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Association between the Quantity and Quality of Environmental Disclosure of Listed Non-Financial Firms in Nigeria

[1]Dr. Akinlabi, Akinjide Gideon, [2]Iwajomo, Olaniyi Olatunji, [3]Dr. Ojomolade, Dele Jacob
[1 2 3]Department of Accounting, Finance and Taxation, Caleb University Lagos, Nigeria

Abstract
To determine trend and extent that corporate environmental disclosure address environmental impact, this study examined the association between environmental disclosure quantity and quality of listed non-financial firms in Nigeria. The study adopted legitimacy theory, ex-post facto research design and purposive sampling technique to select most polluting firms as sample. Secondary data obtained were analysed using descriptive statistics and correlation analysis. Average overall and sectorial quantity and quality of environmental disclosure of sampled firms are below average, with quality lower than quantity. Overall and individual sector results proved that statistically significant positive association exists between quantity and quality of environmental disclosure of sampled firms. Correlation coefficient of overall, consumer goods and healthcare sectors' is very strong (above 0.83 and overall 0.71), industrial goods sector is strong (0.66), natural resources and oil and gas sectors were moderate (0.52 & 0.49 respectively). The study concludes that the statistically significant positive relationship between quantity and quality of environmental disclosure of listed non-financial firms in Nigeria is imperfect (less than 1) and confirmed the assumptions of legitimacy theory, which is more pronounced in the industrial goods, natural resources, and oil and gas sectors. The study recommends that relevant agencies and stakeholders should adopt policies that improve corporate disclosure of environmental information that effectively address their environmental impacts.

Keywords: *Legitimacy theory, quality of environmental disclosures, quantity of environmental disclosure;*

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I. Introduction

Globally, attention of stakeholders on corporate environmental accountability is growing. Stakeholders are now more concerned with the extent to which the quantity of corporate environmental disclosed by firms address their environmental impact. This is because environmental information disclosure quantity and damages to the environment are increasing simultaneously. This raise concern on whether the environmental disclosure by firms effectively address the impact of their operation and products on the natural environment. Akinlabi (2025) opined that the recent increases in the corporate response to environmental disclosure are indicative rather than real. For a firm to be regarded as environmentally accountable, its disclosure is expected to improve and should be true, fair and represents what it portends.

Studies confirmed that growing concerns and pressure from stakeholders forced firms to respond positively to environmental sustainability, though initially as a legitimacy tool (Deegan & Rankin, 1996; Iredele, 2020). Stakeholders' demands contributed to improvement in the level (quantity) of corporate environmental disclosure but whether it address the environmental risks and opportunities of firms remain an ongoing debate. The initial expectation is that improved response of firms to environmental information disclosure would encourage healthy corporate environmental practices. The turn of events suggests that increases in quantity of environmental disclosure is yet to have notable impact on the damages caused by firms to the natural environment. The stakeholders are concerned that the improvements in the quantity of environmental disclosure of firms is yet to yield expected level of protection of the natural environment (Duanmu et al. 2018). Environmental accountability model to achieve much anticipated protection of the natural environment must produce disclosure of corporate environmental information that effectively address the environmental impact of firms' products and operations. Such accountability model must guarantee continuous improvement in the environmental disclosure quality and quantity. In order to ascertain whether disclosures of firms are of good quality, continuous measurement and comparison of the disclosure quantity and quality will be necessary (Ayoola, 2017; Akinlabi, 2025).

Streams of empirical evidence that are relevant to this study can be grouped into three. The first group examined the level of environmental disclosure of sampled firms, and some of them went further the identify factors influencing its level. Findings by these studies shows that the quantity of environmental information disclosed by firms in developing countries is poor and below average (Alawiye-Adams & Akomolafe, 2017; Akinlabi, 2025; & Kitsikopoulos et al., 2018). This differ from developed nations experience where disclosures quantity is higher and increasing (Helfaya et al., 2018). Akinlabi (2025) and Kitsikopoulos et al., (2018) noted that quantity of environmental disclosure by sampled firms are growing but at a slower rate than expected. Akinlabi (2025) and Kitsikopoulos et al., (2018) are examples of relevant studies that identified factors influencing corporate environmental disclosure quantity. Others failed to make reference to level of quantity of environmental information disclosed by sampled firms (Helfaya et al., 2018; Soyemi et al., 2019; Adepoju & Adeagbo, 2025). The second group of studies either identified qualitative characteristics of environmental disclosure (Bachmann et al., 2013; Helfaya et al., 2018), measure the quality of environmental disclosure (Brammer et al., 2008; Wei and Wang, 2016)) and/or identified its relationship with other variables (Akinlabi et al., 2022; Nwaigwe et al., 2022). Unlike the first group, the scope of their studies excluded association between quality and quantity of environmental disclosure of sampled firms.

