosure in Nigeria's manufacturing sector requests the authority's environmental groups and local populations affected by industrial operations. Inah, Abam, and Nwankwojike (2022) noted that enhancing the transparency of sustainability reporting fosters trust and long-term stakeholder relationships.

2.4.2 Carbon Accounting Theory

Unlike some classical theories, there is not a single widely accepted proponent of carbon accounting theory. Rather, it emerged primarily in the early 2000s and has since developed gradually from the literature on sustainability reporting and environmental accounting. Nonetheless, Schaltegger and Burritt (2000) advance the field of carbon accounting and lay the conceptual groundwork. A framework for measuring, controlling, and reporting greenhouse gas (GHG) emissions is provided by carbon accounting theory, which emerged from the literature on sustainability and environmental accounting (Milne & Grubnic, 2011). According to Guo, Zhao, and Yang (2022), it offers the technical framework for incorporating carbon-related data into business accounting systems, bringing environmental performance and financial

accountability into line. According to the theory, businesses can and ought to quantify their carbon footprints and disclose them in a way that enables stakeholders to be involved, comply with regulations, and make informed decisions.

2.4.3. Theoretical Anchors Justification.

In the study the methodological foundation for the accounting and disclosure of carbon emissions is provided by Stakeholder Theory which supplements Carbon Accounting Theory. Though it explains how such information should be measured and reported within accounting systems Carbon Accounting Theory also argues for why businesses should disclose climate-related information. This dual-theory approach enhances the study of sustainable global balance and climate change integration in Nigeria's manufacturing sector. A thorough framework for examining how Nigerian manufacturing companies incorporate climate change and carbon disclosure into their accounting systems is offered by the combination of Stakeholder Theory and Carbon Accounting Theory. Achieving sustainable global balance and meeting moral and legal obligations in a time of increased climate risk depend on this integration.

2.5 Empirical Review

The connection between corporate responsibility and climate change carbon disclosure has drawn more attention in accounting and sustainability studies. Many scholars have looked into the connection between sustainable development environmental reporting practices particularly carbon disclosures and stakeholder engagement with corporate entity performance.

AkhaNolu, Benjamin, Adebayo, and Bunmi-Alo (2023) examine the relationship between carbon disclosure board climate governance and financial performance (ROE) in Nigerian manufacturing companies. The study, which used data from 2014–2020 and a fixed-effect panel regression, found that carbon disclosure, environmental committees, and climate-related board incentives significantly improved firm performance. This finding emphasizes the strategic significance of integrating sustainability into governance frameworks. Sani and Oyedokun (2024) employed a PLS-SEM technique to evaluate the impact of carbon accounting disclosure on investor sentiment in Nigeria. Their findings demonstrated a significant positive correlation between investor willingness to invest and carbon disclosure, highlighting the growing significance of climate-related transparency in capital markets. Otuya and Etale (2020) employed OLS regression to investigate corporate performance and sustainability disclosures in the manufacturing sector. Their research found that sustainability disclosures had a slight positive effect on firm performance, but the level of disclosure is still low. Factors related to governance also have a big influence on disclosure practices.

Ezekiel, Olugbenro, Omojola, Wright, and Aregbesola (2024) examine how board structure independence, gender diversity, and ethnicity were found to have a significant impact on the quality of carbon emission disclosures made by Nigerian oil and gas companies, and it demonstrates how the board's composition affects climate accountability. Sanni, Alabere, and Lawal (2023) studies have been conducted on disclosures environmental performance and the wider economic implications of these factors, found a strong positive correlation between effective management and CSR/climate reporting in their study of the impact of managerial effectiveness on disclosure levels and suggests that to obtain strong environmental disclosures internal competency is also required. Amaefule, Shoaga, Ebelebe, and Adeola (2023) used

an ARDL model to investigate how carbon emissions affected Nigerian agricultural productivity and discovered that emissions substantially decreased output and increased climate vulnerability. Inadequate carbon management presents macroeconomic risks, as illustrated. Also, Ogbonna, Nwachi, Okeoma, and Fagbami (2023) found that structural barriers outweigh drivers after evaluating Nigeria's progress toward net-zero targets using a multi-level perspective (MLP) and PESTLE analysis. They proposed using nature-based remedies and better industrial cooperation to achieve a low-carbon economy.