The third group of studies examined the relationship between environmental disclosure quantity and quality of sampled firms, with no consensus yet. Their findings are in three categories; positive, negative and no relationship. Evidence from developing nations (Okereke et al., 2025; Said *et al.*, 2016) suggest that a positive relationship exists between the quantity and quality of environmental disclosure. Conflicting evidence from developed country were reported by Aburaya (2012) and Helfaya *et al.* (2018). While the former found a negative correlation, the latter found no relationship between the quantity and quality of environmental disclosure of sampled United Kingdom (UK) listed firms. Helfaya *et al.* (2018) findings indicate a changing situation in the UK since Aburaya (2012). Akinlabi (2025) and Khosroshahi et al. (2021) further cautioned that the relationship between the quality and quantity of environmental disclosure depends on the economic characteristics of each country, which are dissimilar but comparable. Replicating the examination of the association between the quantity and quality of environmental disclosure of firms in Nigeria is therefore necessary. Findings of such study will help stakeholders determine the extent to which environmental disclosure of firms address the environmental concerns arising from firm activities, products and services.

The study objective is the assessment of the degree of association between quantity and quality of environmental disclosure by listed non-financial firms in Nigeria. In order to achieve this objective, the study addressed the following question;

What is the extent of association between the quantity and quality of environmental disclosures of listed non-financial firms in Nigeria?

This study contends that under the current model of environmental sustainability and accountability, firms predominantly use environmental accountability as legitimacy tool. They adopted environmental disclosure practices that failed to effectively address the environmental risks associated with the business of their enterprise. The quantity of disclosure is growing at a level that is lower than the quality of disclosure. The study discovered that the trend in the disclosure of sampled non-financial sectors shows that the gap between average environmental disclosure quantity and quality is not converging. Though the association between the duos is significantly positive, only two sectors have a very strong association while others have strong and moderate associations. This implies the heavy use environmental accountability as mere legitimacy tool by these sectors.

The rest of the study are structured as follows. Section two, literature review, where the conceptual, empirical and theoretical framework for the study were discussed. In section three and four, research method and results were discussed. Section five and six discussed the conclusion and recommendations from the study.

II. Literature Review

Relevant conceptual, empirical and theoretical frameworks for the study are reviewed thus.

Conceptual Review

The relevant concepts of this study are environmental disclosure quantity and quality.

Environmental Disclosure Quantity

The environmental disclosure quantity refers to the amount or extent of information that a firm provide on the impact of its activities on the natural environment. Such information usually include the measures adopted by a firm to prevent, mitigate or ameliorate negative effect of its activities on the natural environment (Akinlabi, 2025, Engel et al., 2008). Soyemi et al. (2019) opined that corporate environmental information disclosure stems four sources namely involuntary, mandatory, voluntary, and other forms of disclosures. In Nigeria, corporate environmental disclosure is largely voluntary as obtainable in most emerging economies but will become mandatory by 2030.

The quantity of environmental disclosure has been measured in various ways. Early research in corporate environmental disclosure measure quantity of information disclosed using word-count (Alawiye-Adams et al., 2017; Akanno, et al., 2015). Other researchers such as Aliyu (2019) and Solomon (2024) applied selected indices while Global Reporting Initiative (GRI) standard, Security and Exchange Commission (SEC) sustainability reporting guideline for publicly listed firms in Nigeria, and the International Standard Organisation (ISO) standards, among others (Akinlabi, 2025; Ehizalarazi & Kabra, 2017; Soyemi et al, 2019).

Environmental Disclosure Quality

The quality of information refers to its relevance to the needs of users. High-quality information satisfies the needs and demands of users who require it to carry out their tasks or procedures. The degree to which information disclosed by firms address their environmental effect and satisfy stakeholders' expectations measure the quality of corporate environmental disclosures (Akinlabi et al., 2022). In order for environmental disclosures to accomplish this goal, all relevant facts must be represented accurately, fairly, and truthfully (Baalouch et al., 2019).

Previous studies have applied various methods to identify what constitute a proper measure of the environmental disclosure quality. Survey by Bachmann et al. (2013) and Helfaya et al. (2018) identified the extent disclosures address the impacts of products and services on the environment; waste handling; management of water resources; environmental objectives and targets disclosure; among others as measure of environmental disclosure quality. Other researchers have applied selected indices that include some of these indices to measure environmental disclosure quality (Altoé et al., 2017; Baalouch et al., 2019; Erin et al., 2022; Hooks et al., 2007). However, most of these measures does not tailor their index towards the qualitative measures enshrined in the International Accounting Standard Board (IASB).

Environmental Disclosure Quantity and Quality

The extent to which firms disclose environmental information, factors underpinning the disclosure choices, whether the information disclosed address environmental impacts of the firm, and the effect of disclosures on performance are some of the major topics in environmental accounting research. The call and response of firms to increased environmental disclosures is yet to effectively curb the rising level of environmental damage (Deegan, 2016). To accelerate the limited and sluggish progress towards the achievement of environmental sustainability, demand for quality should complement the initial call for increased quantity of disclosure (Kitsikopoulos et al., 2018).

They (quantity and quality of environmental disclosure) have a joint potential role in improving the level of environmental sustainability, which either may not individually achieve. The quality of environmental disclosure by listed firms can only be measured from the extent of environmental information disclosed. A total shift of attention to the call for quality (not in addition to demand for an increased quantity) of environmental disclosure may negatively affect the success recorded so far and limit the potential benefits of the call for quality disclosure alone. Stakeholders' focus has recently shifted to include demand for increased quality in addition to quantity of corporate environmental disclosure (Akinlabi et al., 2022; Ayoola. 2017).

Empirical Review

Mitali et al. (2011) presented evidence from India. They analyzed data obtained from 22 core sectors (oil and petrochemicals, mining and minerals, steel, and cement) through the content analysis method. They discovered that there is variation in environmental disclosures across the industries examined, and the disclosures are of high quality, though the level of information disclosed does not satisfy the needs of stakeholders. Despite this remarkable submission, they did not discuss how they arrived at the themes utilized to determine acceptable quality and quantity of environmental disclosure, as well as the theoretical framework of the study.

Uwuigbe *et al.* (2011) compared the environmental disclosure of listed firms in the building materials and breweries sectors in Nigeria. T-test results obtained shows a significant difference in the environmental disclosure of sampled sections while is generally low. The breweries sector have a higher level of disclosure with lower variation than the building materials sector.

Similar methodology to Uwaloma et al. (2011) was adopted by Oba and Fodio (2012) the latter focused on the oil and gas, and construction sectors. Their findings revealed a statistically significant difference in the quantity of environmental disclosure of sampled sectors but the oil and gas sector have higher disclosure. These findings corroborate Uwaloma et al. (2011) who opined that contribution of individual sector to the overall country-level environmental disclosure in Nigeria is differ significantly. Differences in the level of environmental risks, attention of stakeholders form part of the justifications for the disparity.

Akanno et al. (2015) obtained secondary data from 154 listed firms to examine the corporate environmental disclosure of firms in Nigeria. Descriptive statistics results proved that the oil and gas firms have higher level of environmental disclosure, followed by food and insurance sectors and banking industry, the lowest. Analysis of Variance (ANOVA) results proved that the differences in the extent of environmental disclosure among sampled sectors is significant for all the disclosure themes examined by the study which is not different from Uwaloma *et al.* (2011) and Oba *et al.* (2012).

Comparative evidence of the quantity and quality of environmental disclosure are rare. Rezaee and Tuo (2019) investigated the impact of quantity and quality of sustainability disclosures on the innate and quality of discretionary earnings of listed firms in the USA. Data obtained from 35,110 firms were analysed using the difference-in-difference and Ordinary Least Square (OLS) regression, taking cognizance of ethical values and culture of sampled firms. Results obtained confirmed the quality of sustainability disclosure reinforces the influence of its quantity on earnings quality. This implies that demand for the quality of sustainability disclosure cannot replace but reinforces the role of sustainability disclosure quantity of firms.

Empirical evidence from developing countries obtained by Zulfikar (2021) compared the environmental disclosure quantity of listed firms in Indonesia and Malaysia. The extent of environmental disclosure of sampled firms were measured using content analysis based on the requirements of Sustainability Reporting Guideline (SRG). Results obtained from the t-test proved that the environmental disclosure quantity in both countries are low but different. The study failed to disclose the level of difference observed but it provides empirical evidence that the environmental disclosure of two nations or sectors may not be the same.

Theoretical Framework

This study was premised on the assumptions of legitimacy theory. Propounded by Dowling and Pfeffer in 1975, the legitimacy theory highlights the means by which firms project themselves to stakeholders as responsible, trustworthy and dependable (Martens & Bui, 2023). Firms derive and retain legitimacy by ensuring that their operations fall within values and norms in the implied and changing social contract with the society (Deegan, 2002; Uyagwu & Luka, 2017). Otherwise, the contract may be withdrawn, and the firm loses their legitimacy. The implied social contract requires firms should be seen to adopt practices that secure the environment against damages and ameliorate such where they occur. Omodero & Ihendinihu (2016) argued that the legitimacy gap arises when corporate behavior differs from expectations.

Corporate communication through disclosure is one of the ways firms explain the impact of their operations on the environment. The extent and quality of disclosure are tools that firms have used over time to influence acceptance by the larger society (Akinlabi, 2025; Welbeck et al., 2017). Firms exploit disclosure as a tool to improve their legitimacy by engaging in an increased quantity of environmental information disclosure that may not necessarily address their environmental risks (Deegan et al., 1996; Iredele, 2020). Such disclosure practices improves legitimacy rather than the objective of preserving the natural environment. Legitimacy theory has been widely applauded due to its relevance in explaining common business phenomena such as social and environmental accounting (Deegan, 2019; Iredele, 2020). Through legitimacy theory, Abass et al. (2022), Gerged et al. (2024), and Nwaiwu and Okuwa (2025) explained that corporate environmental accounting and disclosure present firms with the opportunity to influence societal perceptions about their image. The legitimacy theory has been criticized due to its overdependence on organisational legitimacy.

III. Method

Ex-post facto research design was adopted for the study. Study population consist of 94 non-financial firms listed on the main and premium boards of the Nigerian Exchange Limited (NGX). A sample of 52 most polluting firms were selected using a purposive sampling technique. They are considered representative sample since they have higher environmental risk and responsibilities due to environmental implications of their business. Methodology adopted by Akinlabi (2025) was applied to select these firms based on the year 2020 Toxic Release Inventory (TRI) of the Environmental Protection Agency of the United States. The NGX grouped relevant firms into five sectors; consumer goods (20), healthcare (7); industrial goods (13), natural resources (4), and oil and gas (8). Ten (10) firms were excluded for incomplete dataset. Secondary data covered the period when IFRS was fully adopted by listed firms in Nigeria in 2012 to 2022 were obtained for the study. The Global Reporting Initiative (GRI) index and Standardized Scoring Scale for Qualitative Characteristics of Environmental Disclosure adapted from Soyemi et al. (2019) and Akinlabi (2025) to measure environmental disclosure quantity and quality respectively (See *Appendix 1 & 2*).