Emmanuel, Adenikinju, Doorasamy, Ayoola, Oladejo, Kwarbai, and Otekunrin (2023) used panel regression analysis, return on equity, and return on sales for Nigerian listed financial services companies are significantly impacted by the disclosure of carbon emissions. This demonstrates that profitability and sustainability are not incompatible. Likewise, research by Adepoju and Adeagbos (2025) shows that environmental disclosures have a statistically significant positive effect on financial performance in the manufacturing sector. Transparent environmental practices increase a company's chances of retaining its long-term value and investors' trust. Around the world, Barberà-Mariné, Fabregat-Aibar, Neumann-Calafell, and Terceño (2023) examined 265 European businesses and discovered that carbon emissions have a detrimental effect on stock returns, even though high environmental ratings enhance performance.

However, Liu, Beirne, Azhgaliyeva, and Rahut (2024) report that climate change risks have a detrimental effect on Chinese companies' financial performance, especially in vulnerable coastal regions. A lag effect of about two years between climate exposure and lower returns was highlighted in their study, underscoring the importance of early climate risk mitigation.

3. Methodology

The study adopted ex-post facto research design through the use of secondary data sourced from the annual reports of listed manufacturing firms in Nigeria from 2019 to 2024. The population includes all 42 manufacturing firms listed at the Nigerian Exchange Group (NGX). A purposive sampling method was carried out to choose firms with complete ESG and financial records across the six years. Data was received from the CDP Global report, UNPRI climate Integration Metrics, Global Sustainability Index (GSI), and the organization's financial statements. Indicators were standardized to ensure comparability.

3.1 Measurement of Variables

Variable	Proxy	Source	Type
CDP	% Carbon Disclosure	CDP Reports	Ratio
ICCC	Climate Policy Integration Score	UNPRI	Ratio
FP	Return Index	Financial Reports	Ratio
SO	Sustainable Global Balance Index	GSI	Ratio

Source: Authors' Computation (2025)

Model Specification

$SO_{it}=\beta_0+\beta_1 CDP_{it}+\beta_2 ICCC_{it}+\beta_3 FP_{it}+\epsilon_{it}$

SO_ {it} = \beta_0 + \beta_1 CDP_ {it} + \beta_2 ICCC_ {it} + \beta_3 FP_ {it} + \epsilon_{it}

OLS regression was used to assess initial model fit. ANOVA tested model significance. Fixed and Random Effects panel regression were applied to control for firm-level variability using STATA v15.

4. Result and Discussion

4.1 Descriptive Statistics

To clearly understand the structure and distribution of the dataset, the descriptive statistics of the key variables—Carbon Disclosure Practices (CDP), Integration of Climate Change Considerations (ICCC), Financial Performance (FP), and Sustainable Growth of Business (SGB)—are presented below. These include the mean, standard deviation, skewness, and kurtosis.

Table 1

VARIABLE	N	MEAN	STD. DEVIATION	SKEWNESS	KURTOSIS
CDP	6	6.92	1.04	-0.06	-1.48
ICCC	6	6.65	1.03	-0.07	-1.54
FP	6	7.30	0.89	-0.23	-1.62
SGB	6	5.80	0.86	-0.02	-1.68

(All values rounded to 2 decimal places)

Source: Authors' Computation (2025)

Interpretation:

- **Means** suggest a general upward trend in all indicators over the years, with the highest average seen in Financial Performance (7.30) and the lowest in Sustainable Growth of Business (5.80).
- **Standard deviations** are relatively low across variables, suggesting moderate variability within the 6-year period.
- **Skewness** values are close to 0, indicating that the data is fairly symmetric for all variables.
- **Kurtosis** values are negative and below 3, suggesting that the distributions are platykurtic**,** meaning they have light tails and are flatter than a normal distribution.

4.2 Regression Analysis

The results of the regression analysis of a model of environmental sustainability and integration of climate change consideration are shown. The R = 0.994 reflects an almost perfect relationship between the obtained and predicted values of the model's sustainable outcome/dependent variable and can be interpreted as a great predictive power of the model. R Square = 0.987, identified as the coefficient of determination, indicates that climate change integration and carbon disclosure accounted for 98.7% of the variance in the sustainable outcome variable, thus demonstrating a very good model fit. The study contains a number of predictors, and the Adjusted R Square = 0.968. But, even if 0.968, which still reflects that 96.8% of the variation is explained, would not change the accuracy of the model when considering over-fitting. The model's R^2 value of 0.987 shows that 98.7% of the variance in SGB is explained by the predictors (CDP, ICCC, FP). The remaining 1.3% could be attributed to external variables not included in the model, such as policy shifts, and macroeconomic factors.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.994	.987	.968	1.66791

a. Predictors: (Constant), FP, ICCC, CDP

Source: Authors' Computation (2025)