Method of Data Analysis

Combination of descriptive statistics and correlation analysis were used to test the degree of association between the quantity and quality of environmental disclosure of sampled firms. Other researchers (Eljayash et al., 2012; and Rezaee et al., 2019) have adopted similar method to investigate the relationship between quantity and quality of environmental disclosures

IV. Results and Discussion

This section discussed results obtained from data analysed to assess the association between the quality and quantity of environmental disclosure of listed non-financial firms. The descriptive statistics and correlation results obtained for all sectors (overall) were further broken down and discussed on sector-by-sector basis.

Figure 1 and *2* compared average Quantity of Environmental Disclosure (QED) and Environmental Disclosure Quality (EDQ) by sampled non-financial firms in Nigeria by year and sector respectively. *Figure 1* shows that the level of QED and EDQ improved at progressively throughout the study period but the between the duos slightly reduced but remains wide. The average quality is lower than average quantity of environmental disclosure of sampled firms.

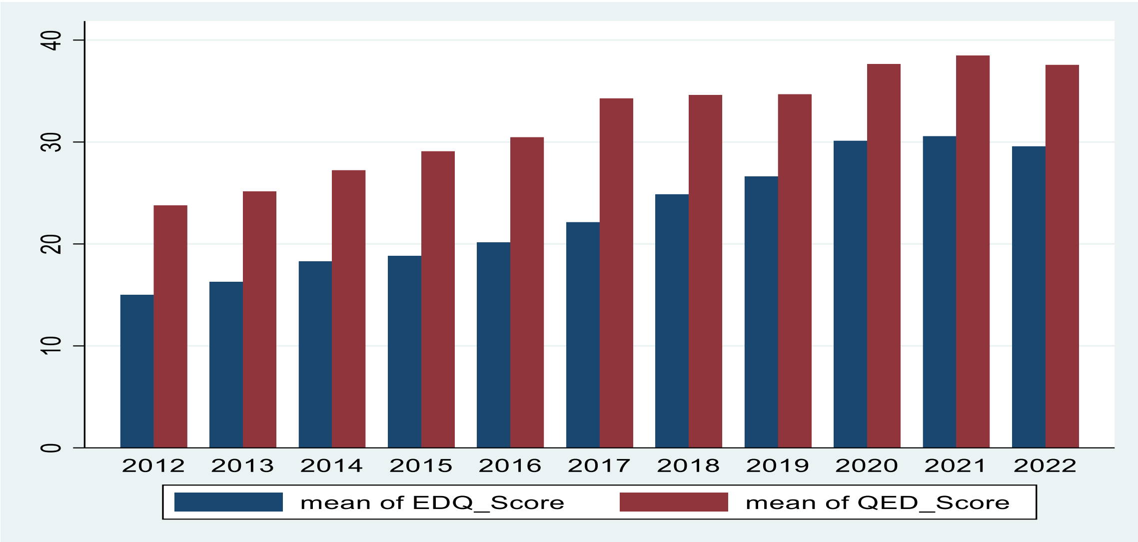

Figure 1: Trends and relationship between overall EDQ and QED Mean of Listed Non-Financial Firms in Nigeria by Year.

Source: Researcher's computation (2025).

In *Figure 2*, the compared average EDQ and QED of five non-financial sectors sampled for this study. Though increase in QED led to a corresponding increase in EDQ, the rate of increase are not uniform across five sampled sectors. The widest margin between the level of QED and EDQ was observed in the consumer goods sector bars, implying that increase in QED of the sector have least impact on the EDQ when compared with other sectors. While its average QED was about 35%, average EDQ stood at about 21% leaving a margin of about 14%. This is similar to the oil and gas sector bars. The average QED exceeds average EDQ by a margin of about 14% (36%-22%). This was followed by the Natural resources sector where the average QED exceed average EDQ by 8%; while average QED was about 16%, the average EDQ was about 8%. The margin between the average QED and EDQ bars for the Industrial goods sector was about 2% (39% - 37%). The best margin was observed from the healthcare sector bars. The average EDQ bar exceeds the QED bar slightly. This shows that the level of quality of environmental information disclosed by the healthcare sector are of a very high quality but below the average (50%).