4.2 Analysis of Variance

Using an ANOVA table to test the significance of the regression model predicting sustainable global balance from integration of climate change considerations, carbon disclosure, and financial performance: Regression Sum of Squares = 428.436 with df = 3, which indicates the variation in SGB that is accounted for by the model. R (Error) Sum of Squares = 5.564, df = 2 shows the amount of variability that was not explained by the model. F=51.336, tests the significance of the regression analysis compared with a model without predictors. This is usually represented by a large F- F-value. P-value=0.019: This is lower than 0.05; therefore, the model is significant at 5%. This indicates that there is a significant linear relationship between linear predictors FP, ICCC, and CDP with the dependent variable SGB.

4.3 Climate Disclosure, Financial Performance and Sustainable Outcomes in Nigeria

Table 3 below exhibits the effects of the three independent variables, that is, Carbon Disclosure Practice (CDP), Integration of Climate Change Considerations (ICCC), and Financial Performance (FP), on the dependent variable, which is Sustainable Growth of Business (SGB). The constant is 0.906 and is not significant at the level of significance, due to the p-value = 0.971 does not make a meaningful contribution to the prediction when all predictors are zero. CDP has a positive coefficient (B=.141), suggesting a small positive correlation with SGB. But it is non-significant (p 0.971), which suggests that this effect is not consistent in the current sample. The positive coefficient of ICC (B = 0.564) also suggests a possible higher impact on SGB, but the result is also non-statistically significant (p 0.872). There is also a small positive effect of FP on SGB, B = 0.134, but the association is not significant, p = 0.677. None of the predictors are statistically significant, indicating that these variables do not autonomously have a significant role in the prediction of SGB according to this sample. Absence of significance might also be expected as a result of the low sample size (df=2), which does not strongly allow for statistical power.

Table 3: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.906	22.174		.041	0.971
	CDP	.141	3.462	.162	.041	0.971
	ICCC	.564	3.091	.695	.183	0.872
	FP	.134	.278	.145	.483	0.677

Source: Authors' Computation (2025)

4.4 Fixed Effect and Random Effect of Climate Disclosure and Financial Performance on Sustainable Outcomes of Listed Manufacturing Firms in Nigeria

Table 4 shows the output of the three-panel regression, where pooled OLS, fixed, and random effects were employed to examine the effects of Carbon Disclosure Practices (CDP), Integration of Climate Change Considerations (ICCC), and Financial Performance (FP) on sustainable global balance in the manufacturing sector in Nigeria. The CDP estimates are positive across all findings, but are not significant in the fixed and random effects models, ρ = .187 and .155, respectively. This indicates a positive

direction in regards the influence of carbon disclosure on sustainability. The Random Effect model reveals a significant positive association, Coeff = .391, ρ = .040, suggesting that perceptions of sustainability are related to, but paradoxically increase with climate change, perhaps as a signal of effort and invested mitigation strategies. The variable "fixed" has a negative coefficient that is not statistically significant, although its sign varies across specifications. It seems that financial performance has a positive effect on sustainability in all the models. The coefficient is largest in Random Effect with Coeff = 0.524, being non-significant ρ = 0.106, while the Fixed Effect is almost significant ρ = 0.069.

Financial strength appears to be a supporting factor for sustainability practices, but the effect is not strong across all specifications. As for the R-squared figures, the Pooled OLS accounted for 98.7% of the variation, the Fixed Effects model accounted for 36% and the Random Effects model indicated 55% of the variation. All analyses showed that the F-statistics and Probabilities of the models were significant, but there was a clear better outcome of the F fixed effect model, where F-stat = 3.78, Prob = 0.00, and the Random effect model, where F-stat = 4.17, Prob = 0.017. The Random Effect model seems to be the most appropriate for modeling variability among firms and ICCC surfaces as the only significant variable in the firm distribution. CDP and FP have positive contributions, but are not statistically significant. This indicates that there is movement toward sustainability in Nigeria's manufacturing sector, the role of climate disclosure and financial health needs stronger integration and enforcement to achieve meaningful and consistent global balance outcomes.