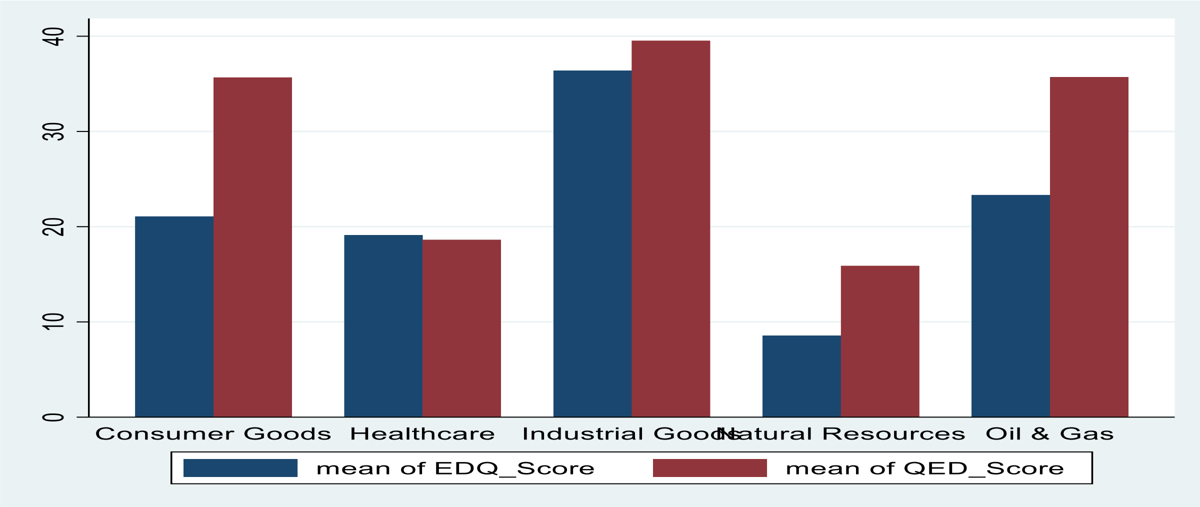

Figure 2: Bar Chart Showing Relationship between EDQ and QED Mean of Listed Non-Financial Firms in Nigeria by Sector.
Source: Researcher's computation (2025).

From *Table 1,* the correlation coefficients and *p-value*s obtained from the assessment of association between the environmental disclosure quality (EDQ) and quantity of environmental disclosure (QED) were presented. The *p-values* of the correlation coefficients obtained for the overall and individual sectors are less than 5% and statistically significant at 95% confidence interval. The correlation coefficient 0.7071 obtained for all sectors (overall) was positive and statistically significant, with a *p-value* of 0.00%. Likewise, the correlation coefficients obtained for five sectors examined by the study were positive, significant (with less than 5% *p-value*) and ranges from 0.4951 to 0.8333. The correlation coefficients for the consumer goods, healthcare, industrial goods, natural resources, and the oil and gas sectors were 0.8333, 0.8253, 0.6633, 0.5157, and 0.4951 respectively. The *p-value* for these individual sectors were 0.00% except the natural resources which has a *p-value* of 0.03% which is also significant.

Table 1: Correlation Between Environmental Disclosure Quality (EDQ) and Quantity of Environmental Disclosure (QED) of listed non-Financial Firms in Nigeria

Sector	Item	Value	Comment
All Sectors	Correlation Coefficient	0.7071	Very Strong positive
	P-value	0.000*	Significant
Industrial Goods	Correlation Coefficient	0.8333	Very Strong positive
	P-value	0.000*	Significant
Healthcare	Correlation Coefficient	0.8253	Very Strong positive
	P-value	0.000*	Significant
Consumer Goods	Correlation Coefficient	0.6633	Strong positive
	P-value	0.000*	Significant
Natural Resources	Correlation Coefficient	0.5157	Moderate positive
	P-value	0.0003*	Significant
Oil & Gas	Correlation Coefficient	0.4951	Moderate positive
	P-value	0.000*	Significant

Source: Researcher's computation, 2025.
Where * indicates that the *p-value* of the correlation coefficient is statistically significant.

V. Discussion of Findings

Table 1 presents the correlation analysis results showing the association between quantity of environmental disclosure (QED) and environmental disclosure quality (EDQ). The p-values of the correlation coefficients obtained for overall and five sectors examined are less than 5% which is statistically significant at 95% confidence interval. From the overall and individual sectors results, a positive statistically significant association between the quantity and quality of environmental disclosure of listed non-financial firms in Nigeria. The QED have a statistically significant association with the EDQ of listed non-financial firms in Nigeria.

The overall (all sector) association between QED and EDQ of sampled non-financial firms have a correlation coefficient of 71% (see *table 1*). This implies that there is a very strong and positive relationship between the EDQ and QED of listed non-financial firms in Nigeria. This implies that for a unit increase in the level of QED of listed non-financial firms, there will be a corresponding increase of about 71% in their overall EDQ and *vice-vasa*. A significant and positive association implies that positive changes in the quantity of environmental information disclosure (QED) will lead to a significant positive change in the level of environmental disclosure quality (EDQ) by non-financial firms and *vice-vasa*. This shows that environmental disclosure quantity of listed the non-financial firms in Nigeria significantly address the impact of their operations on the natural environment but not perfectly. Since the strength of the association is not perfect (less than 1), increases in QED is disproportionate to increase in EDQ. Hence, the current level of association can still be improved upon.

However, the strength of the association between QED and EDQ are different but positive and significant across the five non-financial sectors examined by this research. The industrial goods sector has the strongest association between the QED and EDQ. The association between the QED and EDQ of the industrial goods and healthcare sectors were very strong with above 83% correlation coefficient (see *table 1*). More than 83% of the environmental information disclosed by these sectors during the study period effectively addressed their impacts on the natural environment. The quality of the environmental information disclosed by firms in the industrial goods sector meet the quality requirements used for this study but not perfectly. This suggests that future improvement in the quantity of environmental disclosure by firms in the sector significantly impacts the achievement of environmental sustainability objectives better than other sector. If the observed level of association is maintained, the sector will significantly aid the protection of the natural environment from further damages.

The level of association between the QED and EDQ of consumer goods sectors is strong with correlation coefficient of 66.33% while that of the natural resources and oil and gas sectors were moderate with correlation coefficients of 51.57% and 49.15% respectively. While increases in the quantity of environmental disclosure of consumer goods sector have strongly relationship with the quality of disclosure of their environmental disclosure, quantity of healthcare and oil and gas sectors moderate or average association with the quality of environmental disclosures. The correlation coefficient of QED and EDQ of the oil and gas sector is less than average. The consumer goods and oil and gas sectors, especially, are some of the most environmentally sensitive sectors which are expected to have high level of regard for the protection of natural environment. Contrary to expectation, their environmental disclosure is of low quality and averagely address the environmental impact of their products and activities despite engaging in environmentally sensitive businesses. This implies that these sectors (consumer goods, healthcare, and oil and gas sectors) have largely used increases in their environmental disclosure as more of a legitimacy tool than for the purpose of environmental sustainability.

These results are similar to some of the findings from other developing and developed nations which established statistically significant correlation between EDQ and QED of listed non-financial firms. This includes evidence from developing nations such as Arab countries (Eljayash *et al*., 2012) and Malaysia (Buniamin, 2010; Said *et al*., 2016). Evidence from New Zealand (Hooks *et al*. (2011) being a developed nations suggests that the correlation between the quantity and quality of environmental disclosure of listed firms is positive and statistically significant. However, findings from this study differ from Aburaya (2012) which found negative correlation between the quantity and quality of environmental disclosures of UK firms and submission of Helfaya *et al.* (2018) who found no relationship between the duos. This further affirmed Akinlabi (2025) and Said *et al.* (2016) who opined that the relationship between the quantity and quality of environmental disclosures of firm depends of individual nation's economic characteristics. This might have affected lack of consensus in the similarities and differences in study findings when compared with other countries.

VI. Conclusion

This study adopted ex-post facto research design and legitimacy theoretic backgrounds to assess the association between the quantity and quality of environmental disclosure of listed non-financial firms in Nigeria. Secondary data from samples selected using purposive sampling technique was analysed using descriptive statistics and correlation analysis. The study therefore concludes thus;

The quality and quantity of environmental disclosure of sampled sectors are below average, with industrial goods sector having the highest, followed by the consumer goods, oil and gas, healthcare and natural resources sectors, in that order;

There is a statistically significant positive correlation between the environmental disclosure quantity and quality of listed non-financial firms in Nigeria;

The quantity and quality of environmental disclosure have less than a proportionate association. The correlation coefficient of the association between quantity and quality of environmental disclosure of listed non-financial financial firms in Nigeria (overall and individual sector) is less than perfect (less than 1) leaving a wide room for improvements. While only the industrial goods and healthcare sectors have very strong association, the other three sectors have strong (consumer goods) and moderate association (and oil and gas sectors and natural resources sectors);

Findings of the study confirmed the assumptions of the legitimacy theory. The relationship between the quantity and quality of environmental disclosure of sampled sectors confirmed that sampled sectors engage in environmental disclosure as a mere legitimacy tool. The association between the quality and quantity of environmental disclosure of these sectors, especially the healthcare, industrial goods, and oil and gas sectors, are moderate. They engage in environmental disclosure practices that does not effectively address the environmental impact of their activities.

VII. Recommendation

The study therefore recommend that stakeholders should complement the call for improved quantity with demand for improved quality of environmental disclosure of listed non-financial firms in Nigeria. Since the correlation coefficient obtained for the overall and individual sector is less than 1, a call for quality should complement the demand for increase in the quantity of environmental information disclosure of non-financial firms in Nigeria.

Relevant government agencies should adopt and intensify the implementation of policies that will improve on the corporate disclosures that effectively address the environmental impact of the activities of firms. Implementation of additional environmental regulations and policies to improve environmental disclosure, especially in quality, of environmentally sensitive sectors such as consumer goods, natural resources and oil and gas sectors should be considered.

Early transition to obligatory environmental disclosure regime should be considered for the sectors with poor quality and quantity of disclosure consumer goods, oil and gas, natural resources and other relevant sectors. This will improve gains accruable from the adoption of International Sustainability Disclosure Standards recently introduces.

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Appendices

1. Quantity of Environmental Disclosure Index

A. General Standard Disclosure (14 items) (*maximum point* =25)

i. Vision and Strategy (6 items) (maximum point =11)

Index	No disclosure	Limited disclosure	Detailed disclosure
CEO statement addressing firm's strategy on environmental sustainability	0	1	2
Statement about firm's environmental policy, values and principles	0	1	
Statement about firm's environmental precautionary approach	0	1	2
Statement about firm's environmental risk, key impacts and performance to stakeholders	0	1	2
Review of environmental policy	0	1	
Statement about specific environmental innovations or new technologies	0	1	2

ii. Commitments (8 items) (maximum point =14)

Existence of any mechanism dealing with environmental related issues (department of pollution control/EMS)	0	1	2
Independent verification/assurance about environmental information disclosed	0	1	2
Existence of terms and conditions applicable to suppliers and/or customers regarding environmental practices	0	1	2
Involvement of a governing body in firm's environmental disclosure	0	1	2
Stakeholder's involvement in setting corporate environmental policies	0	1	2
Awareness programmes among employees	0	1	
Awareness programme among community members	0	1	
Awards received for environmental activities	0	1	2