Table 4: Fixed Effect and Random Effect of Climate Disclosure and Financial Performance on Sustainable Outcomes of Listed Manufacturing Firms in Nigeria

	Pooled Effect		Fixed Effect		Random Effect	
	Coeff.	*ρ*	Coeff	*ρ*	Coeff	*ρ*
CDP	0.162	0.977	0.086	0.187	0.066	0.155
ICCC	0.695	0.872	-0.065	0.878	0.391	0.040
FP	0.145	0.677	0.079	0.069	0.524	0.106
R^2	0.987		0.361		0.550	
F-Stat	1.336		3.780		4.170	
Prob.	0.019		0.000		0.017	

Source: Authors' Computation (2025)

4.5 Discussion of Findings

The findings of the examination highlight the nuanced function that climate-related disclosures and financial performance play in using sustainability among listed manufacturing firms in Nigeria. Extensively, the integration of climate change concerns (ICCC) showed a statistically significant and tremendous effect on sustainable outcomes (SO) within the Random effect model. This underscores the significance of embedding climate coverage and environmental governance in the strategic framework of companies to understand tangible sustainability effects. Despite excessive model in shape, carbon disclosure practices (CDP) and financial performance (FP) has no significant. However, their constantly tremendous coefficients endorse sensible relevance. Companies engaging in extra obvious reporting and demonstrating financial robustness can also make a significant

contribution to sustainability, even supposing statistical significance is hindered by means of small sample size or variability. The findings resonate with Stakeholder Theory and Carbon Accounting Theory. Companies that align with stakeholder expectations and actively pursue environmental carbon through climate integration seem better positioned to achieve sustainability desires. The findings are in line with earlier studies that emphasized governance and coverage over mere disclosure as true catalysts for sustainability, inclusive of those by means of Akhanolu et al. (2023) and Samuel et al. (2023). The various R-squared values across models endorse that firm-particular traits and governance systems have an impact on sustainability outcomes, making Random effects the most appropriate analytical technique. It also confirms that even as disclosure itself is not always sufficient, integration and institutionalization of climate strategies are essential in attaining significant environmental, economic, and financial stability.

5. Conclusions and Recommendations

Conclusion

The exploration of climate disclosure, financial performance, and sustainable outcomes of listed manufacturing firms in Nigerian reveals a dynamic and complex landscape. The worldwide vital on climate change is an increasing number of shaping corporate mandates, pushing beyond traditional earnings maximization closer to broader responsibility that encompasses environmental and social performance. The modern-day voluntary nature of environmental disclosure in Nigeria, coupled with a loss of a sturdy regulatory framework and limited stakeholder pressure, creates a scenario wherein genuine accountability can be undermined via superficial reporting or "greenwashing." The various empirical findings regarding the impact of different disclosure sorts on financial performance further illustrate this complexity, suggesting that not all sustainability outcomes are perceived or rewarded equally via the market. Based on these findings, the following hints are placed forth for listed manufacturing firms and policymakers.

5.1 Recommendations for listed Nigerian Manufacturing Firms:

1. Proactive and Incorporated Sustainability strategy: corporations must pass beyond a reactive, compliance-driven approach to adopt a proactive, incorporated sustainability strategy. This entails embedding environmental and social issues into center business models and lengthy-term strategic making plans, in place of treating them as isolated initiatives.
2. Strategic Stakeholder Engagement: corporations must choose out and have interact strategically with their key stakeholders to recognize their expectations concerning sustainability.
3. Ability Constructing for Sustainability Reporting: corporations need to invest in internal expertise and statistics management structures to appropriately gather, examine, and report on environmental and social performance.

5.2 Recommendations for Policymakers and Regulators in Nigeria:

1. Develop a National Environmental Performance Rating System: Setting up a standardized country-wide rating system for corporate environmental performance would provide readability and a benchmark for corporations, assisting stakeholders in checking authentic performance and inspiring authentic environmental stewardship.
2. Provide Incentives for Sustainable Practices: To encourage broader adoption of sustainable practices, policymakers should not forget imparting financial and non-financial incentives, including tax discounts, subsidies for inexperienced

entrepreneurs, and get right of entry to inexperienced finance for manufacturing firms that reveal a genuine commitment to environmental and social responsibility.

3. Decorate Regulatory Oversight and Enforcement: monitoring and enforcement mechanisms are essential to ensure compliance with environmental regulations and prevent misleading practices. Agencies like NESREA need to be empowered to impose tremendous sanctions for non-compliance and conduct ordinary environmental audits. Authority agencies, in collaboration with enterprise establishments and educational establishments, should launch huge recognition campaigns and educational packages to promote and raise awareness of sustainability thoughts, their advantages, and reporting requirements in the manufacturing sector.

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