B. Specific Standard Disclosure (33 items) (*maximum point* =55*)*

i. Materials and Energy (8 items) (maximum point =13)

Environmentally preferable materials used	0	1	2
Recycled input materials	0	1	
Energy consumption within the organisation	0	1	2
Energy consumption outside the organisation	0	1	2
Initiatives to reduce energy consumption	0	1	

Benefits derived such as product improvement, cost reduction, product development or import substitution	0	1	2
Energy saved	0	1	2
Statement about energy audit	0	1	

ii. Water and Biodiversity (6) (8)

Total water consumption by different sources	0	1	
Water source affected by withdrawal of water	0	1	
Water recycled and reused	0	1	
Impacts of business activities, products and services on biodiversity	0	1	2
Strategies, actions and plans for managing impacts on biodiversity	0	1	2
Measures taken to preserve biodiversity	0	1	

iii. Emissions (5) (9)

Greenhouse gas emissions	0	1	2
Other significant air emissions	0	1	2
Emission of ozone-depleting substances	0	1	2
Initiatives to reduce greenhouse gas emissions	0	1	
Reduction achieved	0	1	2

iv. Effluents and Wastes (6) (10)

Waste discharge and disposal method	0	1	2
Water biodiversity affected by discharge of waste	0	1	2
Reuse and recycling of wastage	0	1	
Total number and volume of spills	0	1	2
Impact of spills (oil, fuel, wastes, chemicals, and so on)	0	1	
Weight of transported, imported, exported or treated hazardous waste	0	1	2

v. Products and Services (3) (5)

Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation	0	1	
Percentage of products sold and their packaging materials that are reclaimed by category	0	1	2
Environmental impacts of transporting products and workforce members	0	1	2

vi. Environmental Spending (5) (10)

Capital investment on energy conservation equipment	0	1	2
Expenditure incurred on research and development	0	1	2
Total environmental expenditures and investment on other activities	0	1	2
Amount spent on fines related to environmental issues	0	1	2
Summary of Naira savings arising from environmental initiatives	0	1	2
Overall items = 47 and maximum possible score = 80			

Source: Soyemi, *et al.* (2019).

2. Standardized Scoring Scale for Qualitative Characteristics of Environmental Disclosure/Measurement of EDQ of firms

A.	**Relevance**		
	Question/Indices	**Operationalization**	**Concept**
1	Does the firm put in place environmental plan and objectives/goals?	1 = No disclosure 2 = plan or objective/goals mentioned 3 = Both mentioned 4 = Both highlighted/limited explanation 5 = Explained in details	Relevance
2	Is the firm aware of their environmental risks and opportunities?	1 = Not disclosure 2 = Risk or opportunity mentioned 3 = Both mentioned 4 = Both highlighted/limited explanation 5 = Explained in details	Relevance
3	To what extent has the firm engage stakeholders in their environmental activities?	1 = No disclosure 2 = engaged once 3 = 1-2 times 4 = 3-4 times 5 = > 4 times.	Relevance
4	To what extent has the community supported the environmental behavior and initiatives of the firm?	1 = No disclosure 2 = General disclosure 3 = Specific supports (non-financial) 4 = Financial support 5 = Comprehensive (financial & non-financial support)	Relevance
5	To what extent is the firm prepared to prevent environmental damages and/or their remediation?	1 = No disclosure 2= general statement 3 = Existence of board committee or prevention team/dept. 4 = Existence of both	Relevance
6	To what extent is the firm committed to prompt response to environmental emergencies?	1 = No disclosure 2 = General statement 3= Existence of emergency response team/dept. 4 = Explanation on response process with evidences	Relevance
7	Are there initiatives to reduce future negative impacts on the environment?	1 = No disclosure 2 = R&D on environmental friendly product/process or investment in environmentally friendly methods 3 = Both	Relevance & accountability

8	To what extent did the firm account for use of resources; water	1 = No disclosure 2 = Disclosure of usage, saved and recycled 3 = Any two of the above 4= All	Relevance & accountability
9	To what extent did the firm account for use of resources; energy	1 = No disclosure 2 = Disclosure of usage, saved and recycled 3 = Any two of the above 4= All	Relevance & accountability
10	To what extent did the firm account for use of resources; land	1 = No disclosure 2 = Disclosure of usage, saved and recycled 3 = Any two of the above 4= All	Relevance & accountability
11	To what extent did the firm account for use of resources; solid wastes	1 = No disclosure 2 = Disclosure of usage, saved and recycled 3 = Any two of the above 4= All	Relevance & accountability
12	To what extent did the firm account for Greenhouse gas emission?	2 = No disclosure 2 = Disclosure of usage, saved and recycled 3 = Any two of the above 4= All	Relevance & accountability
B.	**Faithful Representation/Reliability**		
1	To what degree does the firm justify policies, assumptions and estimates adopted for environmental reporting?	1 = Only described estimations 2 = General explanation 3 = Specific explanation of estimations 4 = Specific explanation, formulas explained, and so on 5 = Comprehensive argumentation	Verifiability
2	Did the firm environmental report highlight sanctions and awards received on their environmental performance?	1 = Not disclosure 2 = sanctions or awards mentioned 3 = Both mentioned 4 = Explained why and consequences of either 5 = Detailed explanation of both (financial inclusive)	Neutrality
3	To what extent did the environmental report of the firm highlights their positive and negative impact on the environment?	1 = Negative events only mentioned in footnotes 2 = Emphasize on positive events 3 = Emphasize on positive events, but negative events are mentioned; no negative events occurred 4 = Balance pos/neg events 5 = Impact of pos/neg events is also explained	Neutrality
4	Are the environmental programs and activities of the firm certified by relevant agency, regulator or supported by pressure groups?	1 = Not disclosure 2 = Approval by relevant agency/regulator or support by pressure group mentioned 3 = Both mentioned 4 = Explained why and consequences of either 5 = Detailed explanation of both	Free from material error, verification, neutrality & completeness
5	Are the process and product of the firm certified as environmentally safe by relevant agency, group or body?	1 = Not disclosure 2 = product or process certified Nationally 3 = Both certified Nationally 4 = Either certified by internationally recorgnised body 5 = Both certified by internationally recorgnised body	Completeness, verifiability & fairness
6	To what extent does those charged with the firm governance support quality environmental disclosure?	1 = No mention of environmental performance in CEO/ chairman address 2 = Mention in either 3= Mention in both 4 = Extra attention paid to information on the environment 5 = Comprehensive description of environmental performance	Completeness, verifiability & free from material error
7	To what extent does the firm governance structure recognize need for environmental protection?	1 = No recognition 2 = General recognition 3 = Existence of board position for environmental expert or committee 4 = Existence of both 5 = Management remuneration tied to environmental performance 6 = All (board expert, committee & remuneration tied to environmental performance)	Completeness, verifiability & free from material error
8	Was the firm environmental reports audited for the reporting period?	1= No audit 2 = internal audit 3 = Audited based on local/industry standard 4 = audited based on international standards	Completeness, verifiability & free from material error
C.	**Understandability**		
1	To what extent is the environmental information of the firm presented in an organised manner?	1 = No separate section/lumped with other information 2 = Separate section with complete table of contents 3 = in addition to two, headings 4 = In addition to 2 & 3, order of components 5 = In addition to 2-4, summary/ conclusion at the end of each subsection	Understandability
2	To what degree are the notes to financial statements clearly explain the effect of the firm's products and activities on the environmental?	1 = No explanation 2 = Very short description, difficult to understand 3 = Explanation that describes what happens 4 = Terms are explained (which assumptions and so on) 5 = Everything that might be difficult to understand is explained	Understandability
3	To what extent does the firm use pictures, graphs, tables and figures to present environmental information?	1 = No picture, graph, table or figure 2 = 1-2, 3 = 3-5, 4 = 6-10, 5 = > 10.	Understandability
4	To what extent is the use of language and jargons in environmental reports easy to understand.	1 = Much jargon (industry), not explained 2 = Much jargon, minimal explanation 3 = Jargon is explained in text/ glossary 4 = Not much jargon, or well explained 5 = No jargon, or extraordinary explanation	Understandability
5	What is the size of the pages dedicated to environmental information disclosure?	1 = No glossary 2 = 0 - 1 page 3 = 2-3 pages 4 = 4-5 pages = > 5 pages	Understandability

D.	**Comparability**		
1	Is disclosure guidelines adopted for report preparation?	1 = Not adopted 2 = Industry guidelines 3 = national/local guidelines 4 = Internationally recognized guidelines 5 = Full adoption/compliance with the international reporting guidelines	Consistency
2	Is the current year disclosure compared with the previous years for disclosure themes?	1 = Not compared; Revision without notes 2 = Limited comparison; Revision with few notes 3 = Revision with clear notes 4 = Clear notes and implications (past) 5 = Comprehensive notes	Consistency
3	To what extent did the firm current year reporting format differ from the previous year?	1 = No difference 2 = difference mentioned 3 = difference highlighted 4 = difference described = difference supported with evidence/specific areas explained	Consistency
4	To what extent is current year environmental performance compared with planned or budgeted performance?	1 = No comparison 2 = Only budget 3 = With plan (short term) 4 = with plan (long term) 5 = with plan, budget and implications explained	Consistency
5	To what extent did the firm's environmental disclosure comparable to disclosure by other firms?	1 = No comparison 2= Environmental policies compared 3 = Environmental policies and reporting format 4 = statement indicating policies, reporting format and explanations on what other firms are doing	Comparability
6	To what extent does the firm use financial information in the environmental report?	1 = No figures 2 = 1-2 figures 3 = 3-5 figures 4 = 6-10 figures 5 = > 10 figures	Comparability
7	To what extent did the firm highlight changes in environmental disclosure?	1 = No changes highlighted 2= Changes not explained 3 = Minimum explanation 4 = Explained why 5 = Explained why and consequences	Comparability
E.	**Timeliness**		
1	How many days did it take for the auditor to sign the auditors' report after book year end?	Natural logarithm of number of days 1 = 1 - 1.99 2 = 2 - 2.99 3 = 3 - 3.99 4 = 4 - 4.99 5 = 5 - 5.99	Timeliness
2	Does the firm issue a separate environmental or sustainability report for the period under review?	1 = No separate report issued 2= Separate report issued	Timeliness

Source: Akinlabi (2025).